

### BOX 3.4 Debt, financial crises, and productivity

*High debt levels increase the probability of financial crises and weigh heavily on productivity growth through a wide range of channels. During debt accumulation episodes associated with financial crises, cumulative productivity gains three years into the episode are 2 percentage points lower than in episodes without crises. Financial crises are accompanied by large and protracted declines in productivity: five years after the financial crisis, productivity is 6.5 percent lower than it would have been without a crisis.*

#### Introduction

Productivity growth is vulnerable to a range of adverse shocks including those associated with financial crises, especially in the context of rapid debt accumulation (Chapter 4). Following the global financial crisis and subsequent global recession of 2007-09, a broad range of countries experienced a rapid accumulation of debt together with a significant slowdown of productivity growth. Debt accumulation raises both long-term and short-term risks to productivity growth. In the long-term, it can lead to misallocation of resources towards low productivity projects, worsen investment prospects, weigh on competitiveness, and curb technological transfers embodied in investment.<sup>1</sup> In the short-term, debt accumulation also increases the probability of financial crises that sharply raise borrowing cost, worsen balance sheets and depress productivity growth, which can last over an extended period.<sup>2</sup>

Against this backdrop, this box discusses the linkages between productivity and financial crises as well as rapid debt accumulation. Specifically, it addresses the following two questions:

- Through which channels does debt affect productivity?
- What is the empirical link between financial crises and productivity?

#### Channels of transmission

Elevated debt levels can affect productivity growth via several channels. These include misallocation of resources, policy uncertainty and debt overhangs that weigh on productivity-enhancing investment, and a higher probability of financial crises.

**Misallocation of resources.** If used to fund productive investments with high rates of return, debt can have

positive effects on productivity and growth (Reinhart and Rogoff 2010; Poirson, Pattillo, and Ricci 2004). However, debt accumulation can impede productivity by encouraging a misallocation of resources towards projects that yield short-term returns at the expense of long-term returns or offer low risk at the expense of high returns (Poirson, Pattillo, and Ricci 2002; Checherita-Westphal and Rother 2012). These short-term projects can include those that rely heavily on returns from asset price appreciation on expectations of rapid future growth (Claessens and Kose 2017, 2018).

**Debt overhangs.** Rapid debt accumulation can lead to debt overhangs whose debt service crowds out productive investment.<sup>3</sup> At the firm level, a large outstanding debt stock can weigh on investment and, hence, the productivity growth that technology embedded in this investment can generate. At the government level, debt service on high debt may crowd out other productivity-enhancing spending, including for education, health or infrastructure.

**Policy uncertainty.** Especially high government debt increases uncertainty about growth prospects. For investors, large projected government debt service cost creates policy uncertainty because they may eventually compel governments to introduce distortionary taxation (including on future investment returns), curtail growth-enhancing spending, or delay reforms that may support innovation and productivity (IMF 2018). Such uncertainty lowers incentives to invest in productivity-enhancing technologies (Krugman 1988).

**Higher probability of financial crises.** Higher debt increases the probability of financial crises. These tend to be associated with severe short-run productivity losses and lasting productivity weaknesses. Financial crises include debt, banking, and currency crises.

- *Sovereign debt crises.* Higher government debt may encourage governments to shift towards lower-cost

Note: This box was prepared by Alistair Dieppe, Sinem Kilic Celik, and Cedric Okou.

<sup>1</sup> Blanchard and Wolfers (2000); Bulow and Rogoff (1989).

