

Inflation in emerging market and developing economies since the mid-2000s has, on average, been low and stable. This chapter investigates whether these recent gains in inflation performance are sustainable as global financial conditions normalize. The findings are as follows: first, despite the overall stability, sizable heterogeneity in inflation performance and in variability of longer-term inflation expectations remains among emerging markets. Second, changes in longer-term inflation expectations are the main determinant of inflation, while external conditions play a more limited role, suggesting that domestic, not global, factors are the main contributor to the recent gains in inflation performance. Third, further improvements in the extent of anchoring of inflation expectations can significantly improve economic resilience to adverse external shocks in emerging markets. Anchoring reduces inflation persistence and limits the pass-through of currency depreciations to domestic prices, allowing monetary policy to focus more on smoothing fluctuations in output.

Introduction

Inflation in emerging market and developing economies (hereafter, emerging markets) has, on average, been remarkably low and stable in recent years (Figure 3.1).¹ Following large commodity price swings, inflation in most emerging markets has been quick to stabilize, and the short-lived effects of inflationary shocks have, in turn, allowed central banks in these countries to cut interest rates to fight off recessions.

As monetary policy gradually normalizes in advanced economies, the ability of emerging markets to fend off inflationary pressures is being tested

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¹The analysis of this chapter is largely based on 19 emerging markets: Argentina, Brazil, Bulgaria, Chile, China, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, and Turkey. For details on the sample selection, see Online Annex 3.1. All annexes are available online at www.imf.org/en/Publications/WEO.

again.² This chapter examines whether the recent gains in inflation performance—quick stabilization after inflationary shocks—are sustainable, or represent an artifact of (potentially temporary) global factors that have put downward pressure on inflation. The answer is crucial as emerging markets craft their monetary policies to navigate the future shift in global financial conditions.

Proponents on both sides of the question can find evidence for their positions (Figure 3.2). The optimists can point to substantial supportive changes in institutional and policy frameworks (Rogoff 2004; Chapter 4 of the September 2005 *World Economic Outlook* [WEO]; Végh and Vuletin 2014; Chapter 2 of the April 2016 WEO). For example, after the Asian crisis of the late 1990s, which illustrated anew some limitations of pegged exchange rate regimes, central banks in many emerging markets adopted inflation targeting. Furthermore, as noted, their price stability endured despite sharp swings in commodity prices, the global financial crisis, and periods of strong and sustained US dollar appreciation. The policy changes, combined with real-world success, indicate that the gains in inflation performance are well rooted.

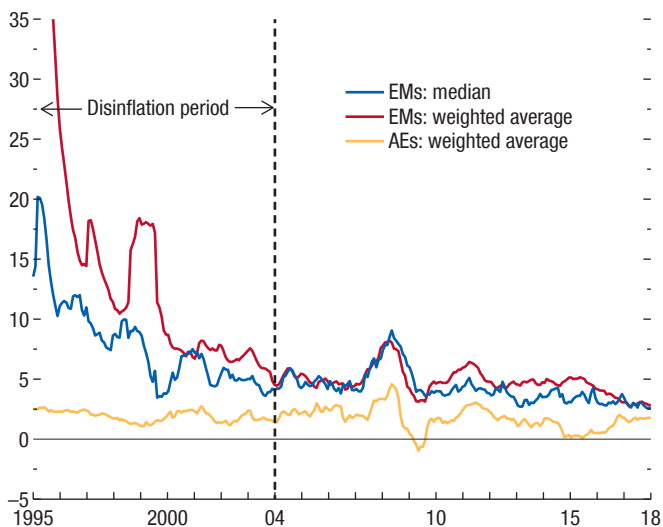
Pessimists can argue that China's integration into world trade and the broader globalization of commerce created a disinflationary environment benefiting emerging markets (Carney 2017; Auer, Levchenko, and Sauré forthcoming; Chapter 2 of the May 2018 *Regional Economic Outlook: Asia and Pacific*). They may further note that the period following the global financial crisis was characterized by historically benign external financial conditions—manifested in low US government bond yields and compressed spreads in emerging markets—that limited the number of crisis events and accompanying inflation surges in emerging markets (Chapter 2 of the April 2016 WEO).

To shed more light on these issues, this chapter first examines the above competing claims: Was the

²As advanced economies endeavor to raise interest rates from abnormal lows, currencies in emerging markets will tend to depreciate as global portfolio investments react to diminished yield differentials. The depreciation will be passed on to domestic prices.

Figure 3.1. Headline Consumer Price Index Inflation (Percent)

Following a period of disinflation during the 1990s and early 2000s, inflation in emerging markets has remained low and stable since the mid-2000s.



Sources: Haver Analytics; and IMF staff calculations.
 Note: AEs = advanced economies; EMs = emerging markets. See Online Annex 3.1 for data sources and country coverage. Weighted average is constructed using weights of nominal GDP, expressed in US dollar terms, for 2010–12. The vertical dashed line distinguishes the disinflation period from the rest of the sample.

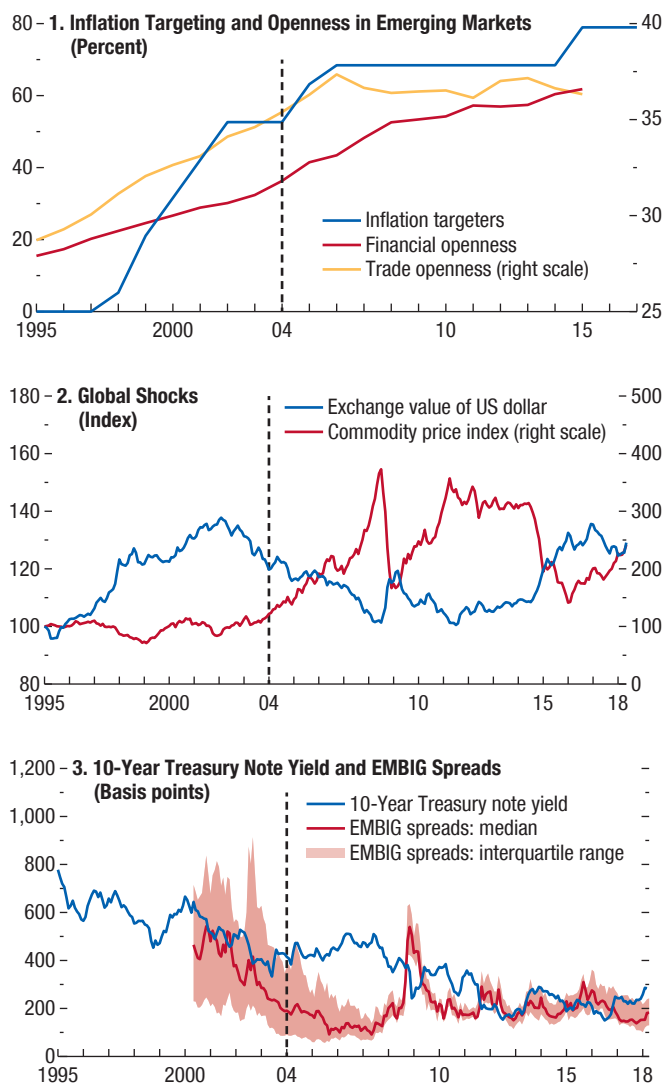
recent benign inflation behavior widespread among emerging markets? What was driving inflation during this episode? And have the gains in inflation been well rooted through better domestic policies, or can they be expected to wane as global conditions shift?

Analysis of these initial questions finds that, first, the improved inflation performance since the mid-2000s was indeed broad based. However, the gains have not been uniform, as some emerging markets continue to find it challenging to keep inflation low. Second, it concludes that longer-term inflation expectations have been the main factor determining inflation, compared with the considerably smaller role of external conditions. This finding suggests that domestic, not global, factors were the main contributor to the recent gains in inflation performance.³

³Chapter 3 of the April 2006 WEO draws similar conclusions from an analysis of the role of global factors in the disinflation episode of the 1990s and early 2000s. Focusing on advanced economies, Ihrig and others (2010) find little support for an increasing role of global factors in the inflation process, although others (see Borio and Filardo 2007) argue that the role of global factors has increased since the 1990s.

Figure 3.2. Institutional and Policy Changes, Global Shocks, and Financial Conditions

The decline and subsequent stability of inflation in emerging markets coincided with substantial improvements in institutional and policy frameworks and endured despite sharp swings in commodity prices and other large global shocks. Yet, the period was also characterized by historically benign external financial conditions.



Sources: Haver Analytics; JPMorgan Emerging Market Bond Index; Lane and Milesi-Ferretti (2018); and IMF staff calculations.
 Note: EMBIG = emerging market bond index global. See Online Annex 3.1 for data sources and country coverage. Inflation targeters are expressed as percent of countries in the sample. Trade openness is defined as imports in percent of GDP (five-year moving average). Financial openness is defined as the sum of foreign direct investment and portfolio equity liabilities in percent of GDP (five-year moving average). Exchange value of US dollar is the nominal broad trade-weighted exchange value of the US dollar (Jan-95=100). The commodity price index is based on prices in US dollars of a broad set of commodities (Jan-95=100). EMBIG spreads are spreads between sovereign bonds in emerging markets and comparable US Treasury bonds. The vertical dashed line distinguishes the disinflation period from the rest of the sample.

Given the importance of changes in inflation expectations in driving inflation in emerging markets, the second part of the chapter zooms in on the behavior of inflation expectations. It measures and summarizes the extent of anchoring of longer-term inflation expectations in emerging markets and studies its implications for inflation performance and the conduct of monetary policy. More specifically, the chapter addresses the following questions:

- How has the extent of anchoring of inflation expectations evolved in recent decades? How much heterogeneity in the extent of anchoring is there among emerging markets, and how does it compare with conditions in advanced economies?
- What are the implications of the extent of anchoring of inflation expectations for monetary policy cyclicality and macroeconomic resilience when facing adverse external shocks?

In examining those questions, the chapter reaches the following conclusions:

- The anchoring of inflation expectations has improved significantly over the past two decades, with the bulk of the gains taking place in the 2000s. Nonetheless, there is considerable heterogeneity in the extent of anchoring across emerging markets, as longer-term inflation expectations in several countries remain relatively volatile.
- Better-anchored inflation expectations reduce inflation persistence and limit the pass-through of currency depreciations to domestic prices. Such stability allows monetary policy to focus more on smoothing output fluctuations and improving resilience to adverse external shocks.

The chapter concludes that, amid monetary policy normalization in advanced economies, it is important for policymakers in emerging markets to consolidate and, in some cases, further improve the extent of anchoring of inflation expectations. How can the volatility of domestic inflation expectations be reduced? The empirical findings from the literature, confirmed by the evidence reported in this chapter, link the extent of anchoring to the performance of domestic fiscal and monetary policy frameworks. Fiscal sustainability is a necessary precondition for a credible nominal anchor. Similarly, a reduction in the variability of longer-term inflation expectations cannot be achieved without a credible and independent central bank that communicates its intentions in a transparent and timely manner. These recommenda-

tions remain relevant also for emerging markets with better-anchored expectations, as their commitment to inflation targets will likely be tested by the gradual monetary policy normalization in advanced economies.

Extent of Improvements in Inflation Outcomes

How broad based are the gains in inflation performance? To answer this question, this section first examines headline consumer price inflation statistics, which are available for a comprehensive set of 90 emerging market and developing economies, and then zooms in on a sample of 19 emerging markets for which more detailed inflation data are available.⁴ Box 3.1 shows that the 19 sample countries, which constitute 80 percent of the GDP of all emerging market and developing economies, are broadly representative in terms of inflation trends of the comprehensive set of emerging market and developing economies.⁵

Headline consumer prices in the wider group of emerging market and developing economies, split into three broad geographical areas—Asia, Latin America, and the combination of Europe, the Middle East, and Africa—all exhibit the same pattern of convergence to lower inflation rates (Figure 3.3, panel 1). The sizable and persistent differences in inflation rates among these regions during the 1990s and early 2000s were gone by the mid-2000s. In addition, the dispersion of inflation rates across emerging market and developing economies—as measured by the distance between the 10th and 90th percentiles of the distribution—had declined substantially by the mid-2000s and has remained relatively stable since then.

