

### BOX 3.4 The long shadow of contractions over potential output

*Contractions are associated with about 1 percentage point lower potential growth four to five years after their onset. The effect is initially stronger, but less persistent, for emerging market and developing economies.*

The slow recovery from the global financial crisis and the sharp slowdown in commodity-exporting EMDEs caused by the recent slump in commodity prices have reignited the debate about the impact of deep recessions on potential output levels and growth. Global output contracted by 1.8 percent in 2009 and, in 2017, remained 4 percent below its pre-crisis trend. Most EMDEs avoided outright contractions in 2009—partly as a result of large stimulus. However, one-quarter of commodity-exporting EMDEs subsequently slid into recessions as commodity prices declined. In others, growth halved as a result of domestic political tensions or spillovers from policy uncertainty elsewhere. This post-crisis growth weakness has coincided with a decline in potential growth (Figure 3.4.1).

Severe short-term output shocks have been associated with highly persistent losses in output levels in both advanced economies and emerging market and developing economies (EMDEs). In advanced economies, output growth also tends to remain lower after recessions than

pre-recession for a protracted period.<sup>1</sup> On average in a sample of 40 advanced economies and EMDEs, a recession was associated with 0.5 percentage point lower per capita potential growth in the two years following the pre-recession output peak, but half of this decline was reversed over the following two years (Haltmeier 2012).

Against this background, this box focuses on the impact of contractions on potential growth in a large sample of AEs and EMDEs. Specifically, it addresses the following questions:

- How can contractions affect potential growth?
- What has been the impact of contractions on potential growth?

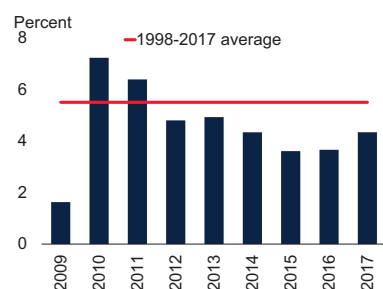
#### Linkages: Theory and evidence

A number of mechanisms may drive potential output losses as a result of crises or severe contractions. Theoretical models highlight the role of weak profitability for

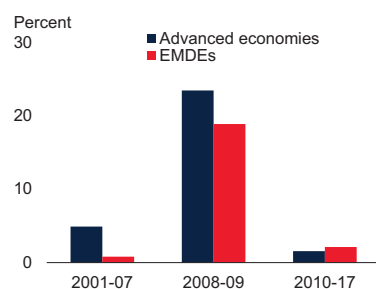
**FIGURE 3.4.1 Output**

*Global output remains 4 percent below its pre-crisis trend. While most EMDEs avoided outright contractions in 2009—partly as a result of large stimulus—several subsequently slid into recessions or sharp slowdowns. Since the global financial crisis, potential growth has also slowed, by all measures of potential growth.*

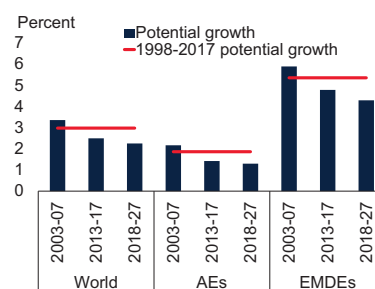
#### A. EMDE output growth



#### B. Share of countries with output contractions



#### C. Potential growth



Source: World Bank.

Note: GDP-weighted averages.

B. Includes 38 advanced economies and 150 EMDEs.

C. Potential growth estimates based on the production function approach.

Note: This box was prepared by Sinem Kilic Celik and Franziska Ohnsorge.

<sup>1</sup> For research on the impact of contractions on growth, see Cerra and Saxena (2008); Candelon, Carare and Miao (2016); Queraltó (2013); Blanchard, Cerutti and Summers (2015); Martin, Munyan, and Wilson (2015); Ball (2014); and Haltmeier (2012).

