

## BOX 4.1 Inflation during global recessions

*Some of the sharpest inflation movements over the past half century occurred around global recessions. During these episodes, inflation typically declined for several months, driven by the coincidence of several shocks, before recovering to a lower level than before the global recession. The 2020 global recession featured the most muted inflation decline and fastest subsequent inflation upturn among the five global recessions episodes over the past 50 years.*

### Introduction

Global inflation has steadily trended down since 1970. However, there were several notable departures from this downward trend associated with global recessions. During global recessions, global output collapsed, and oil prices plunged, thus lowering inflation (Baffes et al. 2015; Kose and Terrones 2015; Wheeler et al. 2020). Along the subsequent recovery path, some global recessions were followed by lasting supply weakness that compounded the inflationary pressures associated with the demand rebound. Against this backdrop, this box examines the following questions.

- How did inflation evolve during global recessions?
- What were the drivers of inflation during global recessions?

For the purposes of this box, global inflation is defined as the cross-country median of quarterly inflation rates of 25 advanced economies and 51 EMDEs during 1970-2020. To remove one-off factors, the four-quarter moving average of quarter-on-quarter annualized inflation is used as a proxy for trend inflation.<sup>a</sup> The analysis is restricted to CPI inflation for lack of a sufficiently large country sample for other inflation measures in the 1970s-1990s. Turning points of global business cycles before the outbreak of the COVID-19 pandemic are identified using global per capita gross domestic product (GDP) as in World Bank (2020b). Since 1970, there have been five global recessions with their troughs in 1975Q1, 1982Q4, 1991Q1, and 2009Q1, and 2020Q2. These recessions were associated with a wide range of adverse developments, including financial crises in advanced economies or EMDEs (Kose, Sugawara, and Terrones 2020).

*Note:* This box was prepared by Jongrim Ha, M. Ayhan Kose, and Franziska Ohnsorge.

a. The rolling average smooths out seasonal and short-term factors. Other studies often employed different measures of trend inflation that span somewhat longer horizons; Ball (1994) employed a nine-quarter centered rolling average to eliminate the irregular factors in inflation. If applied here, this would rule out a comparison with 2020 for lack of data. Therefore, the four-quarter trailing moving average of inflation is employed instead. The results are largely consistent using four-quarter centered rolling averages.

### Evolution of inflation during global recessions

Global recessions set off a decline in global inflation that lasted several quarters beyond the trough of the recession and well into the recoveries (figure B4.1.1). Global inflation declined by a cumulative 6.2 percentage points, on average, between the trough of the global recession and the subsequent trough of global inflation. The global recession in 2009 was accompanied by a somewhat shallower (5.1 percentage point, peak to trough) and shorter-lived inflation decline, in part reflecting lower inflation at the start of the recession. Four quarters after the trough of the 2009 global recession, global inflation began to pick up. This pickup was delayed by another 1-2 years after the 1991 and 1975 global recessions and by five more years in the 1982 global recession. After all global recessions other than 1991, global inflation subsequently stabilized at a lower rate than before the global recession, returning to a path of long-term trend disinflation.

The disinflation around global recessions was broad-based across country groups (for both headline CPI and GDP deflator inflation) and inflation measures (figure B4.1.2). That said, in the 1970s through 1990s, the inflation decline was steeper in advanced economies than EMDEs, partly due to the delayed disinflation in EMDEs with high inflation in early 1990s. From 2000, the decline in inflation around global recessions was much more pronounced in EMDEs. Data for other inflation measures, such as core CPI and PPI inflation, is only available for the 2009 and 2020 recessions. In both the global recession of 2009 and of 2020, global inflation declined by all measures of inflation, but the inflation decline was larger and more prolonged in 2009 for all measures of inflation.