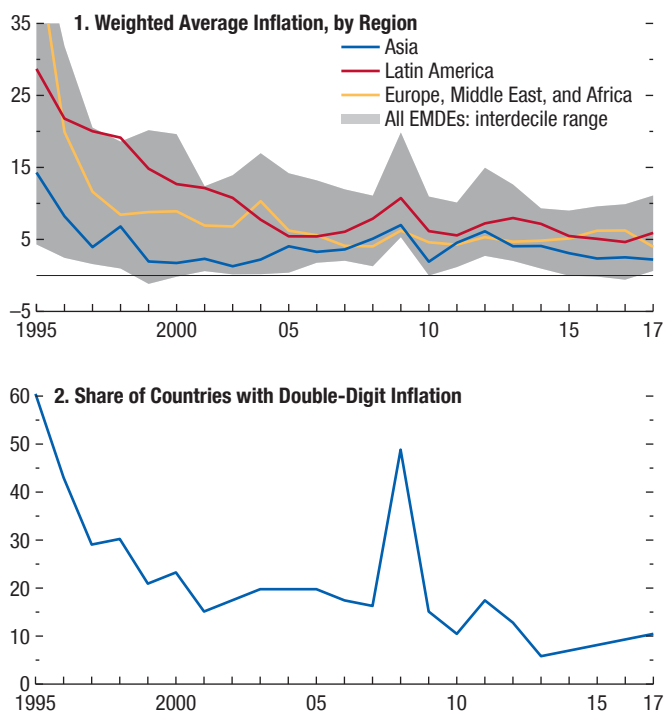
The share of emerging market and developing economies with inflation rates exceeding 10 percent declined

⁴Country coverage, data sources, and definitions of variables are reported in Online Annex 3.1.

⁵The sample includes relatively large emerging markets but, with regard to other basic macroeconomic characteristics (income per capita, GDP growth rates, the level of financial development, and trade openness), the sample economies are comparable to the rest of emerging market and developing economies. One notable difference is that the median degree of exchange rate flexibility among the sample economies is larger than among all emerging market and developing economies. The more limited exchange rate flexibility in the broader set of emerging market and developing economies can affect inflation through channels that are less prevalent in the sample economies (see Box 3.1). However, the broader concept of inflation expectations anchoring—as studied in this chapter—is equally relevant in flexible, managed, or fixed exchange rate regimes. See Adrian, Laxton, and Obstfeld (2018) for a discussion of the challenges in managing inflation expectations under different monetary regimes.

Figure 3.3. Regional Differences and Dispersion in Headline Consumer Price Index Inflation in Emerging Market and Developing Economies
(Percent)

The gains in inflation performance among emerging market and developing economies were broad based. But 15 percent of these economies still registered double-digit inflation rates over 2004–18.



Source: IMF staff calculations.
Note: EMDEs = emerging market and developing economies. See Online Annex 3.1 for data sources and country coverage.

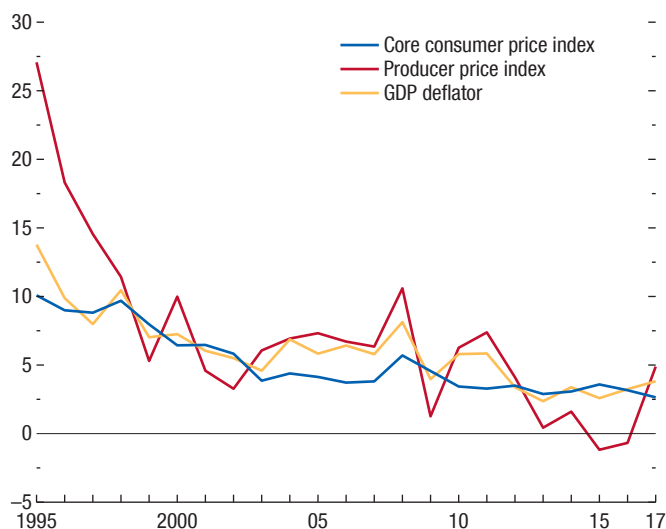
dramatically from the mid-1990s until the early 2000s and stayed relatively stable thereafter (Figure 3.3, panel 2). Nonetheless, the gains in inflation behavior are not uniform—15 percent of emerging market and developing economies have had a headline inflation rate of 10 percent or more, on average, from 2004 to the first quarter of 2018. Several other economies exhibited sustained surges of inflation to double-digit rates.

Turning to other measures of price inflation, the inflation rate for so-called core consumer prices, which exclude food and energy items with more volatile prices, also declined until the mid-2000s and has remained low and stable since then (Figure 3.4).⁶ The

⁶For these more detailed inflation statistics, as well as the econometric analysis that follows, the chapter focuses on the narrower sample of 19 emerging markets, defined in Online Annex 3.1.

Figure 3.4. Other Measures of Price Inflation in Emerging Markets
(Percent)

Alternative price measures for emerging markets also indicate a sizable decline in inflation during the 1990s and early 2000s and relative price stability since the mid-2000s.



Source: IMF staff calculations.
Note: See Online Annex 3.1 for data sources and country coverage. Lines denote medians across sample emerging markets of each indicator.

inflation rate of producer prices fell drastically during the 1990s and has remained at relatively low levels ever since. Finally, the same pattern is exhibited by GDP deflators, which encompass the prices of all domestically produced final goods and services.

Inflation variability has been stable or declining in emerging markets since 2004 (Figure 3.5). The decline in the variability of inflation rates is not driven by exchange rate behavior, as there is no clear evidence of a decline in the variability of exchange rate movements since the late 1990s.⁷ Inflation persistence also declined gradually during the sample period.⁸ As with inflation rates—which are higher in emerging markets than in advanced economies—two factors suggest that emerging markets could be expected to exhibit a greater degree of inflation volatility and persistence. First, a higher share of consumption in emerging markets is devoted to food and other commodities, whose prices

⁷See Ilzetzki, Reinhart, and Rogoff (2017) for a discussion of changes in de facto exchange rate volatility.

⁸Inflation persistence is defined as the tendency for price shocks to elevate inflation above its long-term level for a prolonged period (see Online Annex 3.1 for details).

tend to be more volatile. And, especially regarding persistence, monetary policy institutions and frameworks in emerging markets could be less developed and thus less effective.⁹ So, it is a notable commentary on the progress made in strengthening monetary policy frameworks in emerging markets that, since 2004, the volatility of inflation for a large share (but not all) of the country sample has been comparable to that in advanced economies. The persistence of inflation has also been reduced, even though it remains somewhat above the level in advanced economies.

In sum, inflation performance in emerging markets has markedly improved since the mid-2000s. The improvement is not, however, uniform across the country sample, and inflation is still generally more volatile and persistent than in advanced economies.

Determinants of Inflation in Emerging Markets

What has been driving inflation in emerging markets during the period of stable and low inflation from 2004 to the first quarter of 2018? Among other inflation determinants, this section assesses the role played by two competing forces—external price pressures and changes in longer-term inflation expectations—and gauges the overall contributions from factors of global and domestic origin.¹⁰

The analysis decomposes inflation into contributions from conventional determinants of inflation—the degree of economic slack, inflation expectations, and external factors—and consists of two stages.¹¹ The first stage estimates a Phillips curve.¹² The specification includes domestic and foreign output gaps, three-year-ahead inflation forecasts, and a measure of external price developments as explanatory factors, and allows for inflation persistence and country fixed effects. The baseline specification is estimated for a panel of sample emerging

⁹See Mishkin (2007) for a discussion of how better monetary policy can contribute to a decline in inflation persistence.

¹⁰In line with the existing literature, longer-term inflation expectations are proxied by surveys covering professional forecasters. Some studies have documented significant differences between forecasts of households and firms and those of professional analysts (see, for instance, Mankiw, Reis, and Wolfers 2004); unfortunately, surveys covering households and firms are rarely available.

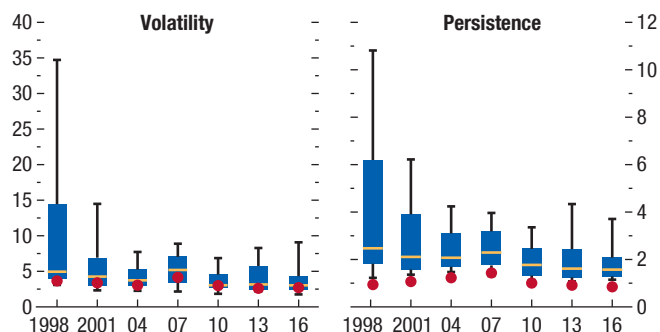
¹¹See Online Annexes 3.1 and 3.2 for details.

¹²Estimates are from a hybrid variant of a standard New Keynesian Phillips curve framework. See Galí and Gertler (1999) and Galí, Gertler, and Lopez-Salido (2001, 2003) for the theoretical underpinnings. To account for the role of global factors, the analysis follows Borio and Filardo (2007); Ihrig and others (2010); and Auer, Levchenko, and Sauré (forthcoming).

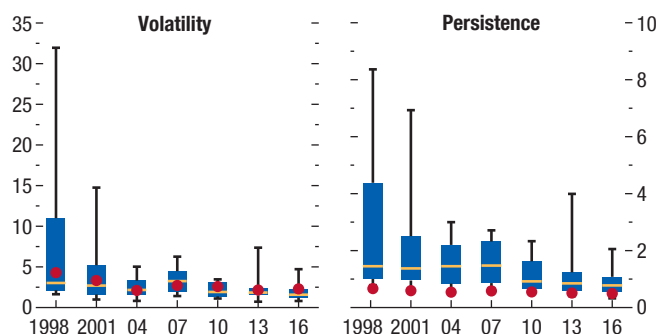
Figure 3.5. Inflation Dynamics
(Percent)

The variability and persistence of consumer price inflation has declined significantly in emerging markets, remaining relatively low since the mid-2000s.

1. Headline Consumer Price Index Inflation



2. Core Consumer Price Index Inflation



Source: IMF staff calculations.

Note: See Online Annex 3.1 for data sources and country coverage. The volatility is computed as the standard deviation of detrended (Hodrick-Prescott) inflation. Persistence denotes the standard deviation of the permanent component of inflation based on Stock and Watson (2007). The horizontal line in each box represents the median across countries; the upper and lower edges of each box show the top and bottom quartiles; and the vertical lines denote the range between the top and bottom deciles. The dots denote the average for advanced economies. X-axis labels indicate the start of three-year windows.

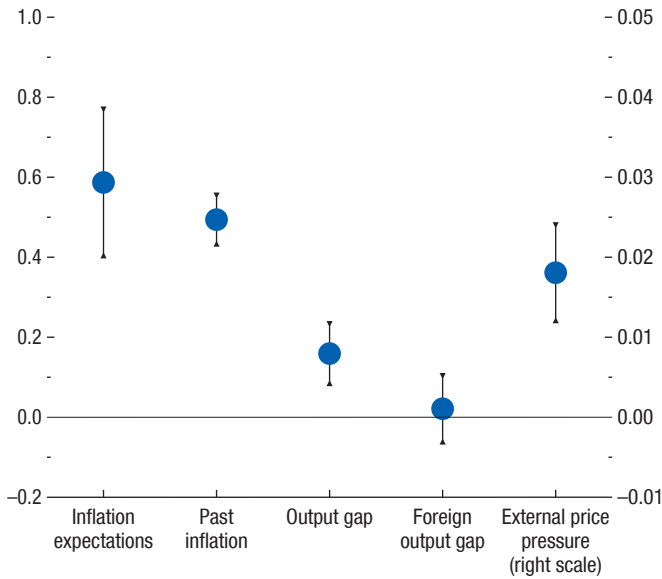
markets using core inflation and quarterly data from the first quarter of 2004 to the first quarter of 2018.¹³ Estimated parameters are broadly consistent with findings in the literature (Figure 3.6).

The second stage of the analysis explores the role of explanatory factors in determining actual inflation during 2004–18. The exercise is constructed in terms

¹³The chapter’s main findings are unchanged for specifications using headline consumer price inflation (Online Annex 3.2). The results are robust to excluding the period of the global financial crisis or focusing the analysis on the postcrisis period.

Figure 3.6. Coefficient Estimates from the Baseline Phillips Curve Specification
(Percentage points)

Inflation expectations, domestic output gaps, and external price pressure significantly influence consumer price inflation in emerging markets.



