

# CHAPTER 1

## Inflation: Concepts, Evolution, and Correlates

*In the past four to five decades, inflation has fallen around the world, with median annual global consumer price inflation down from a peak of 16.6 percent in 1974 to 2.6 percent in 2017. This decline began in advanced economies in the mid-1980s and in emerging market and developing economies in the mid-1990s. By 2000, global inflation had stabilized at historically low levels. Lower inflation has been accompanied by reduced inflation volatility, especially in advanced economies. This improvement in inflation outcomes has stemmed in large part from structural economic changes, including improved monetary and fiscal policy frameworks as well as international trade and financial liberalization. Lower and more stable inflation has often been associated with better growth and development outcomes, partly by reducing uncertainty, fostering a more efficient allocation of resources, and helping preserve financial stability.*

### Introduction

Inflation has declined sharply around the world since the global financial crisis. Global inflation—defined as median consumer price inflation among all countries—fell from 9.2 percent (year-on-year) in the second quarter of 2008 to 2.3 percent in the second quarter of 2018. In 80 percent of emerging market and developing economies (EMDEs), inflation in the second quarter of 2018 ranged between 0.9 and 7.5 percent (year-on-year), compared with a range of 4.8 to 25.3 percent in the second quarter of 2008. Among EMDEs, this has created room for monetary policy to support activity. In advanced economies, however, persistent below-target inflation since the crisis has increased risks of de-anchoring inflation expectations and led central banks to resort to unconventional monetary policy instruments to support demand.

The recent easing of inflation continues a trend that spans nearly 50 years. After a rapid rise during the 1960s, global inflation peaked in 1974 at 16.6 percent (annual average), four times the global inflation in 2017 (Figure 1.1). Similarly, inflation in EMDEs declined from a peak of 17.3 percent (annual average) in 1974 to 3.5 percent in 2017. The disinflation over the past four to five decades has been the result of a confluence of factors, including the adoption of new monetary and fiscal policy frameworks, severe global shocks, and structural changes in national economies and the global economy.

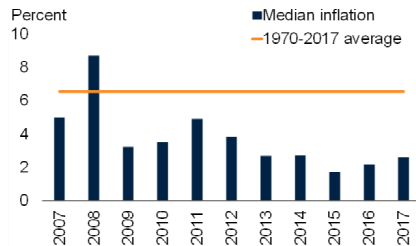
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Note: This chapter was prepared by Jongrim Ha, Anna Ivanova, Franziska Ohnsorge, and Filiz Unsal. Annex 1.1 was prepared by Peter Nagle.

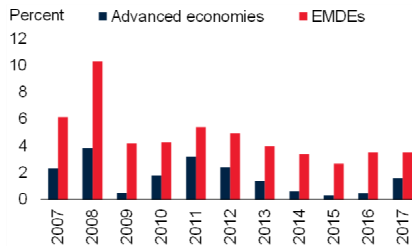
## FIGURE 1.1 Global inflation

Global inflation fell sharply between 1970 and 2000. It has been low since then, a trend shared by all measures of inflation. The post-crisis period of globally low inflation has helped bring inflation into target ranges in the majority of EMDEs but has raised concerns about deflation in advanced economies.

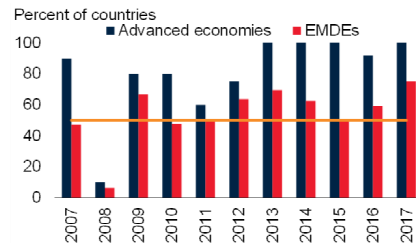
**A. Global inflation**



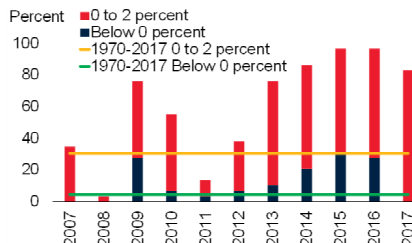
**B. Inflation in advanced economies and EMDEs**



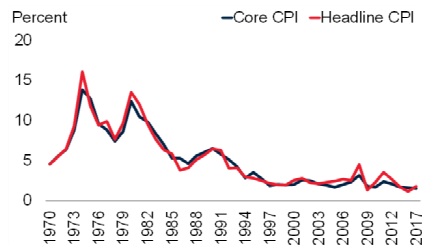
**C. Share of advanced economies and EMDEs with inflation below or within target range**



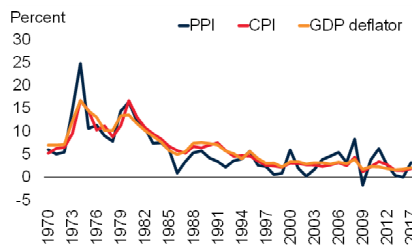
**D. Share of advanced economies with low inflation**



**E. Global core and headline inflation**



**F. Global PPI, CPI, and GDP deflator inflation**



Source: World Bank.