### Drivers of inflation during global recessions

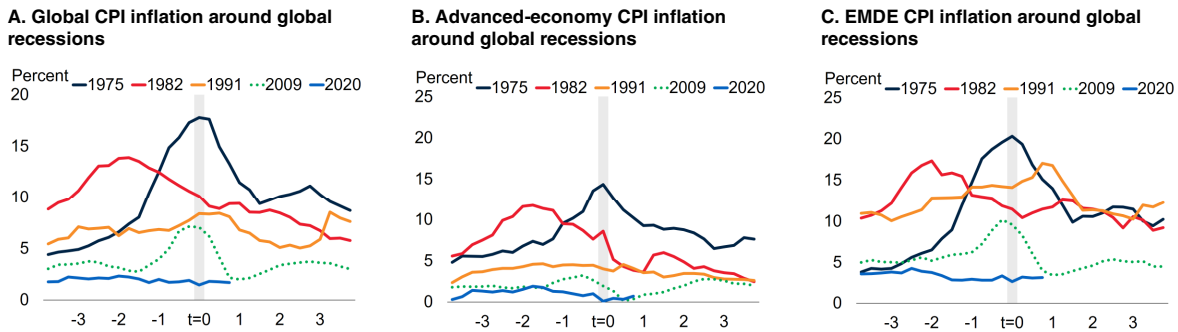
The inflation decline in the first five months of 2020 was predominantly demand-driven. With the exception of the 1991 global recession, disinflation in previous global recessions was driven by a broader range of factors (figure B4.1.3; Ha, Kose, and Ohnsorge 2019).

- The disinflation in the global recession of 1975 was predominantly driven by oil price shocks but also, in almost equal measures, by global supply and demand shocks. This was in part an unwinding of the surge in

**BOX 4.1 Inflation during global recessions (continued)**

**FIGURE B4.1.1 Headline CPI inflation around global recessions**

*Global recessions (in 1975, 1982, 1991, 2009, and 2020) have typically been associated with slowing global inflation.*

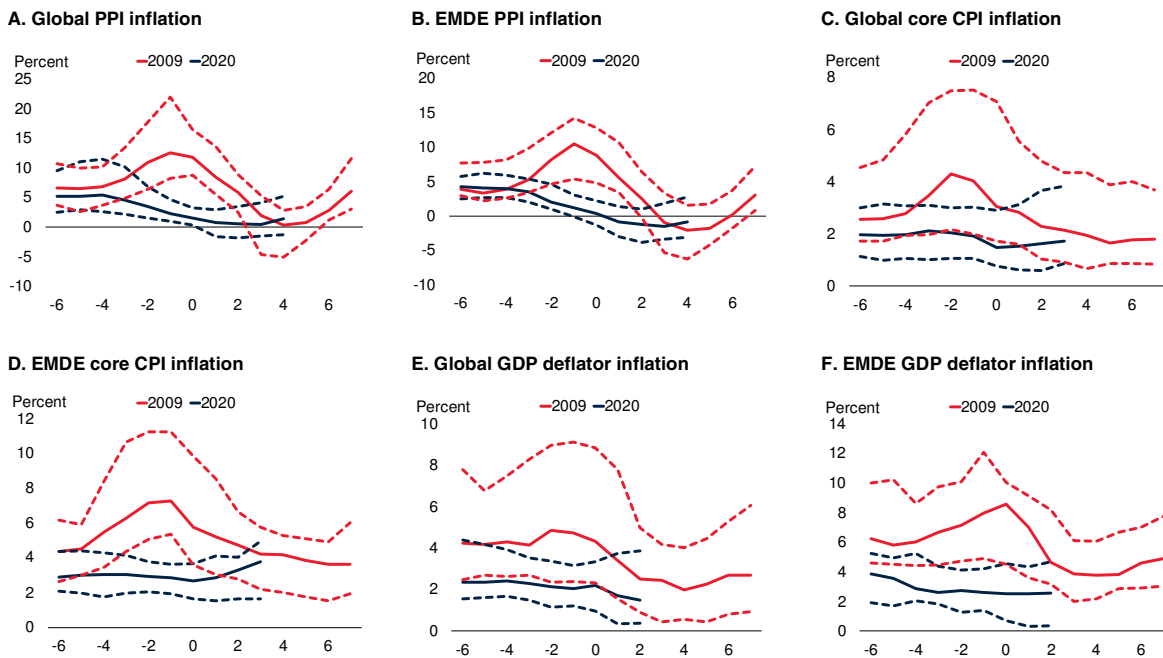


Sources: Kose, Sugawara, and Terrones (2020); World Bank (2020a, 2021a).

Note: Horizontal axes indicate years before and after the troughs of global recessions (shaded area, t = 0). Global inflation is defined as median trend inflation (4-quarter rolling average of quarterly annualized inflation) across 76 countries, consisting of 25 advanced economies and 51 EMDEs. Troughs of global recessions are identified using global per capita GDP and the algorithm in Harding and Pagan (2002) and are consistent with the results in Kose and Terrones (2015). Trough of global recession in 2020 is assumed to be at the second quarter of 2020. EMDEs = emerging market and developing economies.