Source: IMF staff calculations.
Note: See Online Annex 3.1 for data sources and country coverage. The dots denote the estimated coefficient from a hybrid Phillips curve model (see Online Annex 3.2) and the vertical lines denote the 90 percent confidence interval.

of deviations in inflation from its target values.¹⁴ The contribution of each explanatory factor is computed in terms of (1) average contributions to inflation *levels*, and (2) contributions to inflation *variability* at quarterly frequency, in the spirit of a variance decomposition exercise.¹⁵

Contributions to Inflation

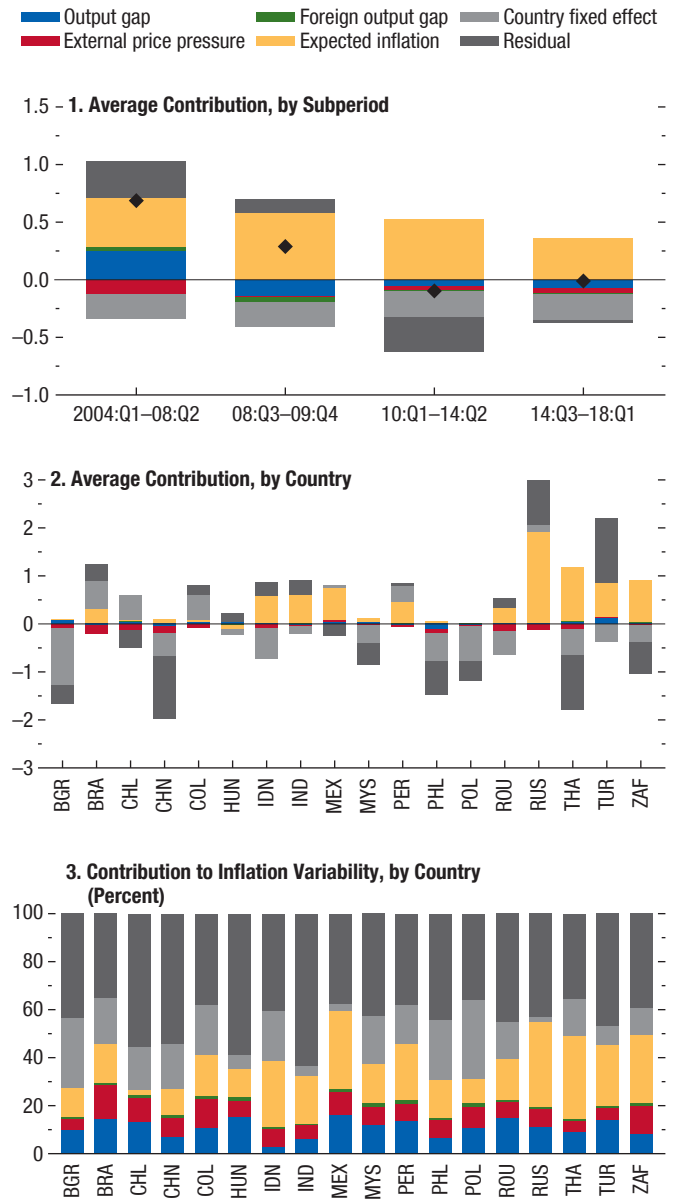
The results indicate that changes in longer-term inflation expectations have been the key driver of the *level* of inflation in emerging markets, with an overall positive contribution to inflation in each of the four indicative subperiods explored (Figure 3.7, panel 1). That is, inflation expectations for the sample

¹⁴When a country is not an inflation targeter, its implicit target is defined as the moving average of 10-year-ahead inflation expectations.

¹⁵The decomposition of inflation dynamics is conducted in a manner similar to that in Yellen (2015) and Chapter 3 of the October 2016 WEO, taking into account the estimated persistence of the inflation process. See Online Annex 3.2 for details.

Figure 3.7. Contributions to Deviation of Core Inflation from Target
(Percentage points, unless noted otherwise)

Changes in longer-term inflation expectations have been the key driver of the level and variability of inflation in emerging markets, although there is substantial cross-country heterogeneity.



Source: IMF staff calculations.
Note: See Online Annex 3.1 for data sources and country coverage. The bars in panel 1 (panel 2) represent the simple average contribution of each factor averaged across countries (periods). The diamonds in panel 1 represent the overall deviation in inflation. Bars for contributions to inflation variability in panel 3 show the simple average of the absolute values of country-specific contributions across periods, expressed as percent of the overall deviation of core inflation from target. Data labels use International Organization for Standardization (ISO) country codes.

emerging markets, on average, exceeded the inflation target.¹⁶ In comparison, external prices exerted a deflationary influence, but the magnitude of this effect (–0.05 percentage point annually, on average, over the sample period) was considerably smaller than that of longer-term inflation expectations (0.5 percentage point). The deflationary pressure from external prices was most pronounced during the boom that preceded the global financial crisis.

The overall deviation of inflation from the target declined gradually during 2004–14, by 0.7 percentage point.¹⁷ This trend is partly explained by output gaps (domestic and foreign), which stimulated inflation during the boom of 2004–07 and depressed it during the bust of 2008–09, and partly by the remaining residual.

Examining the same contributions at the country level reveals that, although changes in longer-term inflation expectations are the main overall contributor to the deviations of actual inflation from target, there is noticeable cross-country heterogeneity (Figure 3.7, panel 2). The average inflationary impact of expectations is sizable for only half of the economies in the sample. In contrast, external price developments have exerted downward pressure on domestic prices for three-fourths of the economies in the sample, even though the magnitude of this contribution is small. The impact of cyclical factors is, by construction, limited when averaged over 2004–18.

Analysis of contributions to the *variability* of inflation shows that the model, on average, explains 55 percent of the deviations of inflation from target (Figure 3.7, panel 3). The results confirm the importance of fluctuations in longer-term inflation expectations around the inflation target. Inflation expectations are the largest contributing explanatory factor for four-fifths of the sample countries, explaining, on average, 20 percent of the variation in inflation. Similar to the evidence in Figure 3.7, panel 2, there is substantial heterogeneity across countries, with the share attributable to inflation expectations ranging from 2 percent to 35 percent. The results also confirm that external price movements played a more limited role in the variability in inflation rates, on average explaining 8 percent of inflation deviations. The contribution of

the foreign output gap is negligible in all decomposition results.¹⁸

Role of Domestic and Global Factors

The remaining task for the analysis is to assess domestic and global contributions to inflation in emerging markets. The two capture an important distinction in that only domestic factors can be influenced by policies in emerging markets, making them potentially sustainable. In contrast, foreign factors, even when deflationary, are more temporary in nature and could dissipate or reverse.

To gauge the contribution of global factors to inflation deviations from target, the analysis reinterprets results from the baseline contributions exercise in panel 3 of Figure 3.7. Fluctuations in inflation expectations and domestic output gaps are considered domestic factors, whereas external price pressure and foreign output gaps are interpreted as global factors.^{19,20} Applying this definition of global factors, the contribution results for inflation variability suggest that inflation deviations from target during 2004–18 were largely determined by domestic factors, with foreign factors explaining 5–15 percent of inflation variability.

¹⁸The analysis in this section is subject to several limitations. First, the Phillips curve estimates can be affected by endogeneity issues, although the robustness exercises in Online Annex 3.2 suggest that the economic magnitude of the potential biases are relatively small. Second, the decomposition results are subject to sizable uncertainty given that 45 percent of the variability in inflation remains unexplained.

¹⁹The labeling of contributions as domestic and global factors warrants a cautionary note. On one hand, inflation expectations can be affected by both domestic and global factors, leading to an underestimation of the contribution of global factors. However, the baseline specification directly controls for foreign variables. Moreover, the results, when the inflation expectations variable is purged of external factors (by replacing it with the residual from a regression of inflation expectations on external price pressure, foreign output gap, and country and time fixed effects), are similar (Online Annex 3.2), indicating that inflation expectations are mostly driven by domestic factors. That said, foreign shocks that have an impact on the domestic output gap, but are not captured by changes in the foreign output gap and the external price pressure variable, can also lead to a downward bias in the estimated contribution of global factors. On the other hand, some of the fluctuations in the exchange rate embedded in the external price pressure variable can be due to domestic factors, potentially biasing the estimated contribution of foreign factors upward.

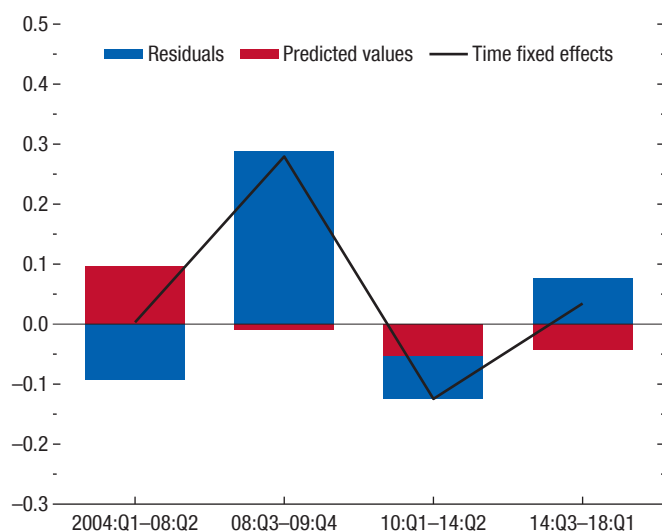
²⁰Online Annex 3.2 reports results from alternative model specifications that include a broader set of foreign factors (for example, global value chain participation, external price pressure from China). Also examined is an alternative decomposition exercise that decomposes inflation levels rather than deviations from target values. Baseline results concerning domestic versus global contributions are shown to be robust to all alternative specifications.

¹⁶This could reflect the public's doubts about the central bank's commitment to the inflation target, or concerns about fiscal sustainability, which may imply higher inflation in the future.

¹⁷This decline is consistent with the small downward trend in core consumer price inflation shown in Figure 3.4.

Figure 3.8. Time Fixed Effects and Common Drivers, by Subperiod
(Percentage points)

Apart from the commodity-induced inflation surge during 2008, common factors played a limited role as drivers of inflation dynamics in emerging markets over 2004–18.



Source: IMF staff calculations.

Note: See Online Annex 3.1 for data sources and country coverage. Time fixed effects are constructed as predicted values from the regression reported in column (1) of Online Annex Table 3.2.2. Residuals are from a regression of these time fixed effects on averages of other explanatory factors included in the same first-stage regression and a constant. Time fixed effects and predicted values are subsequently normalized such that time fixed effects in 2004–18 average to zero.

Could the decrease in the average decomposition residual during 2004–14 (Figure 3.7, panel 1) signify a common source of downward pressure on inflation? To address this question, the analysis estimates a common driver of inflation across emerging markets that cannot be explained by domestic factors.²¹ The approach is implemented by including time fixed effects in the model specification. Results show that the common component (that is, the time fixed effects) captures the commodity-induced inflation surge during 2008 but, for other sample subperiods, its contribution to inflation deviations from target is small in economic terms (the black line in Figure 3.8). Furthermore, the estimated time fixed effects correlate with domestic explanatory factors. Beyond these factors, the residual

²¹For details of this two-stage regression specification, see notes to Figure 3.8. See Chapter 3 of the October 2017 WEO for an earlier application of this approach.

provides a negligible average contribution to inflation during the post-global financial crisis period. These findings corroborate the earlier findings on the comparatively limited average impact of global factors in driving inflation in emerging markets.

Overall, the results of this section point to the centrality of fluctuations in longer-term inflation expectations in driving inflation in emerging countries, which are interpreted to be of domestic origin. Motivated by these findings, the rest of the chapter zooms in on the behavior of inflation expectations.

Anchoring of Inflation Expectations

How anchored are expectations in emerging markets? After discussing how to define and measure the degree of anchoring, this section documents the evolution of anchoring over time, the extent of its variation across the sample economies, and the influence of policy frameworks on the extent of anchoring.

Measuring Anchoring

The concept of anchored inflation expectations has no widely agreed-upon definition. The literature has, however, developed an operational or practical definition—it is a set of predictions about the behavior of inflation forecasts in economies where expectations are “anchored.” Under those circumstances, expectations for inflation over a sufficiently long horizon should be centered around the explicit or implicit target and hence not react to transitory fluctuations in actual inflation or in short-term inflation expectations (Demertzis, Marcellino, and Viegli 2012; Kumar and others 2015). In addition, if the monetary framework is credible and inflation expectations are well anchored, the dispersion (range of values) of individual longer-term inflation forecasts would tend to be low (Capistrán and Ramos-Francia 2010; Dovern, Fritsche, and Slacalek 2012; Ehrmann 2015; Kumar and others 2015).

Building on these operational characteristics, the analysis uses survey-based longer-term inflation forecasts from professional forecasters to construct four complementary metrics aimed at capturing the extent of anchoring of inflation expectations:²²

²²Detailed definitions for each measure are provided in Online Annex 3.3.

- A summary measure of absolute deviations in inflation forecasts from a target,
- A summary measure of the variability of inflation forecasts over time,
- The dispersion of inflation forecasts across individual forecasters, and
- The sensitivity of inflation forecasts to surprises about current inflation.

In each case, a lower reading represents better anchoring of inflation expectations. Of course, each measure has advantages and shortcomings, including in terms of data coverage. Nonetheless, these four measures convey a consistent picture for each country.²³

The Extent of Anchoring in Emerging Markets

These metrics suggest that inflation expectations have become increasingly anchored in emerging markets over the past two decades (Figure 3.9). The improvement in the extent of anchoring was particularly prominent in the early 2000s; subsequent gains have been more muted. Toward the end of the sample period, there is evidence that the extent of anchoring has worsened in a few countries. However, this recent trend is not consistent across the four anchoring metrics.

