

A. Low Growth and Low Inflation Expectations in the Post-COVID-19 World: A Market-Based Perspective¹

The US 10-year real yield—derived from Treasury inflation-protected securities—has declined sharply since the COVID-19 sell-off (Figure 1.1.1, panel 1).² Such a decline may point to increasing concerns about a deterioration in growth prospects over the next 10 years.

To assess the inflation outlook, information contained in both real and nominal yields must be considered jointly. A common measure of market-based inflation expectations—breakeven inflation—is computed as the difference between nominal and real yields for a given maturity. Breakevens, however, are subject to two important potential distortions. First, US Treasury inflation-protected securities are generally less liquid than their nominal counterparts, especially during periods of market stress. Second, breakevens incorporate an inflation risk premium—that is, the compensation that investors require for bearing inflation risk. It is therefore useful to decompose breakevens into expected inflation and inflation risk premium components, adjusting for potential Treasury inflation-protected securities illiquidity, as captured by both volume- and price-based metrics.³

The inflation breakeven decompositions suggest that market-implied average five-year expected inflation fell notably early this year, but has recovered somewhat (Figure 1.1.1, panel 2). Inflation expectations over the 5- to 10-year horizon declined to slightly below 2 percent (Figure 1.1.1, panel 3) and appear to have settled around this lower level. Inflation risk premiums are currently in negative territory, especially at longer horizons, reflecting market expectations of low inflation coinciding with low output growth.⁴

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² Real yields spiked during the brief sell-off in the Treasury securities market in early March, prior to the Federal Reserve's quantitative easing announcement on March 15 and after the Federal Open Market Committee meeting (<https://www.federalreserve.gov/newsevents/pressreleases/monetary20200315a.htm>).

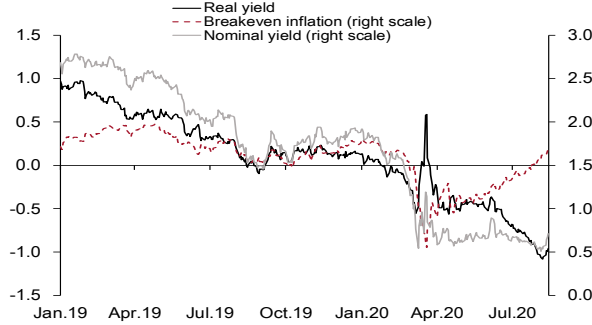
³ Breakeven inflation decompositions are carried out using a variant of the framework put forth by Abrahams and others (2016).

⁴ In the event of a supply shock (for example, an oil shock), low output growth would tend to coincide with high inflation, requiring investors to pay an insurance premium—translating into a positive inflation risk premium—for protection against the risk of inflation eroding real returns. Conversely, in the event of a demand shock, when low output growth would be accompanied by low inflation, nominal bonds would act as “deflation hedges” (Campbell, Sunderam, and Viceira 2016), as they provide insurance against global bad conditions, while real bonds do not. Investors expecting low-inflation outcomes would thus require a premium for holding Treasury inflation-protected securities—corresponding to a low or negative inflation risk premium.

Online Annex Figure 1.1.1. COVID-19 Reinforced Low Growth, Low Inflation Expectations

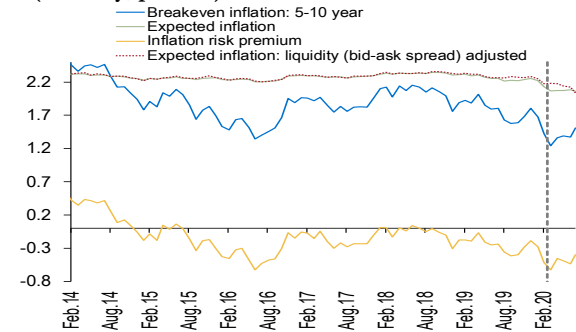
The decline in real yields has accelerated since the start of the COVID-19 pandemic, raising concerns about future growth prospects.