Note: All inflation rates refer to year-on-year inflation. CPI = consumer price index; EMDEs = emerging market and developing economies; GDP = gross domestic product; PPI = producer price index.

A. Median consumer price inflation among 153 economies.

B. Median consumer price inflation of 29 advanced economies and 124 EMDEs.

C. Share of 11 advanced economies and 24 EMDEs with consumer price inflation below target or within target range. The horizontal line indicates 50 percent.

D. Percent of 29 advanced economies with consumer price inflation below zero and between 0 and 2 percent. Horizontal lines indicate 1970-2017 averages.

E. Median for 41 economies.

F. Median for 39 economies.

[Click here to download data and charts.](#)

Low and stable inflation has often been associated with more stable output and employment and more rapid output growth and investment. Low and stable inflation increases the transparency of relative price changes, provides confidence for long-term savers and investors, protects the purchasing power of household income and wealth, and enhances financial stability (Annex 1.1; Box 1.1). By contrast, economies that have experienced high inflation have suffered significantly lower growth (Kremer, Bick, and Nautz 2013). Extended periods of chronically high inflation, often in Latin America, have frequently ended in large output losses during stabilization programs, or even balance of payments crises.

Extremely low inflation, however, such as has prevailed in many advanced economies over the past decade, may make it difficult for central banks to lower real short-term interest rates sufficiently to provide the requisite stimulus to demand, given that the lower bound on nominal rates is close to zero. Extremely low inflation may therefore limit the room for maneuver of conventional monetary policy and lead central banks to use unconventional measures, including large-scale purchases of longer-term financial assets, to reduce longer-term rates. Such difficulties in implementing expansionary monetary policy, in turn, increase the risk of sliding into a self-reinforcing period of deflation that raises debt burdens and further depresses activity. Extremely low inflation may also hinder the adjustment of absolute and relative real wages, because of the general downward rigidity of nominal wages.

**Focus.** This chapter focuses on the factors that have supported long-term disinflation across the world. It also discusses the benefits from such long-term disinflation. This complements the analysis of the drivers of short-term inflation movements in Chapters 2 to 5. This chapter discusses the following questions:

- How does inflation support or hinder economic activity?
- How has global inflation evolved over the past four to five decades?
- What factors have contributed to these trends in global inflation?

**Contribution to the literature.** This chapter's contributions are threefold.

First, it documents the broad-based disinflation over the past four to five decades using a rich database of countries and inflation measures. The analysis is based on a comprehensive data set for a virtually global sample of countries over almost half a century (141 EMDEs and 34 advanced economies for 1970-2018). Earlier studies have documented the broad-based global disinflation, but with data sets that covered a narrower set of countries or a shorter time period. These studies have been mostly restricted to advanced economies and have not taken account of either the drop in the price of oil in 2014 or the period of unusually depressed post-crisis inflation.

**BOX 1.1 Benefits and costs of inflation: A review**

*Estimates of the optimal inflation rate lie in a wide range, depending on country characteristics. Excessively high or low inflation can trigger self-perpetuating output losses. Particular policy challenges arise in exiting from high inflation and navigating very low inflation.*

A large literature has documented the challenges posed by high inflation for advanced economies and emerging market and developing economies (EMDEs). In the 1970s and 1980s in advanced economies and until the early 1990s in EMDEs, the perils of high inflation were the main macroeconomic policy concern. By the early 2000s, at least for advanced economies, the focus had shifted to the causes and consequences of very low inflation, including deflation (that is, negative inflation). This literature enjoyed a renaissance after the global financial crisis, as fears about deflation mounted.

Against this backdrop, this box addresses the following questions:

- What output losses have been associated with high inflation?
- Why is high inflation associated with weak activity?
- What policy challenges does excessively low inflation pose?

**What output losses have been associated with high inflation?**

Adverse effects of high inflation on output have been studied extensively since the 1990s.<sup>1</sup> Early studies found that inflation above 40 percent was associated with slower economic growth in large samples of countries from the 1960s to the mid-1990s (Fischer 1993; Bruno and Easterly 1998; Temple 2002). In most (31 of 41) episodes of inflation above 40 percent, output losses were sharp (2.4 percent, on average), but they were not significant at lower inflation levels (Bruno and Easterly 1998). Lower inflation thresholds, typically below 20 percent, for a negative relationship between inflation and growth were also reported by several subsequent studies based on large samples of countries stretching over multiple decades.<sup>2</sup>

<sup>1</sup>The focus here is on the challenges of persistently high inflation. Bohl and Siklos (2018) review hyperinflation episodes, when month-on-month inflation exceeded 50 percent.