At the same time, the metrics point to substantial variation in the degree of anchoring across emerging markets (Figure 3.10). At the high end, the average level of anchoring over 2004–17 in some emerging markets was even higher than the average for a sample of 11 inflation-targeting advanced economies. But for the emerging markets in the bottom quartile (the least anchored), the average reading for each measure is between three and seven times larger than that for emerging markets in the top quartile.²⁴ On average, anchoring in emerging markets remains substantially weaker than in advanced economies.

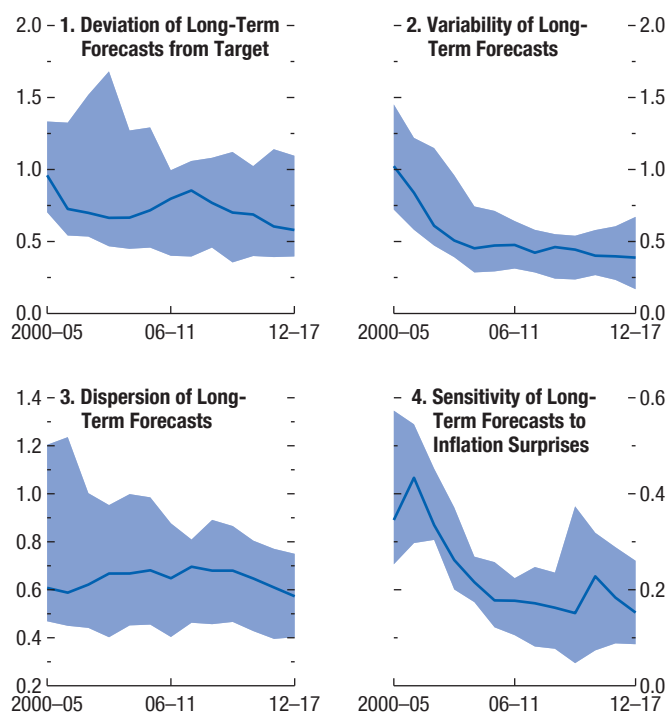
The heterogeneity in the extent of anchoring is reflected in the role of inflation expectations in determining deviations of inflation from targets (Figure 3.7, panels 1 and 2). If the sample economies are split into two even groups according to how well anchored expectations were during 2004–18, the contribution of

²³The rankings of economies, based on each metric of anchoring, correlate highly across measures, with the rank correlation between any two measures ranging from 0.56 to 0.87.

²⁴The metrics also reveal that the position of economies in the ranking for anchoring has changed little over time, indicating that the extent of anchoring changes slowly (Online Annex Figure 3.3.1).

Figure 3.9. Evolution of the Degree of Anchoring of Inflation Expectations, 2000–17
(Percent)

Inflation expectations in emerging markets have become increasingly anchored over the past two decades, with most of the gains taking place prior to the mid-2000s.



Source: IMF staff calculations.

Note: See Online Annex 3.1 for data sources and country coverage. The figure shows the evolution of the degree of anchoring of inflation expectations over six-year rolling windows. The lines denote the median across countries. The shaded areas denote interquartile ranges. The measures on the degree of anchoring of inflation expectations are defined in Online Annex 3.3. In all panels, lower values denote more-anchored inflation expectations.

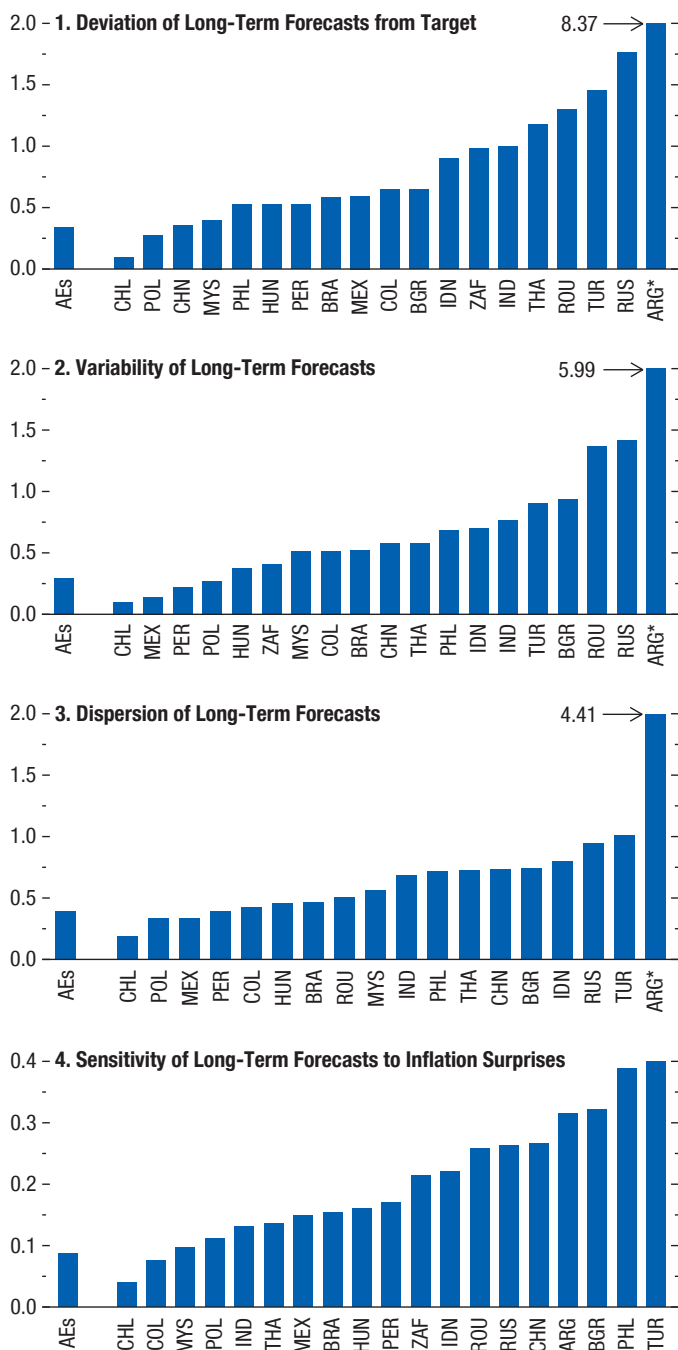
changes in longer-term inflation expectations to actual inflation is substantially larger for the economies with less-anchored inflation expectations (by 0.4 percentage point annually on average) than for those with more-anchored inflation expectations.²⁵ The contribution of other factors to actual inflation is broadly similar across the less- and more-anchored groups.

In sum, the extent of anchoring of inflation expectations in emerging markets has improved significantly over the past few decades, but sizable differences

²⁵Similarly, changes in longer-term inflation expectations account for a relatively low fraction of inflation variability in those economies with better-anchored expectations, such as Chile and Poland (Figure 3.7, panel 3).

Figure 3.10. Cross-Country Heterogeneity in Degree of Anchoring of Inflation Expectations, 2004–17
(Percent)

The extent of anchoring of inflation expectations varies markedly across emerging markets and remains substantially weaker than in advanced economies on average.



Source: IMF staff calculations.

Note: AEs = average of 11 advanced inflation targeting economies. See Online Annex 3.1 for data sources and country coverage. The figures show the average value for each anchoring measure over 2004–17. Values marked with (*) have been truncated at 2. The measures on the degree of anchoring of inflation expectations are defined in Online Annex 3.3. In all panels, lower values denote more-anchored inflation expectations. Data labels use International Organization for Standardization (ISO) country codes.

remain across emerging markets and relative to advanced economies.

Anchoring and Policy Frameworks

What explains the improvements in the anchoring of longer-term inflation expectations across emerging markets, as well as the still-sizable cross-country differences? A comprehensive study is beyond the scope of this chapter, but an exploration of the data confirms findings from the literature regarding the important role of sound monetary and fiscal frameworks in determining inflation expectations.

The literature suggests that the extent of anchoring is intimately related to the credibility of the monetary strategy (Cukierman and Meltzer 1986; King 1995).²⁶ A monetary policy plan will be credible if the public believes the monetary authority does not have incentives to deviate from that plan or does not need to subordinate it to other considerations, such as restoring fiscal solvency. The formation of inflation expectations thus lies at the heart of any concept of credibility. Central banks may use monetary policy to pursue multiple goals, but the credibility of the policy is typically interpreted in terms of inflation performance.

Several studies have found that adopting an inflation target and transparent public communication of monetary policy helps anchor inflation expectations in emerging and advanced economies alike.²⁷ The data analyzed here confirm the importance of inflation targeting and transparency in the sample of emerging markets covered in this chapter (Figure 3.11,

²⁶Cukierman and Meltzer (1986) argue that the ability of the monetary authority to achieve its future objectives depends on the inflation expectations of the public, which in turn depend on the public's evaluation of the credibility of the monetary authority.

²⁷Gürkaynak, Levin, and Swanson (2010) analyze the behavior of long-term forward rates on nominal and inflation-indexed bonds in Sweden, the United Kingdom, and the United States, and conclude that announcing an explicit inflation target helps anchor long-term inflation expectations. Levin, Natalucci, and Piger (2004) reach a similar conclusion for a broader sample of advanced economies. Capistrán and Ramos-Francia (2010) find that the dispersion of inflation forecasts in emerging markets tended to fall after adopting an inflation target, while Brito, Carrière-Swallow, and Gruss (2018) argue that the reduction in disagreement among forecasts that follows the adoption of inflation targeting is largely due to increased central bank transparency. Chapter 3 of the May 2018 *Regional Economic Outlook: Western Hemisphere* finds that stronger transparency frameworks and communication strategies are associated with more-anchored inflation expectations.

panel 1).²⁸ The cross-country variation in the degree of anchoring is related to both the maturity of an inflation targeting regime—more precisely, to the age of the regime—and to the transparency of central bank policy (as measured by Dincer and Eichengreen 2014). More broadly, central bank communication plays a key role in anchoring expectations by improving the predictability of monetary policy (Box 3.2).²⁹

Regardless of the specific design of the monetary framework, sound and sustainable fiscal policy is essential for the credibility of monetary policy (see, for instance, Masson, Savastano, and Sharma 1997; Mishkin 2000; and Mishkin and Savastano 2001).³⁰ If public debt is perceived to be unsustainable, higher inflation will be expected. The mechanism for the expected price acceleration is the expectation of “fiscal dominance”—an eventual monetization of the debt or large devaluations of the currency. Some studies have indeed found an association between fiscal institutions and credibility on one hand and inflation performance and the anchoring of inflation expectations on the other (Combes and others 2017; Caldas Montes and Acar 2018) or a link between expected fiscal performance and inflation expectations (Celasun, Gelos, and Prati 2004). In line with these studies, the cross-country variation in the degree of anchoring in the sample covered in this chapter is positively related to the market perception about the sustainability of public debt (Figure 3.11, panel 2).³¹

Implications of Anchoring for Monetary Policy

Longer-term inflation expectations are a key driver of inflation in emerging markets, and the economies vary in the degree to which the expectations are anchored. When longer-term expectations are not well anchored,

²⁸The analysis on Figure 3.11 is based on the variability of inflation forecasts, but a similar picture emerges when any of the other three anchoring metrics is used.

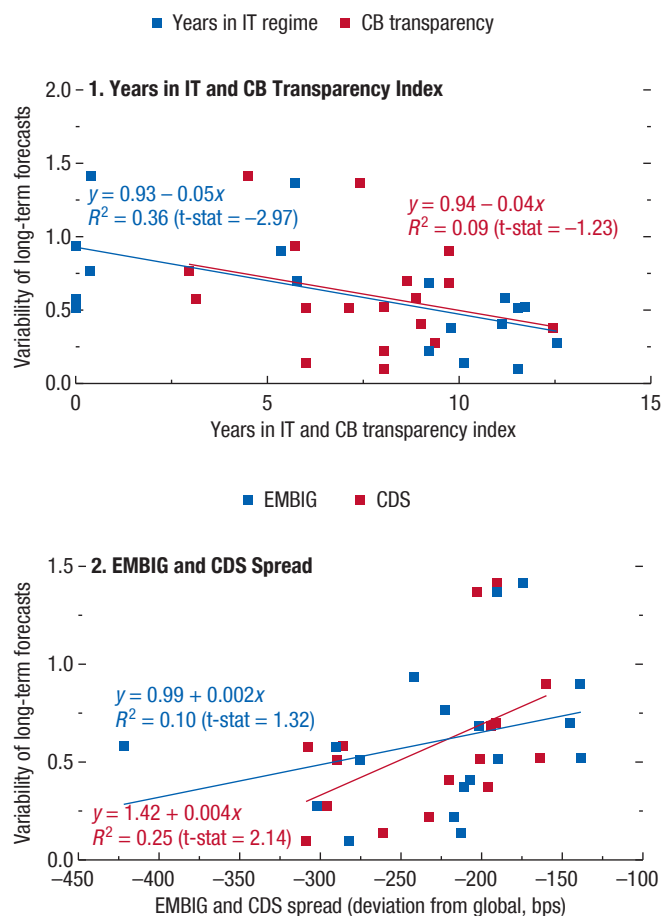
²⁹See Al-Mashat and others (2018b) for a discussion of how central bank transparency and enhanced communication can reinforce confidence in the long-term inflation target and improve the effectiveness of the monetary policy instrument.