1. Evolution of Real and Nominal 10-Year Yields (Daily, percent)



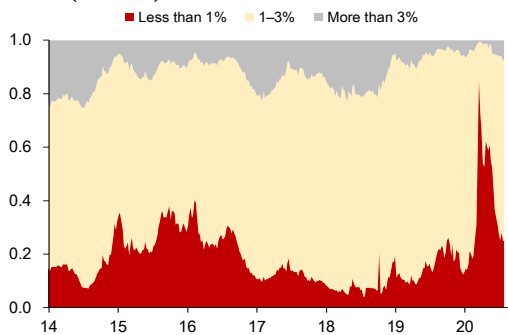
Longer-term inflation expectations appear to have fallen some after the March sell-off.

3. Decomposition of 5- to 10-Year Breakeven (Monthly, percent)



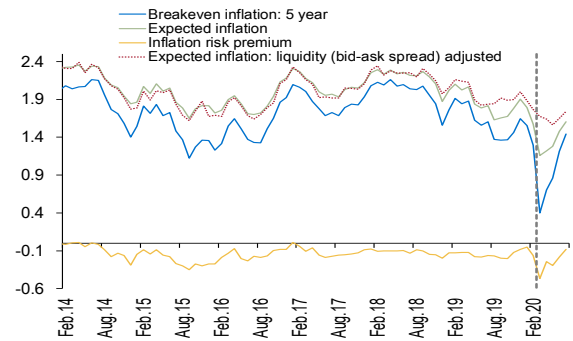
The probability of low inflation has declined in the United States, though it remains almost four times as high as the probability of high inflation (which seems to be on a secular decline).

5. Option-Implied Probabilities of Various Expected Inflation Outcomes (Five-Year Inflation) in the United States (Percent)



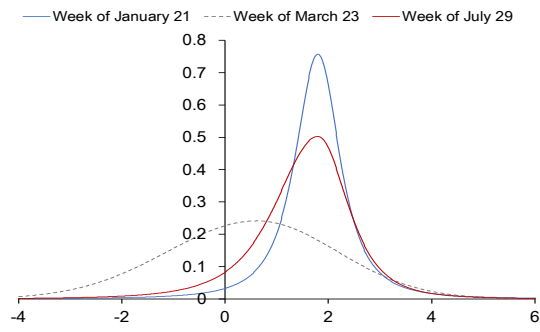
Inflation expectations for the next five years dropped initially but appear to have recovered somewhat.

2. Decomposition of Five-Year Breakeven (Monthly, percent)



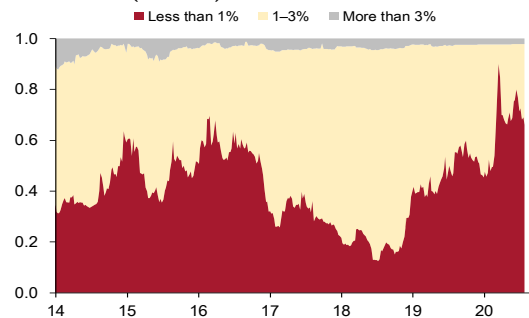
The option-implied probability distribution shows that market pricing has normalized since March 23, but downside skew remains larger than pre-COVID-19 levels.

4. Option-Implied Densities Based on Inflation Caps and Floors: Five-Year Inflation



The probability of low inflation is much higher in the euro area and seems to have stabilized at about 60 percent.

6. Option-Implied Probabilities of Various Expected Inflation Outcomes (Five-Year Inflation) in the Euro Area (Percent)



Sources: Bloomberg Finance L.P.; Federal Reserve Bank of St. Louis, Federal Reserve Economic Data; Federal Reserve Board of Governors; Haver Analytics; and IMF staff calculations.
 Note: Panels 2 and 3 refer to monthly decompositions, based on end-of-month data. In panel 4, the option-implied densities are approximated by a parametric density of skew normal form.

The apparent recovery in five-year market-implied inflation expectations is also reflected in options pricing. Deriving probability densities from inflation caps and floors makes it possible to gauge what likelihood market participants are attaching to different expected inflation outcomes.⁵ After sharply shifting toward very low inflation outcomes and becoming more dispersed during the week of March 23, the most recent density is more in sync with what prevailed at the end of January 2020 (Figure 1.1.1, panel 4), although with a more pronounced downside skew. Specifically, the probability of inflation falling below 1 percent over the next five years, as of the end of July, is about 25 percent—compared with 20 percent around the end of January and 12 percent at the end of 2019. The same probability spiked to about 85 percent at the time of the COVID-19 sell-off.