**FIGURE B4.1.2 Evolution of inflation during 2009 and 2020 global recessions**

*All measures of global and EMDE inflation tend to decline with the onset of global recessions before picking up again. By all measures, the movements of global and EMDE inflation through the global recession of 2020 were more muted and shorter-lived than those during the global recession of 2009.*



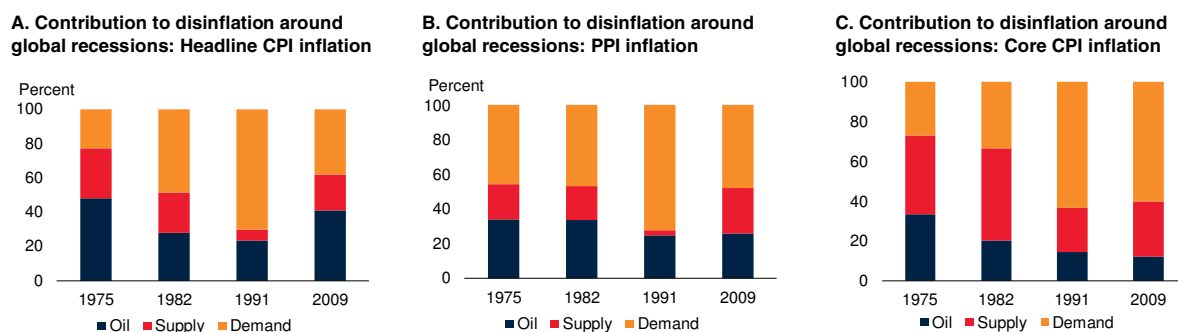
Sources: Kose, Sugawara, and Terrones (2020); World Bank (2020a, 2021a).

Note: Horizontal axes indicate quarters before and after the troughs of global recessions (t=0). Global inflation is defined as median trend inflation (four-quarter rolling average of quarterly inflation). Core inflation data are available for 51 countries, including 28 emerging market and developing economies (EMDEs), and producer price index (PPI) data are available for 85 countries, including 53 EMDEs, GDP deflator data are available for 81 countries, including 50 EMDEs. Troughs of global recessions are 2009Q1 and 2020Q2.

### BOX 4.1 Inflation during global recessions (*continued*)

#### FIGURE B4.1.3 Drivers of disinflation in past global recessions

*Inflation in global recessions has been driven by different types of factors. In 1991, demand largely explained the collapse in inflation movements. In 1975 and 2009, oil price movements were the main source of inflation variation.*



Sources: Ha, Kose, and Ohnsorge (2019); Kose, Sugawara, and Terrones (2020).

Note: Historical decompositions of global inflation measures are estimated by the global FAVAR model for the sample period 1970-2017. Troughs of global recessions are identified using global per capita GDP and the algorithm in Harding and Pagan (2002) and are consistent with the results in

Kose and Terrones (2015). Charts show relative contribution of oil price, global demand, and global supply shocks to global disinflation from the trough of the global recession to the subsequent trough in global inflation.

inflation after the oil crisis in 1973-74 when oil prices quadrupled and an oil embargo disrupted transport and manufacturing.

- The disinflation in the 1982 global recession was driven by global demand shocks (one-half), global supply shocks (one-quarter) and global oil price shocks (one-quarter). This disinflation was in part the intended response to the monetary policy tightening in major advanced economies, after the oil price crisis of 1979 (following the Iranian revolution) led to a surge in inflation.
- The disinflation in the 1991 global recession was predominantly global demand driven as financial crises or credit crunches in several advanced economies culminated in a global recession.
- The disinflation at the height of the global recession of 2009 (2008Q4 and 2009Q1) was driven by both demand and oil price shocks in broadly equal measure. Despite coordinated global fiscal and monetary policy support, the global financial crisis caused a deep global recession that was accompanied by a two-thirds plunge in oil prices in the five months from July 2008.

Again, with the exception of the global recession of 1991, the predominance of demand shocks in driving down core

CPI and PPI inflation during the 2020 pandemic contrasts with the sources of disinflation in previous recessions.

