BOX 3.2 Implications of rising uncertainty for investment in EMDEs

Political and policy-related uncertainty has increased since the global financial crisis for most EMDEs. EU policy uncertainty has reduced investment in the EU’s EMDE trading partners, and domestic policy uncertainty has weighed significantly on investment in Brazil. Global financial market uncertainty (as measured by the VIX) significantly affects EMDE investment.

Elevated macroeconomic and policy uncertainty after the crisis has contributed to weak investment growth in AEs (Kose and Terrones 2015). However, less is known about the implications of uncertainty for EMDEs. This box examines the effects of uncertainty on investment growth by addressing the following questions:

- What are the basic sources of uncertainty?
- How has uncertainty evolved in EMDEs since the 2008-09 crisis?
- How has uncertainty affected investment in EMDEs?

The results suggest a post-crisis rise in political and policy uncertainty in EMDEs and bouts of financial market uncertainty amidst ample global liquidity. Policy uncertainty in the European Union (EU)—including that associated with the Euro Area crisis—has weighed on investment in the EU’s EMDE trading partners in Europe and Central Asia. Domestic policy uncertainty has sharply curtailed investment in Brazil.

Basic sources of uncertainty

Although uncertainty is often discussed in policy debates, there is no universally agreed measure of it. This box uses three measures for EMDEs, the United States, as well as the EU.

- Financial market uncertainty. Financial market uncertainty is measured by a quarterly financial market volatility measure, which is constructed using the realized standard deviation of daily changes in stock price indexes (Bloom, Bond, and Van Reenen 2007; Bloom 2009; Gilchrist, Sim, and Zakrjesk 2014). The VIX index of implied volatility of the S&P 500 stock market index in the United States is used as an indicator of global financial market volatility.

- Economic Policy Uncertainty. The Economic Policy Uncertainty (EPU) Index is a news-based measure to capture policy-related uncertainty developed by Bloom, Baker, and Davis (2016). The EPU index is constructed from counts of terms related to policy

---

Note: This box was prepared by Jongrim Ha, Raju Huidrom, and Congyan Tan.
uncertainty appearing in newspapers in each country. This measure is available for four EMDEs: Brazil, China, India, and Russia.

• Political uncertainty. Political uncertainty is measured by the political risk rating developed by the Political Risk Services Group’s (PRS) International Country Risk Guide (ICRG). The rating simply summarizes expert judgment on each economy’s political environment. As used here, a higher value of the index reflects greater political risk. For the four EMDEs with available data, the ICRG risk scores are positively correlated with the EPU Index, suggesting overlap between political risk and policy uncertainty.

Evolution of uncertainty in EMDEs since the 2008-09 crisis

In most EMDEs, political and policy uncertainty were higher post-crisis (2010-2015) than pre-crisis (2003-2008), as indicated by the ICRG-based political uncertainty and EPU-based policy uncertainty measures (Figure 3.2.1). Political risk increased in more than four-fifths of EMDEs and policy uncertainty increased in all four major EMDEs for which data are available. In contrast, financial market volatility, as measured by the standard deviation of domestic stock market indexes, declined in most EMDEs, reflecting exceptionally accommodative monetary policies and record-low interest rates globally. The generally low post-crisis financial market volatility was disrupted by several bouts of global financial market uncertainty. The VIX, which in normal circumstances tends to fluctuate in the 10-30 range, surged to above 40 basis points during periods of intense market concerns about the future of the Euro Area (March-June 2010 and May-September 2011) and about the stability of Chinese equity markets and growth prospects (July-August 2015).

Impact of uncertainty on investment in EMDEs

To assess the effects of uncertainty on investment during 1998Q1-2016Q2, a series of vector autoregressive models were estimated for 18 EMDEs. Two sources of uncertainty were distinguished: domestic and global. Global financial market uncertainty was captured by the VIX. Global policy uncertainty was captured by the EPU for the United States and the EU. Domestic policy uncertainty was captured by the EPU for Brazil. Details of the estimation are presented in Annex 3.1B.

• Global financial market uncertainty. Global financial market uncertainty shocks, as measured by spikes in
Box 3.2 Implications of rising uncertainty for investment in EMDEs (continued)

### FIGURE 3.2.3 Policy uncertainty and investment in EMDEs

Elevated policy uncertainty in Europe set back investment in ECA. Policy uncertainty has been a significant cause of the investment slump in Brazil since 2013.