³⁰Other factors are also likely to matter for longer-term anchoring; for instance, Mishkin and Savastano (2001) point to the importance of stringent prudential regulations and strict supervision of financial institutions to ensure that the system is capable of withstanding exchange rate fluctuations.

³¹The analysis uses asset prices to capture the market perception about the sustainability of public debt. Importantly, these measures incorporate not only concerns about the current level of public debt for intertemporal fiscal solvency, but also the expected path of future deficits.

Figure 3.11. Anchoring of Inflation Expectations and Policy Frameworks, 2004–17
(Percent, unless noted otherwise)

Sound monetary and fiscal frameworks are associated with better-anchored inflation expectations in emerging markets.



Sources: Dincer and Eichengreen (2014); JP Morgan; Thomson Reuters Datastream; and IMF staff calculations.
Note: bps = basis points; CB = central bank; CDS = credit default swap; EMBIG = emerging market bond index global; IT = inflation targeting. See Online Annex 3.1 for data sources and country coverage. EMBIG spreads and CDS spreads are the residuals from a regression on time fixed effects. For the CB transparency index, higher values indicate higher degree of transparency. Argentina is excluded from the figures as an outlier; its inclusion would further strengthen the depicted relationships.

they tend to rise with price shocks that depress economic activity and place central banks in a policy dilemma. Reacting to rising inflation expectations with tighter monetary conditions would worsen output effects, and loosening policy to boost activity would worsen inflation expectations. Hence, central banks in economies with less-anchored expectations would be less able to focus on smoothing output fluctuations.

A vast literature has explored how inflation performance differs according to variations in the monetary framework (see, for instance, Rogoff and others 2004; Ball and Sheridan 2005; and Gonçalves and Salles 2008). The approach in this section asks, instead, whether variations in the degree of anchoring of inflation expectations affect inflation performance and the trade-offs faced by monetary policy in emerging markets.³²

In particular, the external shock represented by the ongoing normalization of monetary policy in the United States and other advanced economies may well depress activity in emerging markets while also triggering a temporary increase in inflation. This section addresses the following question: Will emerging markets with more-anchored inflation expectations be better able to fight the incipient downturn triggered by the external shock?

The approach takes the variation in the degree of anchoring among emerging markets as given, or as a characteristic that changes only slowly.³³ The analysis first adapts a conventional New Keynesian monetary model to illustrate how the extent of anchoring may influence the domestic economic impact of an external shock. Second, an event analysis uses an earlier and comparable shock—the so-called taper tantrum during the summer of 2013—to explore differences in the responses of key variables between emerging markets with more- and less-anchored inflation expectations. Finally, the analysis explores whether the ability to conduct countercyclical monetary policy in emerging markets is related to the extent of anchoring of inflation expectations.

Insights from a Monetary Model

A version of a New Keynesian monetary model is used to examine how the extent of central bank credibility can influence the impact of an external shock on domestic inflation dynamics and on the reaction of monetary policy. The shock considered is akin to a sudden stop in capital flows (Calvo 1998)

³²The approach pursued in this chapter is more closely related to Mishkin and Savastano (2001), who argue that policymakers can choose from among a wide set of monetary frameworks, but their ability to deliver price stability will ultimately be determined by their credibility, as captured in this chapter by the robustness of the public's longer-term inflation expectations.

³³This is consistent with the evolution of anchoring in the sample. The position of economies in the ranking for anchoring has changed little over time (Online Annex 3.3).

and is modeled as a temporary surge in the country risk premium.³⁴

The degree of monetary policy credibility and the strength of inflation expectations anchoring significantly affect how the model economy responds to the sudden-stop shock (Figure 3.12). Regardless of the degree of credibility, the external shock induces a sharp nominal currency depreciation (not shown in Figure 3.12), which boosts actual inflation. In the economy with a more credible central bank, longer-term inflation expectations are better anchored, and inflation more quickly returns to its long-run level once the effect of the shock dissipates. The result implies a smaller exchange rate pass-through to consumer prices and lower inflation persistence.

With a shorter-lived deviation of inflation from its target, the monetary policy rate need not increase by as much in response to the adverse shock, and can return to its neutral level sooner, leading to a smaller cumulative decline in output.³⁵ In sum, the persistence of inflationary shocks is smaller, and monetary policy can focus more on fighting recessions when credibility is higher and expectations are better anchored, thereby increasing the economy's resilience to adverse external shocks.

The Taper Tantrum Episode

How did key macroeconomic variables in emerging markets react to the taper tantrum in the summer of 2013? The episode was based on a sudden expectation of an imminent move toward monetary normalization in the United States (via a tapering off of bond purchases by the Federal Reserve), which boosted risk premiums on debt instruments in emerging markets. Among the advantages of studying this shock are that it is related to an expectation of de facto monetary policy tightening in the advanced economies, it is well identified, and it is exogenous to emerging markets. Did the response during the taper tantrum episode differ across emerging markets according to how well anchored their inflation expectations were, as would be predicted by the model?³⁶

³⁴The framework follows Alich and others (2009) and Al-Mashat and others (2018a), which extend a conventional monetary model to allow for imperfect credibility. See Online Annex 3.4 for details.

³⁵The expected real interest rate also increases by less in the country with a more credible central bank.

³⁶This analysis does not imply that anchoring is the ultimate driver of the differences in macroeconomic outcomes. As discussed

The empirical exercise estimates the responses of the variables of interest—the exchange rate, inflation, output, and the policy rate—to the taper tantrum shock.³⁷ To tease out the differential effects arising from variations in the extent of anchoring, the economies in the sample are sorted into a more-anchored and a less-anchored group, as defined in Online Annex 3.3, and responses specific to each group are estimated.³⁸

In each of the two country groups, the currency depreciates on impact, as predicted by the model (Figure 3.13, panel 1). The initial depreciation is somewhat smaller in the less-anchored group, which could be an indication of “fear of floating” (see Calvo and Reinhart 2002).³⁹ However, after the first two months, the depreciation effect equalizes across the two groups.

The response of consumer prices suggests a very persistent and statistically significant increase in the price level for the less-anchored economies and, broadly, no consumer price impact in the more-anchored group. The differences between the two groups are statistically significant at all horizons (Figure 3.13, panel 2).

A comparison of the responses of the exchange rate and consumer prices between the two groups of countries suggests that the exchange rate pass-through during the taper tantrum event was substantially larger in countries with less-anchored inflation expectations. A systematic exploration of the exchange rate and consumer price responses across the two groups of economies confirms that the pass-through of currency depreciations is lower in economies with better-anchored inflation expectations (Figure 3.14).⁴⁰

in the previous section, the varying extent of anchoring can be explained by fundamental macroeconomic factors, including the quality of fiscal and monetary policy frameworks.

³⁷The estimates are produced with a local projection framework (Jordà 2005; Jordà, Schularick, and Taylor 2013). The methodology is closely related to an event study approach (see, for example, de Carvalho Filho 2011; Obstfeld 2014; and Ahmed, Coulibaly, and Zlate 2017), but controls for lags of the dependent variable.

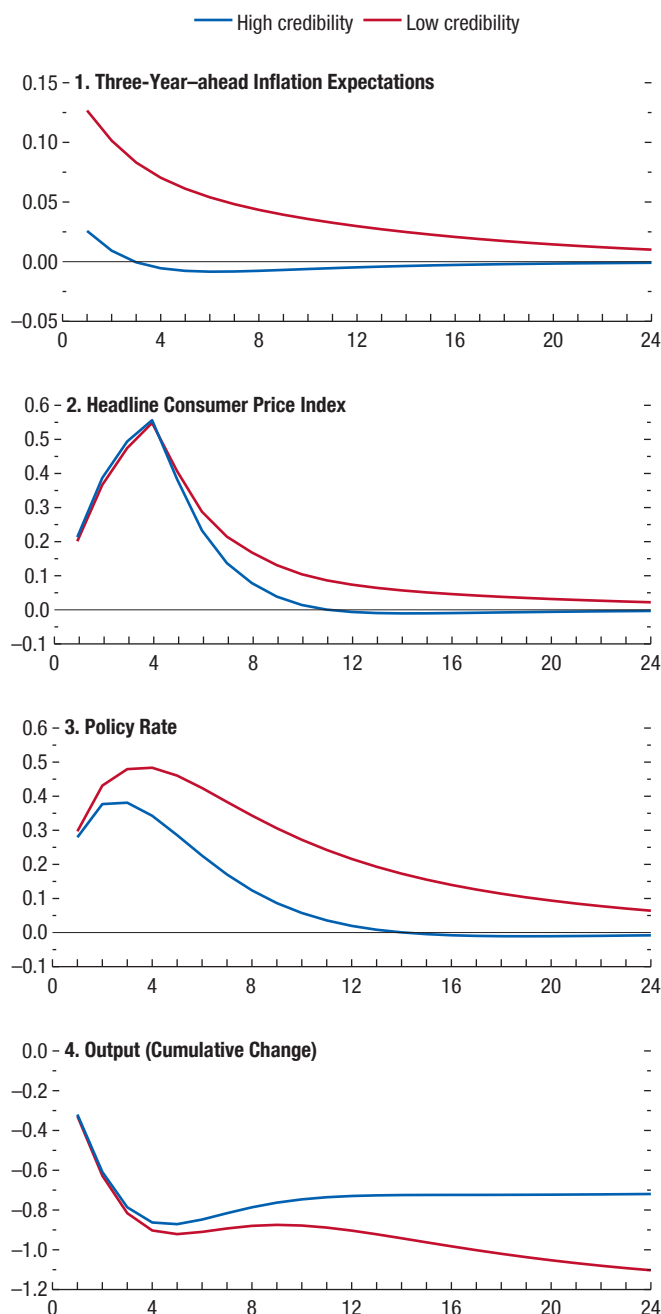
³⁸Details of the estimation strategy and a discussion of robustness checks for the results of this section are in Online Annex 3.5.

³⁹As discussed further below, fear of floating could help explain weak anchoring if the central bank compromises its inflation goals to achieve exchange rate stability.

⁴⁰See Online Annex 3.5 for details. These results are obtained from a reduced-form estimation that does not distinguish between the underlying sources of movements in the exchange rate and, therefore, need to be interpreted with caution (Forbes, Hjortsoe, and Nenova 2015). Reassuringly, however, the magnitude of the pass-through for the less-anchored countries after six months (equal to 11 percent) is comparable to the estimates obtained from the taper tantrum event exercise (14 percent), where the underlying shock is well identified. For the more-anchored countries, the magnitudes of the pass-through are 1 percent and 5 percent, respectively.

Figure 3.12. Gains from Anchoring Inflation Expectations
(Percentage points)

Model simulations suggest that when monetary policy is credible and inflation expectations are better anchored, the economy is more resilient to adverse external shocks.