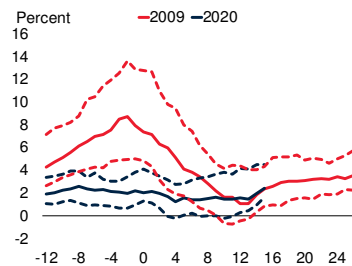
- In 1975, oil price shocks and demand shocks were the main source of PPI disinflation and oil price shocks and supply shocks the main source of core CPI disinflation. Disinflation at that time mainly reflected an unwinding of earlier shocks—the oil price spike of 1974 and the inflationary impact of wage and consumer price controls being lifted, accompanied by the collapse of the Bretton Woods fixed exchange rate system in 1971. The large role of oil price shocks in core CPI inflation dynamics—notwithstanding the exclusion of energy from the core inflation aggregate—in the 1970s may also have reflected poorly anchored inflation expectations once the nominal anchor of the Bretton Woods fixed exchange rate regimes was lost (Ha et al. 2019b).
- In 1982, supply and demand shocks were the main source of core CPI disinflation and demand shocks the main source of PPI disinflation. Again, disinflation in part reflected a drawn-out unwinding of earlier shocks. By the late 1970s, inflation expectations had become unanchored in some advanced economies and inflation-wage spirals became entrenched in major advanced economies while output growth stagnated at a low level (Bryan 2021). The doubling of oil prices in 1979 added fuel

### BOX 4.1 Inflation during global recessions (continued)

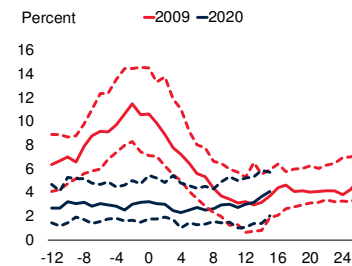
#### FIGURE B4.1.4 Inflation in 2008-10 and 2020-21

In the pandemic-induced global recession of 2020, inflation declined less and rebounded faster than in the financial-crisis-induced global recession of 2009.

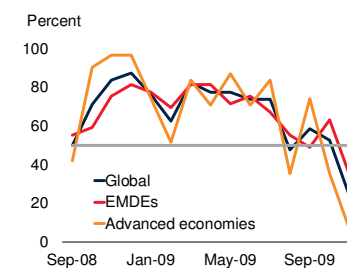
**A. Global inflation**



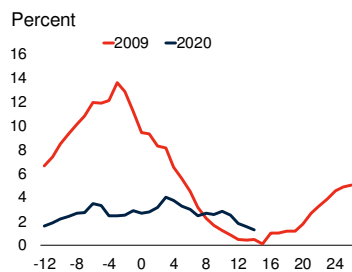
**B. EMDE inflation**



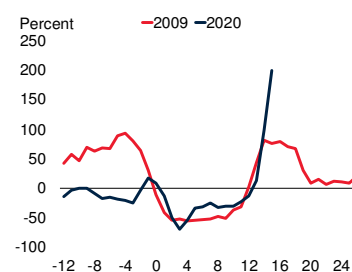
**C. Share of countries with declining inflation**



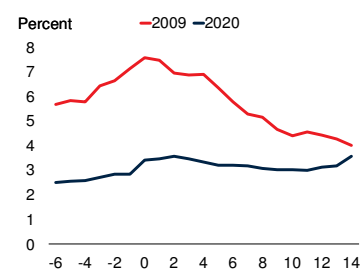
**D. Global food price inflation**



**E. Oil price growth**



**F. Inflation expectations for EMDEs**



Sources: Consensus Economic; Haver Analytics; World Bank.

Note: Year-on-year monthly inflation for 81 countries, of which 31 are advanced economies and 50 are emerging market and developing economies (EMDEs). t=0 is September 2008 for 2009 and January 2020 for 2020.

A.B. Blue and red lines are medians, dotted lines are interquartile ranges.

C. Share of all countries, advanced economies and EMDEs in which year-on-year inflation slowed from one month to the next. Gray line shows 50 percent.

D. Median.

E. Year-on-year growth in the average of Brent, Dubai, and WTI oil prices.

F. Consensus inflation expectation for 2009 ("2009") and 2021 ("2020") for 48 EMDEs.

to inflation pressures. The monetary tightening across advanced economies in the early 1980s helped stabilize inflation expectations while also causing recessions.

- In 2009, negative oil price shocks and global demand shocks contributed, in almost equal measure, to declines in global PPI inflation while core CPI inflation remained broadly stable as negative demand shocks were offset by negative supply shocks. Well-anchored inflation expectations from the early 2000s helped stabilize inflation despite adverse demand shocks.