Panel 5 of Figure 1.1.1 provides a more comprehensive view of the evolution of inflation odds (1) below 1 percent (“low” inflation), (2) of 1–3 percent, and (3) above 3 percent (“high” inflation). In the United States, the probability of low inflation is almost four times that of high inflation, which has been on a declining trend for the better part of the past decade. (A similar pattern is also evident in the euro area.) Moreover, the odds of low inflation in the United States have fallen toward January 2020 levels, while in the euro area they remain elevated at about 60 percent (Figure 1.1.1, panel 6).

In conclusion, despite evidence of upward movement in five-year market-implied inflation expectations after the March sell-off, especially in the United States, such recovery appears to represent more of a reversion toward a preexisting downward trend that emerged after the global financial crisis.

⁵ An inflation cap (floor) offers protection against inflation that is higher (lower) than a given rate over a given horizon and is thus used by investors to insure against such inflation outcomes.

B. Spillovers from Monetary Policies in Major Advanced Economies to Emerging Market Economies⁶

An important policy question is how the highly-accommodative monetary policies of central banks in major advanced economies taken in response to the COVID-19 crisis are likely to affect emerging market economies. Such spillovers have been an ongoing concern of emerging market economy policymakers (Carstens 2019). Expansionary monetary policy in major advanced economies—including both conventional policy rate cuts that may be accompanied by forward guidance and asset purchases—work through broadly similar channels to ease financial conditions in emerging market economies. In particular, the decline in long-term bond yields in major advanced economies tends to put downward pressure on long-term bond yields in emerging market economies through portfolio balance channels as investors are attracted to the relatively higher return on emerging market economy bonds. As a result, emerging market economy asset price rise and risk premiums decline, which in turn boosts emerging market economy currencies, especially for countries with large foreign currency exposures (Hofmann, Shim, and Shin 2019). Such spillovers may be desirable or undesirable for emerging market economies, depending on the state of their business cycles.

A growing empirical literature finds that major advanced economies' monetary policies, especially those of the US Federal Reserve, have sizable quantitative effects on emerging market economies. US Federal Reserve actions have been a major focal point, given that they exert particularly large spillovers to emerging market economies, likely reflecting the predominant role of the dollar both as a funding currency and in trade invoicing (Gopinath and Stein 2019; Bräuning and Ivashina 2020). While empirical studies provide a range of estimates that reflect differences in country coverage, sample periods, and empirical methodologies, there appear to be several important takeaways. First, US monetary policy actions have large effects on emerging market economy sovereign bond yields, particularly at longer maturities.² As shown in Table 1.3.1, several studies find that a US policy easing that depresses US 10-year yields by 100 basis points tends to reduce 10-year emerging market economy bond yields by roughly one-third to one-half as much, with particularly large effects in the post-global financial crisis period (Bowman, Londono, and Sapriza 2016; Curcuru and others 2018; Caballero and Kamber 2019). Moreover, while quantitative easing in the wake of the global financial crisis was often criticized for generating large spillovers to emerging market economies, empirical evidence suggests that the pass-through from the US Federal Reserve's forward guidance and asset purchases to emerging market economy bond yields is broadly commensurate.³ Second, US Federal Reserve actions significantly affect investor risk tolerance for emerging market economy assets. Notably, US Federal Reserve easing raises emerging market economy equity prices (Chari, Stedman, and Lundblad 2020), leads to significant capital inflows to emerging market economies (Fratzscher, Lo Duca, and Straub 2018) and higher corporate leverage in those economies (Alter and Elekdag 2019), and boosts emerging market economy currencies (Table 1.1.1). Finally, the effects of US

⁶ The authors of this section are Pawel Zabczyk and Jianping Zhou.

Federal Reserve actions vary substantially across emerging market economies, with the spillovers typically larger for economies with higher financial openness (IMF, 2011).