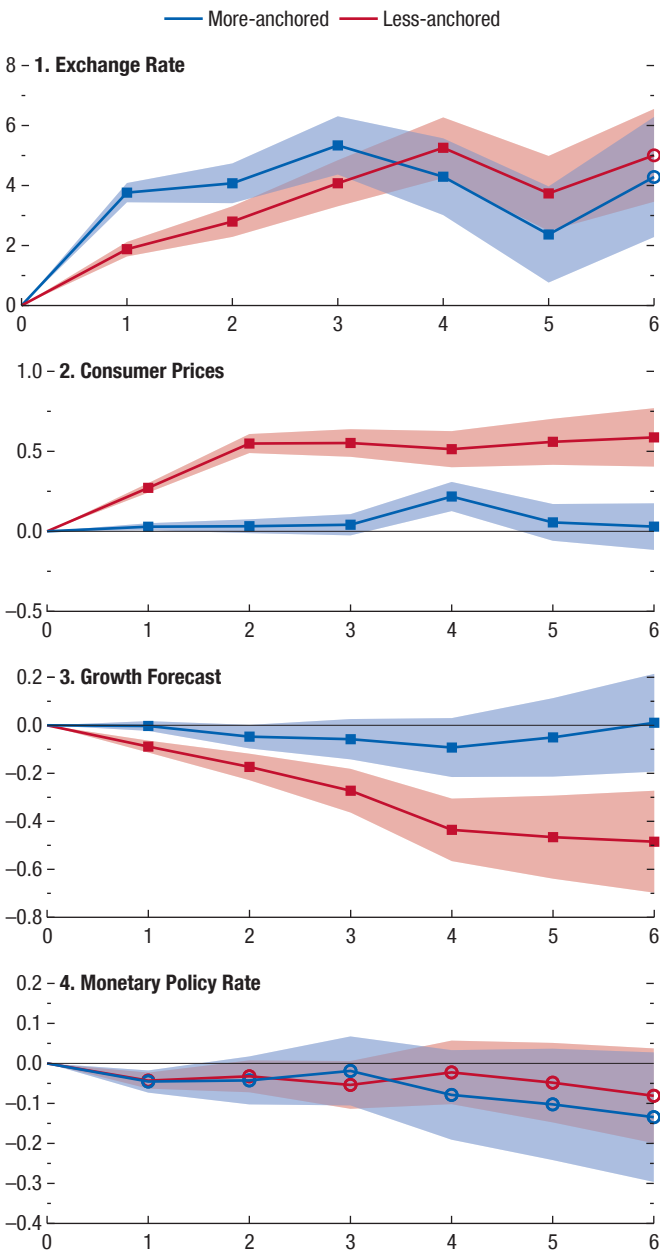


Source: IMF staff calculations.

Note: The figures show impulse responses to a “sudden-stop” shock, defined as an increase in the country-specific risk premium, using a semistructural monetary model described in Online Annex 3.4. X-axis labels indicate time in quarters, with the shock occurring at time = 1.

Figure 3.13. Response to the Taper Tantrum
(Percentage points)

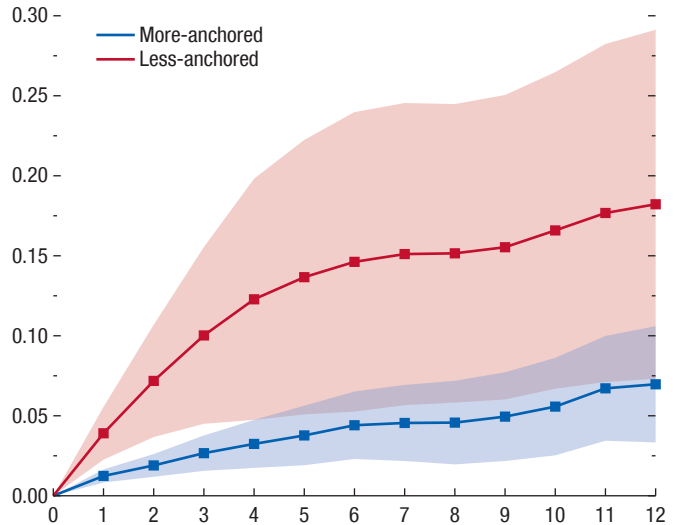
Economies with better-anchored inflation expectations were more resilient to the taper tantrum episode in the summer of 2013—they experienced a smaller increase in inflation and could keep monetary policy relatively more accommodative.



Source: IMF staff calculations.
Note: See Online Annex 3.1 for data sources and country coverage. The figures show the cumulative impulse response to the taper tantrum episode (see Online Annex 3.5 for details). An increase in the exchange rate denotes a depreciation. X-axis denotes time in months. The episode is defined as equal to 1 in May 2013. The shaded areas correspond to 90 percent confidence intervals computed with Driscoll-Kraay standard errors. Solid squares (unfilled circles) for responses denote that the difference between the two responses is statistically significant (not statistically significant) at a 90 percent confidence level. The criterion to classify countries as more- and less-anchored is defined in Online Annex 3.3.

Figure 3.14. Cumulative Exchange Rate Pass-Through
(Percentage points)

The exchange rate pass-through to consumer prices is lower in economies with better-anchored inflation expectations.



Source: IMF staff calculations.
Note: See Online Annex 3.1 for data sources and country coverage. The figure shows the cumulative impulse response of headline consumer prices to a 1 percent change in the nominal effective exchange rate (see Online Annex 3.5 for details). X-axis denotes time in months. The shaded area corresponds to 90 percent confidence intervals computed with Driscoll-Kraay standard errors. Solid squares (unfilled circles) for responses denote that the difference between the two responses is statistically significant (not statistically significant) at a 90 percent confidence level. The criterion to classify countries as more- and less-anchored is defined in Online Annex 3.3.

These findings are consistent with several earlier studies.⁴¹

In terms of the monetary policy dilemma and the response of the policy rate, the less-anchored country group faced a starker trade-off between fighting inflation and countering falling growth prospects during the taper tantrum episode.⁴² Although, in contrast to the more-anchored group, these countries experienced a significant fall in expected output growth, they did

⁴¹Taylor (2000) argues that improvements in monetary performance, as reflected in price stability and better-anchored inflation expectations, result in an endogenous reduction of exchange rate pass-through. Several studies have found evidence in line with this hypothesis, including Gagnon and Ihrig (2001), Choudhri and Hakura (2006), Edwards (2006), Mishkin and Schmidt-Hebbel (2007), Carrière-Swallow and others (2016), and Caselli and Roitman (2016).

⁴²Given the monthly frequency of the estimation, the analysis proxies the response of output using one-year-ahead growth forecasts from Consensus Forecasts. An alternative exercise, using quarterly data and analyzing the reaction of actual output growth to the taper tantrum shock, shows similar results, confirming more a negative output response in less-anchored countries.

not pursue looser monetary policies. Indeed, there is no significant difference in the response of the policy rate across the two groups at any horizon.

In sum, the analysis suggests that economies with better-anchored inflation expectations were more resilient to the taper tantrum episode and were able to keep monetary policy relatively more accommodative.

Countercyclical Monetary Policy

How general are the findings of the taper tantrum episode? When output enters a cyclical decline, could the monetary authorities in countries with more-anchored inflation expectations act more countercyclically than authorities in less-anchored countries, focusing more on reducing output fluctuations?

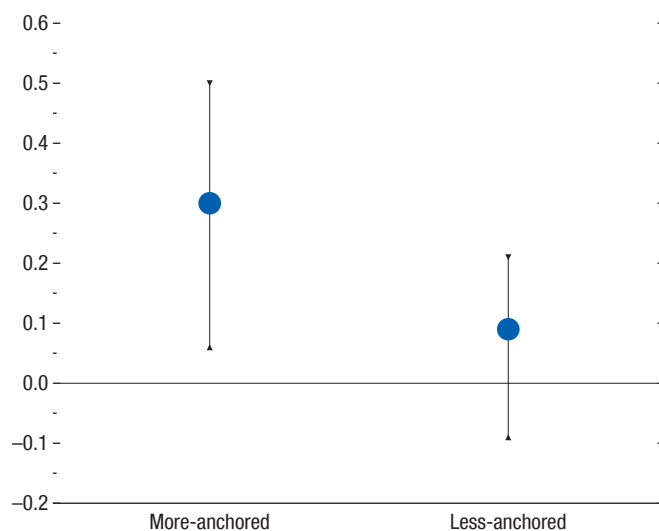
Following Végh and Vuletin (2014) and Végh and others (2017), an examination of a simple correlation between the detrended policy rate and the output gap reveals that monetary policy in both country groups, on average, reacted countercyclically to output gap developments over the first quarter of 2004 to the first quarter of 2018 (Figure 3.15). The countercyclical response was stronger in the more-anchored group. However, such correlation-based findings can be subject to several criticisms. First, they need not be informative of the monetary policy dilemma that policymakers in emerging markets face when hit by adverse external shocks, as monetary policy tradeoffs can vary depending on the nature of the underlying shock. Second, a simple correlation does not control for other factors important to policymakers. For example, if exchange rate stability is an additional policy objective and the exchange rate is correlated with the output gap, the estimated response of the policy rate to the output gap may be biased.

To address these limitations, this section estimates a monetary policy reaction function for the emerging markets in the sample. Following Taylor (1993) and Coibion and Gorodnichenko (2012), the specification allows for inertia in monetary policy and includes the inflation rate, the output gap, and the change in the nominal effective exchange rate. The estimated coefficient on the output gap is interpreted as a measure of monetary policy countercyclicality. To assess whether the extent of anchoring influences the ability to conduct countercyclical policy, the estimation allows the coefficients in the monetary policy reaction function to differ between countries in the more- and less-anchored groups.⁴³

⁴³See Online Annex 3.6 for details.

Figure 3.15. Correlation between Detrended Policy Rate and Output Gap, 2004:Q1–2018:Q1 (Percent)

A simple correlation analysis suggests that over 2004–18 monetary authorities tended to react more to output gap fluctuations in economies with better-anchored inflation expectations.



Source: IMF staff calculations.

Note: See Online Annex 3.1 for data sources and country coverage. The dots denote the median correlation across countries and the vertical lines denote the interquartile range. Monetary policy rate series have been detrended by the Hodrick-Prescott filter, following Végh and Vuletin (2014). The output gap is measured by the real-time output gap from the World Economic Outlook database if available, or by detrended real output using the Hodrick-Prescott filter. The criterion to classify countries as more- and less-anchored is defined in Online Annex 3.3.

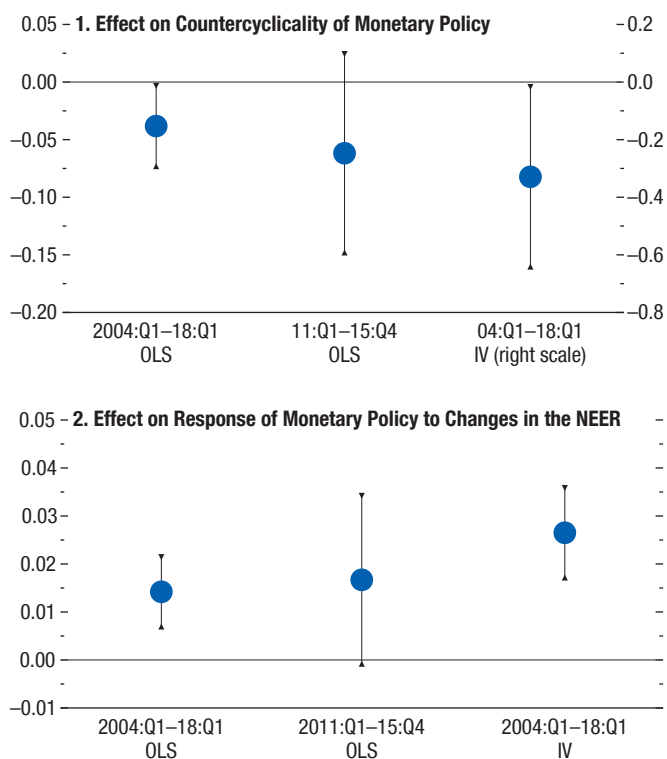
To focus on adverse external shocks that can potentially pose a dilemma between stabilizing output and inflation, such as the one examined in the event study of the taper tantrum, two complementary identification strategies are used. First, the regression analysis is restricted to 2011–15, when emerging markets experienced a substantial slowdown in net capital inflows.⁴⁴ Second, the domestic output gap is instrumented with shocks to the global risk premium, as captured by the Chicago Board Options Exchange Volatility Index (VIX).

The results show that the output gap coefficient is smaller for less-anchored countries than for more-anchored ones for all specifications and, in two of these, the difference between the two output

⁴⁴See Chapter 2 of the April 2016 WEO for a detailed examination of this slowdown episode and Online Annex Figure 3.6.1 for the evolution of net capital inflows to the countries in the sample.

Figure 3.16. Effects of Less-Anchored Inflation Expectations: Regression Results, 2004:Q1–2018:Q1
(Percentage points)

Model estimates suggest that monetary policy reacts more to output fluctuations and less to exchange rate developments in countries with better-anchored inflation expectations—including in periods when adverse external shocks pose a dilemma between stabilizing output and inflation.



Source: IMF staff calculations.