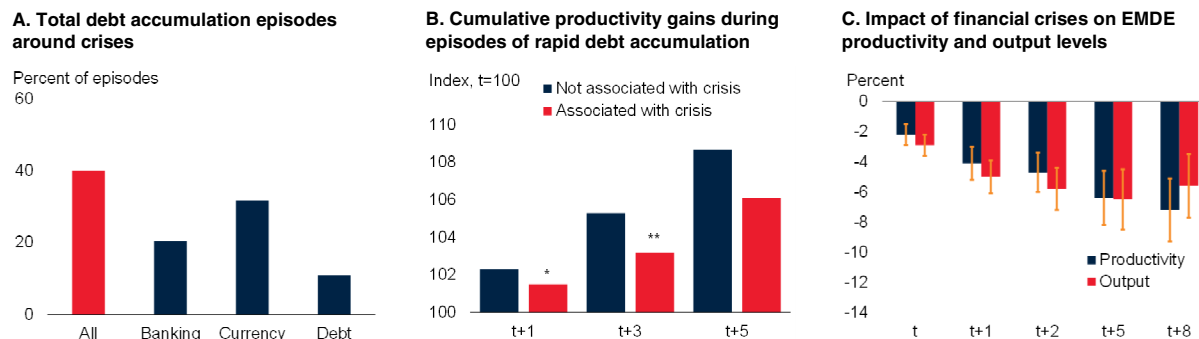
<sup>2</sup> See Aguiar and Gopinath (2006), Arteta and Hale (2008), Blanchard, Cerutti, and Summers (2015), Cerra and Saxena (2008, 2017), Furceri and Mourougane (2012a), Jordà, Schularick, and Taylor (2013), and Reinhart and Rogoff (2009, 2010).

<sup>3</sup> Debt overhang can occur in the presence of high levels of debt, as potential investors hold back new investments because they face heightened uncertainty about tax rates on future investment returns, given the government's large projected revenue needs to service the outstanding debt.

### BOX 3.4 Debt, financial crises, and productivity (continued)

#### FIGURE 3.4.1 Productivity in debt accumulation episodes and financial crises

About 40 percent of all episodes of debt accumulation are associated with financial crises. During those episodes, productivity gains are significantly lower than during other episodes. Specifically, a financial (banking, currency and debt) crisis is accompanied on average by a 6.5 percent cumulative decline in the level of labor productivity after 5 years, and the negative effect is protracted, exceeding 7 percent at an 8 year-horizon.



Source: World Bank.

A. Share of total (government and private) debt accumulation episodes that were associated with financial (banking, currency, debt) crises.

B. \* and \*\* indicates 10 and 5 percent significance level for the difference between productivity growth during the median total debt accumulation associated with crises and the median total debt accumulation episode not associated with crises.

C. Bars show the average loss in labor productivity and output levels in EMDEs, expressed in percent, at impact, 1, 2, ... and 8 years after a financial crisis (Laeven and Valencia 2018). Financial crises include banking, currency and debt crises. Whiskers represent 90 percent confidence intervals. The estimation is based on local projection method (Jordà 2005), which includes control variables (country fixed effects, lagged shocks, forward bias correction terms, and lagged TFP growth) and bias correction (Teulings and Zubanov 2014) for forward values of the crisis dummy between time  $t$  and  $t+h-1$ .

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but higher-risk debt issuance such as at shorter maturities or in foreign currency (Kalemli-Özcan, Laeven, and Moreno 2018). This heightens the probability that financial market stress precipitates a sovereign debt crisis that sharply raises investor risk premia and borrowing cost.<sup>4</sup> These tend to coincide with severe economic disruption just as sovereign debt distress prevents governments from supporting activity with counter-cyclical fiscal policy (Reinhart and Rogoff 2010). This depresses public and private investment and restricts other productivity-enhancing public spending.

- *Banking and currency crises.* Other types of financial crises, including systemic banking crises and currency crises, can also do lasting damage to productivity (Cerra and Saxena 2017; Oulton and Sebastián-Barriol 2017). The disruptions in financial intermediation during banking crises curb the funding of productivity-enhancing technologies and typically trigger recessions (De Ridder 2017). In the subsequent protracted weakness, elevated long-term

unemployment erodes human capital.<sup>5</sup> Because of their shorter duration, currency crises are typically less harmful to productivity. However, combined banking and currency crises can be particularly damaging for economic activity and productivity.