#### Inflation during the last two global recessions

A more granular comparison, using monthly data for 31 advanced economies and 50 EMDEs for 2001-2021, is

possible for the global recessions of 2009 and 2020. This exercise also shows that the global inflation decline during the global recession of 2020 has been more muted and shorter-lived than during the global recession of 2009 (figure B4.1.4). This may reflect the fact that the global recovery from the 2020 recession was swifter than that of any previous global recession in the past eight decades, despite the global recession being the most severe since the Second World War (box 1.1).

Inflation declined by 0.9 percentage point globally and 1.2 percentage point in EMDEs from January 2020 before reaching its trough in May 2020—five months after the beginning of the global pandemic. In contrast, inflation declined by 6.3 percentage points globally and 7.6 percentage points in EMDEs from September 2008 to its trough in October 2009—13 months after the bankruptcy

### BOX 4.1 Inflation during global recessions (*continued*)

of Lehman Brothers that set off the global financial crisis. Whereas inflation started rising in the majority of countries five months after the onset of the pandemic, in May 2020, it only started rising in the majority of countries a year after the onset of the global financial crisis, in October 2009. The global recession of 2009 itself featured a shallower and shorter-lived inflation decline than previous global recessions.

The decline in global inflation from January-May 2020 was four-fifths driven by the collapse in global demand and another one-fifth driven by plunging oil prices, with some offsetting inflationary pressures from supply disruptions. This contrasts with the global financial crisis in which the 13-month decline in global as well as EMDE inflation was about one-half driven by plunging oil prices and only one-third driven by the contraction in global demand. The greater role of global demand in the inflation decline in 2020 than in previous global recessions may reflect the sheer severity of the recession of 2020 (World Bank 2021a). In their rebounds, however, global and EMDE inflation developments after the two global recessions of 2009 and 2020 resembled each other: both were virtually entirely driven by increases in global demand.

Short-term (one-year-ahead) inflation expectations inched down by 0.3 percentage point globally between March and

May 2020 before stabilizing again at 2.0 percent for the remainder of 2020. They only rose by 0.2 percentage point in March 2021 as it became apparent that the recovery was proceeding faster than anticipated and new policy support measures were approved (chapter 1). In EMDEs, inflation expectations declined by 0.5 percentage point throughout 2020 until a 0.4 percentage point uptick in March 2021. These minor movements of short-term inflation expectations stand in sharp contrast to the 2.1 percentage point decline globally and 2.6 percentage point decline in EMDEs in the 14 months following September 2008, through the global recession of 2009. Long-term inflation expectations also remained stable in 2020, both globally and in EMDEs—for EMDEs, in contrast to the 1.0 percentage point decline in the 18 months following September 2008. This in part reflected a view that the disruptions caused by the pandemic were temporary in nature and may have helped dampen fluctuations in global inflation.

### Conclusion

Global recessions are associated with sharp movements in inflation. The 2020 global recession featured the most muted and least protracted inflation decline. This may have reflected lower initial inflation but, in 2020, also deployment of unprecedented policy support and a rapid economic recovery.

## Relative importance of drivers of inflation

To disentangle the quantitative importance of some of these forces, a factor-augmented VAR (FAVAR) model with sign and narrative restrictions is estimated. The model is applied to three global variables—inflation, output growth, and oil price growth—all expressed in month-on-month growth rates. Global inflation and output growth are proxied by the common global factor estimated using a dynamic factor model of cross-country inflation and industrial production growth, respectively (annex 4.1). The dynamic factor model includes monthly data for 30 advanced economies and 51 EMDEs for 2001-2021. The global oil price is based on the average of Dubai, West Texas Intermediate, and Brent oil

prices, as reported in the World Bank's *Pink Sheet* of commodity prices. The exercise is repeated for advanced economies and EMDEs separately, and for headline CPI inflation, core CPI inflation, and PPI inflation. The PPI tends to have larger tradables content than the headline CPI, whereas the core CPI tends to have smaller tradables content than the headline CPI (Ha, Kose, and Ohnsorge 2019). The estimation results suggest a sequence of changing disinflationary forces in January-May 2020 that were subsequently unwound.

- *January-May 2020.* Between January and May, four-fifths of the decline in global inflation reflected the collapse in global demand as consumption and investment collapsed amid lockdowns and uncertainty about policies and growth prospects. Another