Note: IV = instrumental variables; NEER = nominal effective exchange rate; OLS = ordinary least squares. See Online Annex 3.1 for data sources and country coverage. The figure shows the effect on the output gap coefficient (panel 1) and the exchange rate coefficient (panel 2) of being a less-anchored country rather than a more-anchored country from estimated monetary policy reaction functions. Each panel summarizes results from three regression specifications. Starting from the left, the first regression result refers to a full-sample OLS specification, the second regression result refers to the OLS specification in which the impact of more- or less-anchored inflation expectations is identified from the 2011:Q1–15:Q4 period only, and the third regression result refers to a full-sample instrumental variable specification (see Online Annex 3.6 for details). The criterion to classify countries as more- and less-anchored is defined in Online Annex 3.3.

gap coefficients is statistically different from zero (Figure 3.16). The results also suggest that the coefficient on the nominal effective exchange rate is larger for less-anchored countries.⁴⁵ Thus, monetary policy

⁴⁵The results could indicate that fear of floating leads to less-anchored inflation expectations. But there are other possible explanations, and more research is needed before drawing strong conclusions.

in less-anchored countries not only responds less to output gap fluctuations, but it also responds more to fluctuations in the nominal effective exchange rate. Overall, these findings suggest that the ability to conduct countercyclical monetary policy in emerging markets is positively linked to the extent of anchoring of inflation expectations.⁴⁶

Taken together, the results in this section suggest that well-anchored expectations can attenuate the monetary policy dilemma faced by emerging markets when they are hit by adverse external shocks. The inflationary impact of such shocks is smaller when inflation expectations are more anchored, allowing monetary policy to focus more on smoothing output fluctuations, thus improving the resilience of the economy.

Summary and Policy Implications

Following a period of disinflation during the 1990s and early 2000s, inflation in emerging market and developing economies has remained low and stable. This chapter examines the low and stable inflation experience in 19 emerging markets during 2004–18 to determine whether the recent gains in inflation performance are sustainable as global financial conditions normalize.

The chapter finds that, for the average sample emerging market, the gains in inflation performance have been broad based—present across alternative price measures and geographic regions, as well as in terms of both inflation levels and inflation variability. At the same time, the gains are not uniform, as some emerging markets continue to find it challenging to keep inflation low and stable in the face of capital flow reversals and exchange rate pressures. Average inflation in several sample economies remained in double-digit territory during the period under study. The main driver of deviations of inflation from target is fluctuations in longer-term inflation expectations, while the role of global factors is more limited. Zooming in on the behavior of inflation expectations reveals that the extent of expectations anchoring has improved but remains subpar in many emerging markets relative to the better-performing peers and relative to advanced economies.

⁴⁶The findings are qualitatively robust to the exclusion of the global financial crisis period (third quarter of 2007 to the first quarter of 2009) and to alternative groupings of more-anchored and less-anchored economies.

What do these findings imply for inflation, and for economic outcomes more broadly, as global financial conditions normalize? To the extent that a tightening of global financial conditions leads to currency depreciations in emerging markets, some adjustment in relative prices and a temporary increase in their inflation rates is to be expected. But if expectations are well anchored, price stability would not be jeopardized. Indeed, the analysis shows that more-anchored inflation expectations reduce inflation persistence and limit the pass-through of currency depreciations to domestic prices, allowing monetary policy to focus more on reducing output fluctuations. Subpar levels of anchoring of longer-term inflation expectations can constrain central banks' monetary policy responses and make emerging markets more vulnerable to adverse external shocks, such as the ongoing normalization of monetary policy in the United States and other advanced economies.

In terms of policy implications, the chapter argues that domestic fiscal and monetary policy frameworks can significantly affect the performance of output and inflation in response to adverse external shocks through their impact on the extent of anchoring of inflation expectations. One important implication is that emerging markets are not simply bystanders to the forces of globalization and financial conditions in advanced economies.⁴⁷ By improving fiscal and monetary policy frameworks over the past two decades,

⁴⁷Chapter 3 of the April 2017 *Global Financial Stability Report* draws similar conclusions regarding the domestic impact of global financial conditions.

emerging markets have succeeded in reducing inflation to low and sustainable levels. Whether these gains will be maintained largely depends on policymakers' continued commitment to improving the long-term sustainability of fiscal frameworks, including by adopting fiscal rules, and preserving and rebuilding fiscal buffers where necessary. Equally important is their commitment to improving the credibility of central banks, which can be achieved by consolidating and enhancing their independence, as well as through improvements in timeliness, clarity, transparency, and openness in communications. In this context, it is notable that public debt has increased in emerging markets over the past decade and is projected to increase further in many of the largest economies over the next five years (see Chapter 1). Also, a number of less-anchored emerging markets have more recently come under considerable pressures from exchange rate depreciations and shorter-term inflation. These developments suggest that the past gains in inflation performance cannot be taken for granted and require continued improvements in fiscal and monetary policy frameworks.

The chapter also emphasizes that anchoring inflation expectations takes time, which suggests that policymakers in emerging markets should consolidate and further improve the extent of anchoring of inflation expectations, even when favorable economic conditions prevail. In countries where the credibility of monetary frameworks is relatively low, the emphasis should be on communicating clearly the reasons for policy actions taken in response to global developments.

Box 3.1. Inflation Dynamics in a Wider Group of Emerging Market and Developing Economies

This box compares (1) basic macroeconomic characteristics and (2) headline inflation dynamics for a wider group of 71 emerging market and developing economies with the 19 emerging markets covered in the chapter (termed here the “sample” economies).¹ The wider set of 71 economies is separated into (1) 33 other emerging markets, and (2) 38 low-income developing countries, as defined in the *World Economic Outlook* classification, and referred to hereafter as the “other two country groups.”

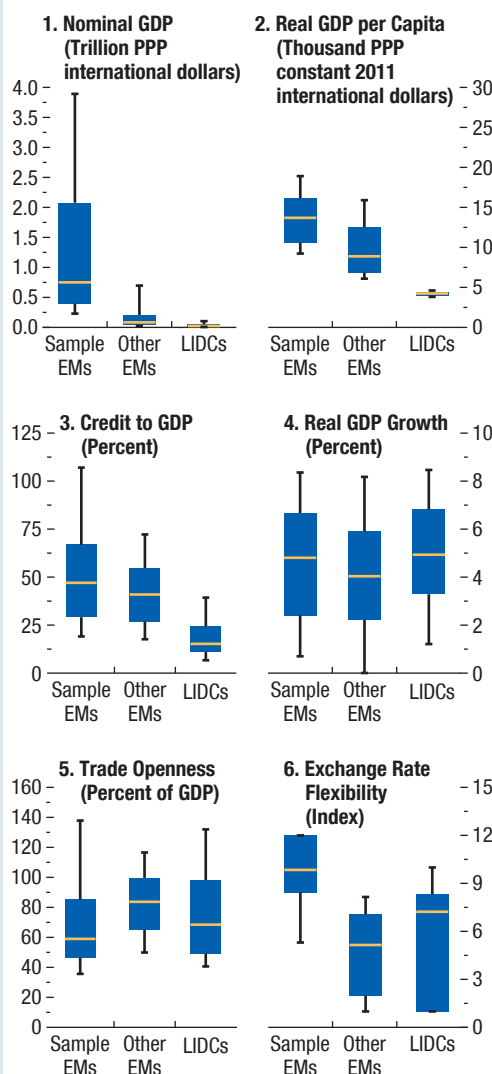
The 19 emerging markets covered in the chapter are among the largest emerging markets (Figure 3.1.1, panel 1). This sample is representative of the broader set of emerging markets along several dimensions, including GDP per capita and financial development (Figure 3.1.1, panels 2 and 3). Also, countries in all three groups grow at a comparable pace (Figure 3.1.1, panel 4) and exhibit similar openness to international trade over the sample period (Figure 3.1.1, panel 5). One difference is that the 19 sample economies have more flexible exchange rates, although several of them exhibit degrees of exchange rate flexibility that are comparable to those of economies in the other two country groups (Figure 3.1.1, panel 6). Greater exchange rate rigidity can contribute to higher inflation volatility for commodity exporters when facing large commodity price swings.² Beyond this specific set of countries, the approach pursued in the chapter emphasizes the broader concept of credible monetary policy frameworks, as captured by the extent of anchoring of inflation expectations, in delivering

The authors of this box are Francesca Caselli and Jilun Xing.

¹The wider group includes all emerging markets and low-income developing countries not included in the core sample of 19 countries, except countries with (1) populations of fewer than 2 million people or (2) at least one episode of hyperinflation, defined as annual inflation of more than 100 percent. The selection of the core sample of 19 economies is driven by data availability. The key data constraint for inclusion in the core sample of countries is the availability of longer-term (three-year-ahead and longer) forecasts for inflation.

²Several countries in the “other two country groups” exhibit limited exchange rate flexibility and are heavily dependent on commodities. Under a fixed exchange rate, when commodity export prices increase, both domestic and import prices rise (given higher domestic demand, which raises nontradables prices, including distribution margins for imports), with the adjustment to the income windfall taking place through relative prices rather than the exchange rate. Conversely, periods of weak commodity export prices put downward pressure on domestic demand and prices. By contrast, under a flexible exchange rate part of the terms-of-trade movement is absorbed by the exchange rate, dampening the effect of this type of shock on inflation.

Figure 3.1.1. Comparison of Macro Characteristics across Country Groups



Sources: Ilzetzki, Reinhart, and Rogoff (2017); World Bank; and IMF staff calculations.

Note: EMs = emerging markets; LIDCs = low-income developing countries; PPP = purchasing power parity. See Online Annex 3.1 for data sources and country coverage. The horizontal line in each box represents the median across countries calculated over the period 2004–17; the upper and lower edges of each box show the top and bottom quartiles; and the vertical lines denote the range between the top and bottom deciles. A higher value of the exchange rate index means greater flexibility.

Box 3.1 (continued)

price stability over the narrower focus on the exchange rate regime.

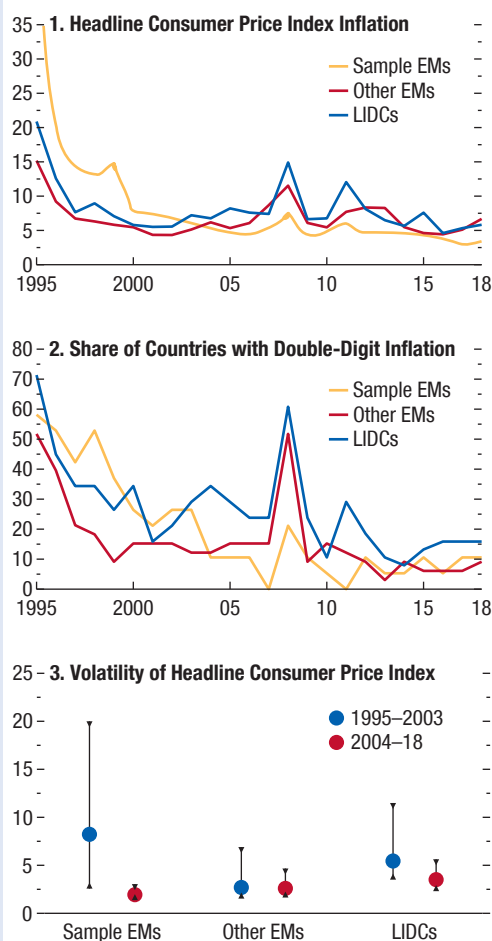
Inflation dynamics in the wider group of other emerging markets and low-income developing countries (the “other two country groups”) show broadly similar trends to that of the sample economies. Headline consumer price inflation in the other two country groups declined between the mid-1990s and the mid-2000s, and, on average, remained lower thereafter (Figure 3.1.2, panel 1). The number of countries with double-digit headline inflation also fell dramatically from the 1990s in all three groups. Less than 15 percent of the countries exhibited double-digit inflation at the end of the sample period, compared with 50–70 percent in 1995 (Figure 3.1.2, panel 2). Inflation volatility in the other two country groups also declined after 2004 (Figure 3.1.2, panel 3).

However, a focus on the post-2004 period reveals some heterogeneity across the three groups. The average inflation rates for the other emerging market and low-income developing country groups, at 7 percent and 8 percent, respectively, remain higher than those of the sample group, at 5 percent (Figure 3.1.2, panel 1). Similarly, volatility of inflation in the other two country groups remains higher than in the sample countries (Figure 3.1.2, panel 3).

What are the factors that could have contributed to higher inflation rates in the other two country groups? Compared with the sample, inflation in these two groups follows the evolution of commodity price inflation more closely (Figure 3.1.3, panel 1), pointing to stronger exposure of these economies to commodity price fluctuations. Indeed, the largest economies in the broader sample include several oil exporters, where the strength of domestic demand is heavily influenced by oil prices. The comovement of inflation with commodity prices is particularly evident in the period after 2004: headline inflation peaks along with the 2008 commodity price spike, declines during the global financial crisis, rebounds later, and finally drops again. Overall, this evidence suggests that economies in the other two country groups were not fully successful in smoothing the repeated commodity shocks they faced in the postcrisis period. Moreover, in low-income developing countries food accounts for a larger share of consumption expenditure, and higher food shares are linked to higher inflation (Figure 3.1.3, panel 2).