#### A. ECA investment response to 10 percent increase in EU policy uncertainty

- **Percentage points**

  - Quarter 1: -0.5
  - Quarter 2: -0.5
  - Quarter 3: -1.5
  - Quarter 4: -2.5
  - Quarter 5: -2.0
  - Quarter 6: -1.5
  - Quarter 7: -1.0
  - Quarter 8: -0.5

#### B. Investment response to 10 percent increase in policy uncertainty in Brazil

- **Percentage points**

  - Quarter 1: -1.0
  - Quarter 2: -1.5
  - Quarter 3: -2.0
  - Quarter 4: -1.5
  - Quarter 5: -1.0
  - Quarter 6: -0.5
  - Quarter 7: 0.0
  - Quarter 8: 0.5

#### C. Contribution of EU policy uncertainty to ECA investment growth

- **Percent**

  - 2008: -20
  - 2009: -15
  - 2010: -10
  - 2011: -5
  - 2012: 0
  - 2013: 5
  - 2014: 10
  - 2015: 15
  - 2016: 20

#### D. Contribution of domestic policy uncertainty to Brazil’s investment growth

- **Percent**

  - 2008: 0
  - 2009: -5
  - 2010: -10
  - 2011: -15
  - 2012: -20
  - 2013: -15
  - 2014: -10
  - 2015: -5
  - 2016: 0

Sources: Bloomberg, Haver Analytics, World Bank estimates.

A.C. Vector autoregressions are used for estimation on a sample of aggregate EMDE variables for 1998Q1-2016Q2. The model includes the EPU for the Euro Area, emerging market stock price (Euro Area) index, emerging market bond index, aggregate real output and investment growth in 6 ECA countries, with G7 real GDP growth, U.S. 10-year bond yields, and MSCI World Index as exogenous regressors and estimated with two lags.

B.D. Country-specific autoregressions are estimated for Brazil for 1998Q1-2016Q2. The model includes the domestic EPU, domestic stock market index, domestic short-term interest rates, and real output and investment growth, with G7 real GDP growth and VIX as exogenous controls and estimated with two lags.

A.B. Show cumulative responses of investment to a 10 percent policy uncertainty shock in the Euro Area and Brazil. Solid lines indicate median responses. Dotted lines indicate the 16-84 percent confidence intervals. Figures C. and D. indicate historical decomposition to investment growths in ECA and Brazil, respectively. Estimates for 2016 are based on the first half in 2016 (annualized).

The VIX, significantly reduced EMDE investment, in line with findings of earlier studies (Carrière-Swallow and Céspedes 2013). Specifically, a 10 percent increase in the VIX reduced average EMDE investment growth by about 0.6 percentage point within a year (Figure 3.2.2). Financial market uncertainty was the key source of the slowdown in EMDE investment growth in 2008-09. Bouts of global financial market uncertainty (such as during the Euro Area crisis, the 2013 Taper Tantrum, and the 2016 Brexit) also weighed on EMDE investment.
Turner 2016; Hall 2016). Similarly, slowing capital accumulation weighs on potential growth in EMDEs.7

Weaker productivity growth. In addition to slowing capital accumulation, weak investment growth is associated with slower total factor productivity growth, as investment is often critical to the adoption of new, productivity-enhancing technologies.8 Among AEs, a steady productivity growth slowdown was underway even before the global financial crisis. Possible drivers include structural change towards lower-productivity services, caused partly by demand shifts related to population ageing, a lack of transformative innovations, and slower technology diffusion.9

Weaker investment growth may partly account for the slowdown in total factor productivity growth in EMDEs, from 2.2 percent in 2010 to -0.2 percent in 2015.10 The productivity slowdown was most pronounced in commodity-exporting EMDEs and those EMDEs with the slowest investment growth (Figure 3.14). Weaker total factor productivity growth would also be reflected in slower labor productivity growth—the key driver of long-term real wage growth and household income growth (Blanchard and Katz 1999; Feldstein 2008).

Slower income catch-up. Weak investment growth in EMDEs is both a symptom and a source of slowing pace of catch-up to AE income levels. Specifically, by reducing potential growth in EMDEs relative to AEs, it slows the pace of catch-up in per-capita incomes. In 2015, the difference in investment growth between EMDEs and AEs reached its lowest level since the early 2000s. If weakness in investment growth persists

7If investment growth is assumed to remain as low as in 2015 (3.3 percent), 2020 potential growth would be about two-thirds of potential growth in the pre-crisis investment growth scenario.
8Gollop, Fraumeni, and Jorgenson (1987); Griliches (1988); Jorgenson (1991); Colecchia and Schreyer (2002); Bourreau, Cambini, and Dogan (2012); and OECD (2016a).
10TFP is calculated as residual from the growth-accounting framework in Didier et al. (2015). The slowdown happened despite some evidence of somewhat faster cross-country technology absorption from countries at the productivity frontier (Comin and Ferrer 2013; IFC 2016a).