This empirical literature provides some basis for deriving rough estimates of the potential financial spillovers to emerging market economies from US Federal Reserve actions during the COVID-19 crisis. The estimates of the pass-through of US policy actions to emerging market economy yields discussed above suggest that those actions since COVID-19 have reduced emerging market economy long-term bond yields substantially—in the range of 30–60 basis points—and have also induced emerging market economy currencies to appreciate by several percentage points. Given that emerging market economy 10-year bond yields have declined by roughly 120 basis points since their peak in mid-March, a straight read of these estimates would suggest that about one-quarter to one-half of the decline in emerging market economy long-term interest rates is attributable to US Federal Reserve easing since the onset of COVID-19. These estimates should be interpreted with suitable caution. The COVID-19 crisis has many unique features, and estimates based on historical experience—especially from the post-global financial crisis period, in which transmission of US Federal Reserve policy changes to emerging market economies was particularly high—may not carry over to the current environment. Even so, the estimates seem consistent both with substantial spillovers from US Federal Reserve easing, and with emerging market economy monetary policies playing a significant role in influencing long-term yields in their economies (as emphasized in Chapter 2).

These financial spillovers to emerging market economies are likely to be welcomed in the near term to the extent that emerging market economies face weak aggregate demand and relatively tight financial conditions. Against this backdrop, accommodative monetary policy by major advanced economies will support recovery in emerging market economies and help cushion against sizable downside risks, including the possibility of a sharp deterioration in investor risk sentiment. The more synchronized global downturn in the COVID-19 crisis contrasts with the post-global financial crisis experience, when emerging market economies staged a much faster recovery than advanced economies. In that case, accommodative monetary policies of major advanced economies induced large capital inflows to emerging market economies and overly-easy financial conditions, posing significant challenges to emerging market economy policymakers.

Online Annex Table 1.1.1. Effects of US Monetary Policy on Emerging Market Economy Yields and Exchange Rates: Selected Studies

Paper	Type of Shock	Sample Period	Effect on Emerging Market Economy Yields		Effect on Foreign Exchange Rate ¹
Bowman and others (2015)	US monetary policy shock increasing US 10-year yields by 100 basis points	Full sample (1/2007–12/2013)	56 basis points (Δ EME basket yield)		200 basis points
Curcuro and others (2018)	US monetary policy announcement associated with a 100 basis points increase in US 10-year Treasury yields	Full sample (1/2002–12/2017)	32 basis points (avg. Δ EME 10Y yield) ²		211 basis points
		Post-global financial crisis (1/2010–12/2017)	48 basis points (avg. Δ EME 10Y yield) ²		427 basis points
Caballero and Kamber (2019)	US monetary policy shock increasing US 10-year yields by 100 basis points	Pre-zero lower bound (1/1999–9/2008)	35 basis points (avg. Δ EME 10Y yield) ⁷		N/A
		Post-zero lower bound (4/2009–12/2015)	76 basis points (avg. Δ EME 10Y yield) ³		N/A
Albagli and others (2019)	US monetary policy shock increasing US two-year yields by 100 basis points	Full sample (1/2003–12/2016)	2-year: 16 basis points⁴	10-year: 29 basis points⁴	352 basis points
		Post-global financial crisis (10/2008–12/2016)	2-year: 29 basis points⁴	10-year: 56 basis points⁴	666 basis points

Source: IMF staff

¹Estimates are either for a basket of emerging market economy currencies or averages of bilateral US dollar estimates. Positive values denote depreciation relative to the US dollar.

²The full sample point estimates and their post-global financial crisis equivalents equal, respectively, the following: Korea (30 basis points, 39 basis points), Mexico (25 basis points, 36 basis points) and Brazil (41 basis points, 69 basis points). The table reports averages of these numbers.

³The numbers refer to averages of point estimates of the effects of the US federal funds rate and forward guidance components in the pre-zero lower bound period, and of the forward guidance and large-scale asset purchase program in the post-zero lower bound period. The emerging market economy sample is comprised of China, Hong Kong SAR, Indonesia, India, Korea, Malaysia, Philippines, Singapore, and Thailand. The individual estimate ranges, rescaled to coincide with a 100 basis point US tightening are pre-zero lower bound federal funds rate [–70, 167], pre-zero lower bound forward guidance [–65, 79], post-zero lower bound forward guidance [18, 262], post-zero lower bound large-scale asset purchase program [1, 110], all in basis points.

⁴The sample is comprised of emerging market economies including Chile, Colombia, Hungary, India, Indonesia, Mexico, Poland, South Africa, South Korea, Taiwan Province of China, and Thailand (though it also includes Israel). The estimates come from a regression estimated for the whole group.

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