The greater sensitivity of inflation in the other two country groups to commodity price swings could reflect differences in the quality of the institutional and policy frameworks. For instance, Choi and

Figure 3.1.2. Inflation Dynamics
(Percent)

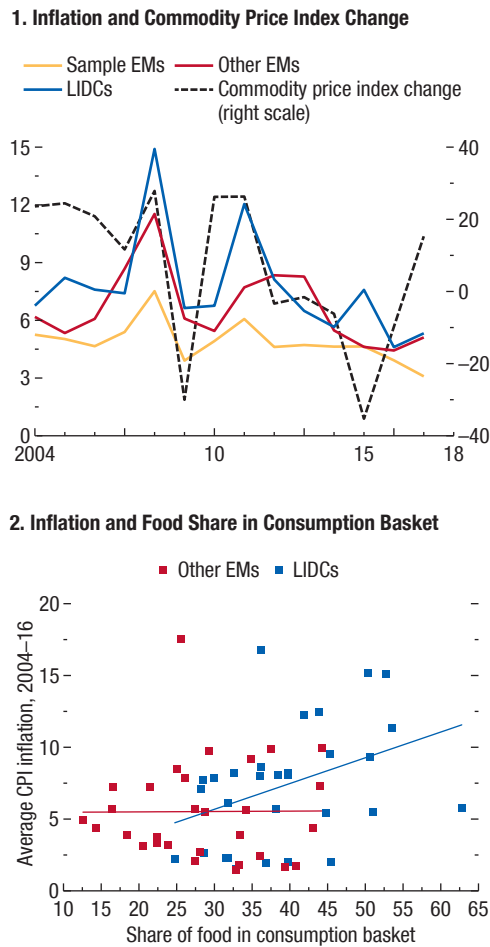


Sources: Haver Analytics; and IMF staff calculations.
Note: EMs = emerging markets; LIDCs = low-income developing countries. See Online Annex 3.1 for data sources and country coverage. The lines in panel 1 denote averages weighted by nominal GDP. The weights are time invariant and computed between 2010 and 2012. The lines in panel 2 denote the share of countries with headline consumer price index greater than or equal to 10 percent. Volatility is computed as the standard deviation of headline inflation. The dots (vertical lines) in panel 3 denote the medians (interquartile ranges).

others (2018) find that, over time, a more credible monetary policy, together with reduced reliance on energy imports, lessens the impact of oil price shocks on inflation. Gelos and Ustyugova (2017) find that commodity price shocks have less persistent effects in countries with independent central banks, lower initial inflation, and better governance. Consistent with these results, central bank transparency—a proxy for

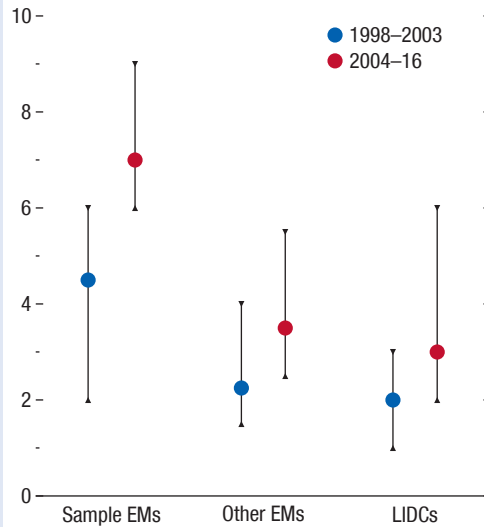
Box 3.1 (continued)

Figure 3.1.3. Inflation, Food Shares, and Commodity Prices (Percent)



Sources: International Labour Organization; and IMF staff calculations.
 Note: CPI = consumer price index; EMs = emerging markets; LIDCs = low-income developing countries. See Online Annex 3.1 for data sources and country coverage. In panel 1, the solid lines denote averages weighted by nominal GDP. The weights are time invariant and computed between 2010 and 2012. The dashed line corresponds to the change in the commodity price index (2005 = 100) of a broad set of commodities. In panel 2, the solid lines denote the fitted regression lines for each group. The slope coefficient is significant for LIDCs, but not for other EMs.

Figure 3.1.4. Central Bank Transparency (Index)



Sources: Dincer and Eichengreen (2014); and IMF staff calculations.
 Note: EMs = emerging markets; LIDCs = low-income developing countries. See Online Annex 3.1 for data sources and country coverage. The dots (vertical lines) denote the medians (interquartile ranges) of each group. The transparency index ranges from 0 to 15 and reflects the sum of the scores attributed to responses to various questions about political, economic, procedural, and operational transparency. An increase represents an improvement in the index.

the quality of the monetary policy framework—in the other two country groups exhibits a slower pace of improvement and remains significantly below the levels of the sample group (Figure 3.1.4). Lack of a clear communication strategy about the inflation outlook and the presence of multiple inconsistent objectives contribute to lower transparency levels in low-income developing countries (IMF 2015). Furthermore, because economies with less transparent and credible monetary policy frameworks tend to exhibit a higher degree of exchange rate pass-through, external shocks to such economies tend to be more inflationary than for economies with better monetary frameworks (Carrière-Swallow and others 2016). Finally, sound fiscal institutions are also a precondition for credible monetary policy. Combes and others (2017), for example, find that the interaction of inflation targeting and fiscal rules has a beneficial effect on both fiscal balances and inflation.

Box 3.2. Clarity of Central Bank Communications and the Extent of Anchoring of Inflation Expectations

“Successful central bank communication efforts should make policy more predictable and market expectations of future short rates more accurate” (Blinder and others 2008).

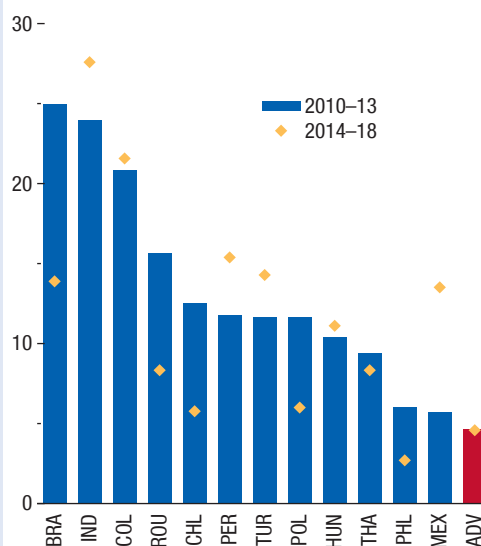
Over the past two decades, central banks in an increasing number of emerging market and developing economies have adopted inflation targeting—a policy that sets an inflation goal and emphasizes transparency and clear communication with the public to help achieve it. The change coincided with improved anchoring of longer-term inflation expectations in many of those economies, but substantial variations in the extent of anchoring still exist. This box shows that more transparent and clear communication by the central bank can improve the anchoring of inflation expectations by reducing uncertainty about future policy actions.

One way in which the central bank can influence the anchoring of inflation expectations is by helping improve the ability of the public to anticipate its adjustments to the monetary policy rate. An empirical glimpse into the clarity and consistency of the central bank’s policy rate decisions can be obtained by measuring the frequency with which central bank decisions differ from what the market expects just before the release of policy announcements. The evidence shows that achieving a high degree of monetary policy predictability has been challenging for emerging market and developing economies (Figure 3.2.1). Despite important steps taken to strengthen monetary policy frameworks during the past two decades, the predictability of policy rate actions by their central banks remains below that of more seasoned inflation-targeting central banks in advanced economies. Furthermore, the evidence shows uneven improvement over time for emerging market and developing economies.

Can poor predictability of monetary policy rate actions affect the anchoring of inflation expectations? Poor predictability may reflect a lack of public understanding about the central bank’s policy strategy. Alternatively, it may indicate the public’s doubt about the central bank’s commitment to price stability. In either case, inflation expectations may not be anchored to the central bank’s target, which has important implications for policy. In this regard, a significant relationship appears between the predictability of monetary

The authors of this box are Yan Carrière-Swallow and Juan Yépez.

Figure 3.2.1. Frequency of Monetary Policy Surprises, 2010–13 versus 2014–18
(Percent of total decisions)



Sources: Bloomberg Finance L.P.; and IMF staff calculations. Note: ADV = average for eight advanced economies. See Online Annex 3.1 for data sources and country coverage. Data labels use International Organization for Standardization (ISO) country codes. Surprises are the difference between the decision regarding the monetary policy rate and the average forecast among analysts surveyed by Bloomberg the day of the policy announcement.

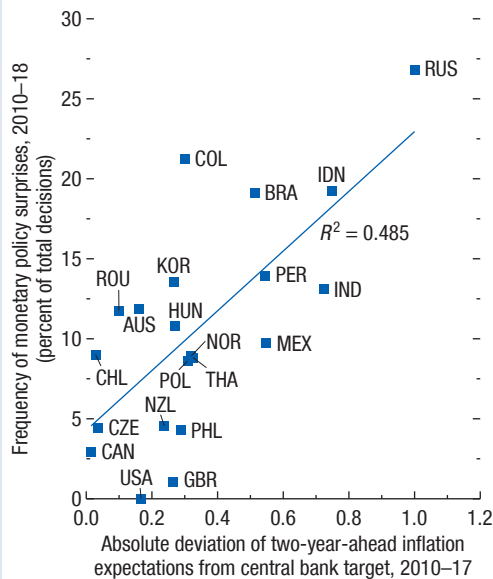
policy and the degree of anchoring of medium-term (two-years-ahead) inflation expectations (Figure 3.2.2).

How can monetary policy be made more predictable? In general terms, predictability requires having a clear policy function that the public understands. Indeed, monetary policy is more predictable in economies where the central bank operates more transparently (Figure 3.2.3). Another characteristic of more predictable central banks is that their communication tends to be easier to understand because it uses plain language and clear sentence structures.

What can central banks do to improve transparency and the quality of their communication? Elements of best practices for transparent central banking include the announcement of a clear objective and frequent and regular publication of statements, minutes, and reports that give an account of the factors behind policy decisions and an assessment of how those factors are likely to evolve over the policy

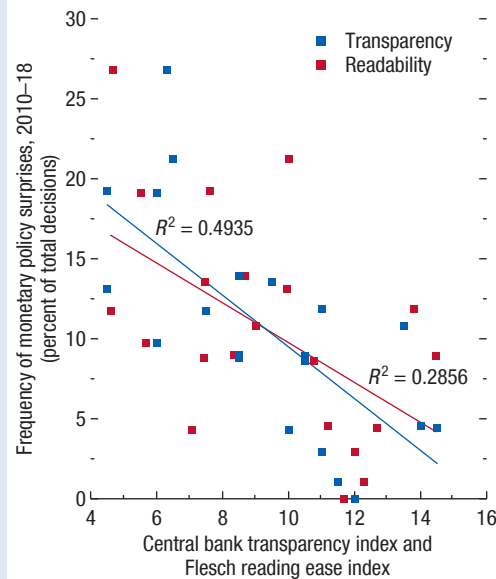
Box 3.2 (continued)

Figure 3.2.2. Monetary Policy Predictability and Anchoring of Inflation Expectations



Sources: Bloomberg Finance L.P.; Consensus Economics; and IMF staff calculations.
 Note: See Online Annex 3.1 for data sources and country coverage. For the definition of monetary policy surprises see notes to Figure 3.2.1. Solid line shows the best linear fit between the variables. Data labels use International Organization for Standardization (ISO) country codes.

Figure 3.2.3. Central Bank Communication and Monetary Policy Predictability



Sources: Bloomberg Finance L.P.; Dincer and Eichengreen (2014); and IMF staff calculations.
 Note: The Flesch reading ease (RE) index is used for central bank press releases in English, which is defined as $RE = 0.33[206.835 - (1.015 \times ASL) - (84.6 \times ASW)]$, in which ASL = average sentence length and ASW = average number of syllables per word. See Online Annex 3.1 for data sources and country coverage. Solid lines show the best linear fit between the variables. The sample includes 21 inflation-targeting economies.

horizon. Improvements along these lines over the past decade have brought the level of transparency in emerging market and developing economies much closer to the levels observed in advanced economies (Dincer and Eichengreen 2014). The Central Bank of Chile, for example, added information to the policy statements released after the meetings, such as the vote tally and the main arguments given by the members of the board.

Several countries, including Chile, Colombia, and Mexico, have also implemented reforms to their

communication strategies to increase the clarity of the information made available to the public. For instance, they have streamlined communication events to focus on medium-term developments; reduced the frequency of monetary policy meetings, aligning them with the release of the monetary policy report; and revamped the content of their policy statements, giving a richer account of the macroeconomic context and explaining why certain policy actions were taken.

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