### BOX 3.4 The long shadow of contractions over potential output (*continued*)

productivity-enhancing R&D spending (Fatás 2000), a liquidity demand shock that tightens availability of funds for technology absorption (Anzoategui et al. 2016), loss of access to bank lending for creative firms (Queralto 2013), a legacy of obsolete capacity (Nguyen and Qian 2014), self-fulfilling expectations of weak growth prospects (Caballero and Simsek 2017), human capital loss and reduced job search activity among the long-term unemployed (Lockwood 1991; Lindbeck 1995; and Blanchard and Summer 1987), and lower labor productivity after financial crises (Oulton and Sebastia-Barriel 2016). Damage to aggregate output during the global financial crisis in the United States has been attributed to a nonlinear effect of demand-side weaknesses (as captured by a threshold unemployment rate, Reifschneider, Wascher, and Wilcox 2015). Other studies also find that the adjustment of growth or output levels to the pre-recession trend is non-linear and depends on the persistence, depth and source of the recession and its coincidence with financial crises.<sup>2</sup>

#### Potential output during contractions

**Data.** The literature on the impact of recessions on potential growth has focused on univariate filter-based methodologies. Since they correlate strongly with actual growth, including during contractions, these filters tend to show a decline in potential growth during the depth of the recession and a subsequent rebound in synch with actual growth (Box 3.1). In contrast, potential growth based on the production function approach will only change in response to contractions if long-term fundamental drivers change substantially for an extended period of time. To capture this longer-term impact, this box focuses on the potential growth measure derived from the production function approach. That said, the results are robust to the use of other methodologies.

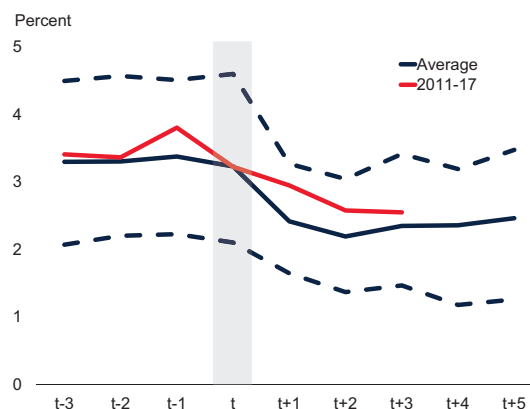
**Definitions.** Contractions are defined as years of negative output growth as in Huidrom, Kose, and Ohnsorge (2016). Depending on data availability for potential growth estimates, this definition yields up to 47 contraction events in 32 advanced economies and up to 77 contraction events in 49 EMDEs during 1990-2016 (Annex 3.4). Contractions, on average, lasted 1.4 years and were associated with growth of -4 percent, on average. In EMDEs, contractions were, on average, similarly short

<sup>2</sup> See Claessens, Kose, and Terrones (2009 and 2012); Furceri and Mourougane (2012); Haltmeier (2012); and Ball (2014).

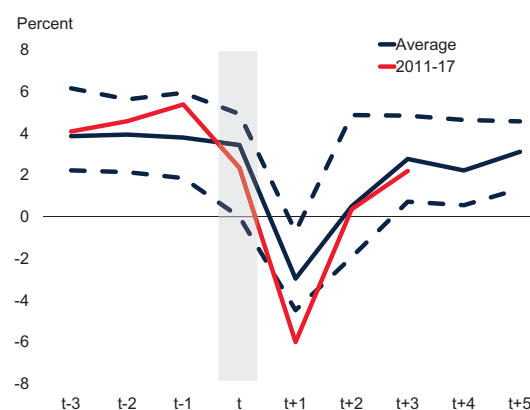
**FIGURE 3.4.2 Potential growth around contractions**

*Contractions are associated with lower potential output growth.*

#### A. Potential growth during contractions: Production function approach



#### B. Actual growth around contractions



Sources: Huidrom, Kose, and Ohnsorge (2016); World Bank; World Economic Outlook, International Monetary Fund.

Note: Contractions are defined as the years of negative output growth from the year after the output peak to the output trough, as in Huidrom, Kose, and Ohnsorge (2016). Sample includes 37 contraction events in advanced economies and 44 contraction events in EMDEs during 1989-2016. The methodology is described in detail in Annex 3.4. Dotted lines indicate interquartile range.