#### Empirical link between financial crises and productivity

**Productivity gains during rapid debt accumulation episodes.** Long-term productivity gains during rapid debt accumulation episodes have been considerably lower when these debt accumulation episodes were associated with financial crises. As in Chapter 4, rapid debt accumulation episodes are defined as an expansion from trough to peak of total debt-to-GDP ratios by more than one standard deviation, with troughs and peaks identified using the Harding and Pagan (2002) algorithm. This yields 190 episodes, of which almost half were associated with financial crises—identified as in (Laeven and Valencia 2018)—at some point during the episode.

<sup>4</sup> Aguiar and Gopinath (2006); Arellano (2008); Sandri (2015).

<sup>5</sup> See Blanchard and Wolfers (2000) and Furceri and Mourougau (2012b).

### BOX 3.4 Debt, financial crises, and productivity (continued)

In a debt accumulation episode accompanied by a crisis, median productivity three years into the episode was 3 percent higher than at the beginning of the episode. This is statistically significantly less than during a debt accumulation episode that was not associated with a crisis (5 percent). The difference may reflect the severe short-term damage to productivity driven by financial crises. Two years later (five years into the episode), productivity differences between the two types of episodes were no longer statistically significant.

**Impact of financial crises on productivity.** The productivity losses associated with financial crises are estimated in a local projections model of productivity levels in financial crises episodes. These episodes are identified as in (Laeven and Valencia 2018). There are 299 financial crisis episodes for which labor productivity estimates are available. 72 percent of these episodes occurred in 71 middle- or high-income EMDEs and 10 percent in 13 low-income countries.

Financial crises are accompanied by large and lasting productivity losses. Immediately after the onset of a debt crisis, labor productivity declines on average by about 2.2 percent and then falls by a cumulative 6.5

percent at the end of five years (Figure 3.4.1). The effect persists into the eighth year. This is consistent with earlier studies that document protracted effects of financial crises on productivity growth (Obstfeld 1996; Morris and Shin 1998; Barro 2001).<sup>6</sup>

### Conclusion

Financial crises weigh heavily on productivity growth through a wide range of channels. During debt accumulation episodes associated with financial crises, cumulative productivity gains three years into the episode are 2 percentage points lower than in episodes without crises. Financial crises are accompanied by large and protracted productivity losses—following an initial drop of 2.2 percent, productivity falls by a cumulative 6.5 percent five years after the onset of the crisis. In this context, the rapid post-crisis build-up of debt in EMDEs increases vulnerability to financial crises and represents an important downside risk to productivity growth (Chapter 4).

<sup>6</sup>The damage to output and productivity does not differ statistically significantly over the first eight years following the crisis.

expose their private sectors to foreign knowledge and technologies through greater trade and foreign direct investment (Boxes 2.1-2.6).

Policy interactions can lead to unintended consequences. For instance, trade liberalization reforms can increase the exposure of private sector firms to foreign knowledge and frontier technologies, and boost productivity. However, trade liberalization can also be associated with greater informality in the short-run if labor markets are not flexible, thus counteracting policies that aim at facilitating the reallocation of resources towards more productive sectors (Bosch, Goni, and Maloney 2007; World Bank 2019a). Therefore, these potential interactions should be accounted for when designing a policy mix for a country.

### Improving factors of production

**Meet infrastructure investment needs.** In several regions (ECA, MNA, SAR), weaker rates of capital deepening accounted for most of the post-crisis

slowdown in labor productivity growth. Elsewhere (SSA, SAR), sizable infrastructure deficits restrict firms' ability to improve productivity. Better physical capital and infrastructure—transport, power, telecommunications—can reinforce a country's competitiveness and boost its productivity (Calderón, Moral-Benito, and Servén 2015). A key challenge is to prioritize investments to reconcile large development needs with funding constraints and to improve public investment management. Low- and middle-income countries will need to spend between 4.5 to 8.2 percent of GDP on new infrastructure annually to 2030 in order to meet infrastructure-related Sustainable Development Goals (Rozenberg and Fay 2019).<sup>19</sup> Where fiscal space exists, governments should fund infrastructure spending in areas likely to generate high-returns. SSA is estimated to have the

<sup>19</sup>SDG targets for universal access to safely managed water, sanitation, and hygiene services, improved irrigation infrastructure to improve food supplies, universal access to electricity and improved transport infrastructure.