<sup>2</sup>See Espinoza, Leon, and Prasad (2012) for a literature review of thresholds in the relationship between inflation and growth. Threshold effects are also estimated by Judson and Orphanides (1999), Omay and Öznur Kan (2010), Bick (2010), and Lopez-Villavicencio and Mignon (2011).

**BOX 1.1 Benefits and costs of inflation: A review (*continued*)**

There is growing evidence that the threshold for a negative relationship between inflation and growth depends on country characteristics. Some of the earliest studies in this literature documented that the threshold tends to be lower in advanced economies—below 10 percent, and typically around 2-3 percent—than in EMDEs, where inflation thresholds have been estimated at around 20 percent.<sup>3</sup> The range of estimates varies widely, however. Some studies have estimated inflation thresholds at around 5-8 percent for Asian EMDEs and 7-9 percent for Sub-Saharan African EMDEs.<sup>4</sup> Country features that have been associated with a more negative link between inflation and growth include greater financial development and trade openness, larger government, weaker institutions, and greater political risk.<sup>5</sup>

**Why is high inflation associated with weak activity?**

High inflation is likely to weaken activity by obscuring and distorting relative prices, creating uncertainty that undermines long-term decision making and discourages savings; redistributing incomes and thereby weakening consumption; and eroding financial stability. Activity is also likely to be weakened by the policies needed to reduce inflation from high levels, including tighter monetary policies.<sup>6</sup>

**Transparency of relative price changes.** High inflation is likely to require frequent price adjustments by firms to maintain their profitability. If price adjustments for different goods and services are asynchronous (“staggered price setting”), relative price distortions will result (Woodford 2003; Fischer 1993). Even if temporary, these will tend to undermine the efficient allocation of resources and productivity growth. In particular,

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<sup>3</sup> Khan and Senhadji (2001); Drukker, Gomis-Porqueras, and Hernandez-Verme (2005); Vaona and Schiavo (2007).

<sup>4</sup> Ndoricimpa (2017); Thanh (2015); Vinayagathan (2013).

<sup>5</sup> In a large sample for 1950-2009 or 1960-2009, Ibarra and Trupkin (2011, 2016) and Eggoh and Khan (2014) find that, on average, inflation above thresholds of 19 and 12 percent, respectively, are associated with lower growth. However, the negative association between inflation and growth is stronger in countries with greater financial depth, broader trade openness, higher investment, and larger government expenditures. The threshold is in the single digits for EMDEs with the highest quality political institutions and most favorable International Country Risk Guide ratings of political risk.

<sup>6</sup> See Mishkin (2008b); Camba-Mendez, Garcia, and Rodriguez-Palenzuela (2003); and Briault (1995) for more detailed literature reviews.

**BOX 1.1 Benefits and costs of inflation: A review (*continued*)**

inflation may encourage investment in property rather than more productive investments (White 2006). If high inflation obscures relative price changes, it also creates a need for costly information search (Aksoy et al. 2017).

**Uncertainty.** High inflation may make it difficult for households and firms to disentangle relative from absolute price changes (Lucas 1972). High inflation is also typically associated with more volatile inflation (Logue and Willet 1976; Andersen and Gruen 1995; IMF 2001). Finally, high and volatile inflation signals an inability of government policies to ensure macroeconomic stability (Fischer 1993). These factors increase uncertainty about the future value of assets and hence discourage investment that requires solid long-term returns to ensure profitability (Woodford 2003). Such investment can be an important source of productivity growth, especially when it embodies new technologies (Greenwood, Hercowitz, and Krusell 1997).

**Erosion of after-tax and real incomes.** High inflation may reduce saving through two channels. First, it lifts nominal income growth and, thus, accelerates tax progression when rising nominal incomes are measured against fixed nominal income tax brackets (Greville and Reddell 1990; Feldstein 1997, 1999). This squeezes post-tax incomes, which will tend to depress household saving. Second, high inflation reduces the real value of debt—which serves as an investment vehicle for household savings—and any income derived from it (Briault 1995). The erosion of after-tax incomes and income derived from debt discourages savings and, hence, the funding envelope for productive investment.