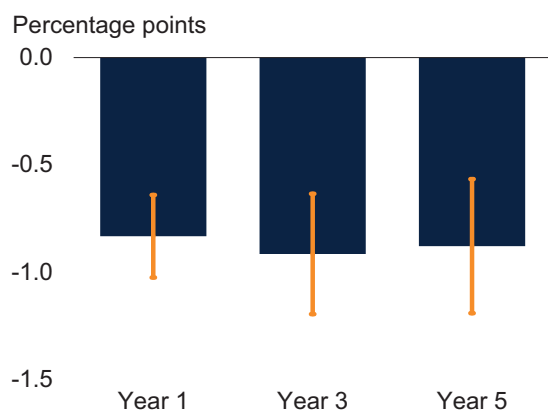
A. B. Unweighted averages of potential growth as estimated by the production function approach (A) or actual growth (B) during contractions. t denotes the peak preceding the contraction. 2011-17 is the unweighted average for countries with contraction episodes after a peak in 2014.

### BOX 3.4 The long shadow of contractions over potential output (*concluded*)

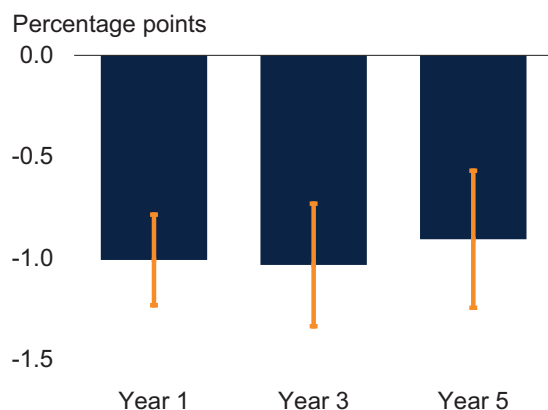
#### FIGURE 3.4.3 Potential growth after contractions

*The fall in potential growth following contractions persists over the following half-decade, but with considerable uncertainty around the magnitude of the effect.*

##### A. Cumulative impulse response of potential output growth after contraction



##### B. Cumulative impulse response of EMDE potential output growth after contraction



Sources: Huidrom, Kose, and Ohnsorge (2016); World Bank; World Economic Outlook, International Monetary Fund.

Notes: Contractions are defined as the years of negative output growth from the year after the output peak to the output trough, as in Huidrom, Kose, and Ohnsorge (2016). Sample includes yields 37 contraction events in advanced economies and 44 contraction events in EMDEs during 1989-2016. The methodology is described in detail in Annex 3.4.

A. Impulse response for the pooled sample of up to 77 advanced and EMDE economies from local projections model, as described in Annex 3.4, over horizons of 1, 3, and 5 years. Dependent variable defined as cumulative slowdown in potential growth after a contraction event using the baseline specification. Bars show coefficient estimates, vertical lines show 90 percent confidence bands.

B. EMDE sample only.

(1.3 years) but somewhat more severe (-4.4 percent) than in advanced economies (-3.4 percent).

**Methodology.** Two exercises are conducted to estimate the impact of short-term output shocks on potential growth: an event study and a local projections model (Jorda, Schularick, and Taylor 2013; Mourougane 2017). For the event study, average potential growth during contractions (all years from the year after the peak to the trough of output) is examined over time and compared with average potential growth in all other years. The local projections model is used to estimate impulse responses of potential growth to contractions.

**Evolution of potential growth during contractions.** Two years following the average contraction, potential growth is still more than 1.2 percentage point below potential growth in the year preceding the contraction (exceeding the decline in actual growth over the same period; Figure 3.4.2). The effect is somewhat stronger in EMDEs than in advanced economies.

**The long shadow of contractions.** The local projections model helps explore the evolution of potential growth following contractions. Contractions leave a legacy of lower potential growth (about 1 percentage point) four to five years after the onset of the contraction (Figure 3.4.3). The effect is initially stronger, but less persistent, for EMDEs.

### Conclusion

For advanced economies, short-term economic disruptions such as output contractions have been shown to reduce *actual* output for several years to come. This box documents that such contractions tend to be associated with weaker *potential* output growth for the following half-decade, although with considerable uncertainty around the magnitude of the effects. Depending on the measure of potential growth, contractions are associated with up to 1 percentage point lower potential growth four to five years after the onset of the contraction. The effect is initially stronger, but less persistent, for EMDEs.