**Risks to financial sector stability.** With high inflation, households will tend to shun financial instruments carrying fixed nominal returns and thus withdraw from bank-intermediated savings. Such disintermediation may force banks to rely on non-deposit liabilities, which will tend to raise the (short-term) cost of financing their (long-term) investment portfolios. This will raise the maturity risks inherent in the balance sheets of financial intermediaries that hold long-term assets, often at fixed interest rates, against short-term liabilities (Schwartz 1995). Furthermore, high inflation will raise the term premia and maturity risks embodied in long-term interest rates that compensate investors for long-term inflation risks. The

**BOX 1.1 Benefits and costs of inflation: A review (*continued*)**

resulting higher borrowing costs increase rollover or default risk and the cost of financing long-term investments (Wright 2011).<sup>7</sup>

**Income redistribution that weakens consumption.** Low-income households tend to rely on wages, pensions, and social benefits as their main sources of income and hold a larger share of their savings in cash (Erosa and Ventura 2002). Wages, pensions, and social benefits tend to respond less and with longer lags to inflation than nonwage income, and the real value of cash savings, being unremunerated, is eroded by inflation (Kahn 1997). As a result, poor households' real incomes tend to decline more than those of higher-income households in high-inflation environments (Romer and Romer 1997; Albanesi 2007).<sup>8</sup> Since poor households have a higher marginal propensity to consume—for example, as shown by Dynan, Skinner, and Zeldes (2004) for the United States—this tends to weaken consumption.

**Exiting high-inflation episodes.** The detrimental effect on growth of high inflation is well established in the literature, although precise thresholds vary. Additional damage to output is done when the necessary measures are taken to exit high inflation. Indexation of wages and other prices can make large output losses necessary to achieve disinflation, especially when central banks lack credibility (Blanchard and Gali 2007). (See Annex 1.3 for U.S. experience with disinflation.)

**What policy challenges does excessively low inflation pose?**

The low inflation of the early 2000s raised concerns about the ability of central banks in advanced economies to support demand when policy rates are near the zero lower bound (Reifschneider and Williams 2000; Eggertsson and Woodford 2003). An extended period of low inflation (“lowflation”) can distort resource allocation, present policy challenges in

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<sup>7</sup>The long-term interest rates can be decomposed into (i) expected inflation, (ii) expectations about the future path of real short-term interest rates, and (iii) a term premium that reflects changes in the perceived riskiness of longer-term securities and their liquidity. Term premiums on longer-term securities will be higher when investors are more risk-averse and/or the perceived risk of holding those securities is high. Historically, the most important risk for long-term bondholders has been the risk of unexpected inflation. Uncertainty about the near-term outlook for the economy or monetary policy also raises the riskiness of bonds.

<sup>8</sup>In addition, poor households often lack access to financial technologies that allow hedging against inflation (Mulligan and Sala-i-Martin 2000). Conversely, those poor households that do have access to credit may benefit from inflation because it erodes the real value of nominal claims such as loans (Doepke and Schneider 2006).

**BOX 1.1 Benefits and costs of inflation: A review (*continued*)**

responding to recessions, and undermine the credibility of central banks.<sup>9</sup> Once entrenched, deflation can trigger a spiral of self-reinforcing output losses.

**Lowflation.** When inflation is extremely low—meaning significantly below the target—relative price declines may require negative inflation in categories of goods and services with excess supply. This presents a challenge when rigidities prevent nominal price cuts of goods and services (Taylor 2000). When nominal prices cannot be reduced, low inflation can lead to distorted relative prices and inefficient allocation of resources across the economy.

Low inflation also poses monetary and fiscal policy challenges. Low inflation is typically associated with low nominal monetary policy rates. In such an environment, monetary policy may be unable to respond with conventional tools to negative shocks that reduce economic activity and inflation, since the interest rate cuts that are needed to support activity would imply negative nominal monetary policy rates. Two decades ago, it was thought that monetary policy rates could not fall below zero—the so-called “zero lower bound”—because of the incentive this would create for moving out of financial instruments into cash (Svensson 2003). The resulting disintermediation could undermine monetary policy effectiveness and capital markets. Since 2010, however, the experiences of Denmark, the Euro Area, Japan, Sweden, and Switzerland indicate that mildly negative interest rates can be sustained for extended periods without causing large-scale financial disintermediation (Arteta et al. 2016; Rogoff 2015).

However, the limited room for monetary policy action amid very low inflation and short-term interest rates implies that fiscal policy has to shoulder more of the responsibility for macroeconomic stabilization (Feldstein 2002). Such proactive fiscal policy may be difficult when government debt is high, because, all else equal, the real burden of debt is likely to remain persistently higher in a lowflation environment than in an inflationary environment where nominal incomes are rising (Contessi, Li, and De Pace 2014).

**Deflation.** Outright deflation, if sustained over an extended period, can reduce output by dampening investment and consumption and distorting resource allocation (Fisher 1933; Friedman and Schwartz 1963). Deflation

<sup>9</sup> Ciccarelli and Osbat (2017); Moghadam, Teja, and Berkmen (2014).