

BOX 3.1 Investment-less credit booms

Since the global financial crisis, private credit has risen sharply in several emerging market and developing economies (EMDEs) and advanced economies (AEs). During this period, credit booms have been unusually “investment-less.” Virtually none of the post-crisis credit booms have been accompanied by the investment surges that were common in earlier episodes. The absence of investment surges during credit booms is accompanied by lower growth once the credit boom unwinds.

Since the global financial crisis, credit to the nonfinancial private sector has risen rapidly in several EMDEs while investment growth has slowed. In the past, credit booms have often financed rapid investment growth, with investment subsequently stalling. Against this background, this box addresses the following questions:

- How has total investment, including both private and public investment, evolved during credit booms and deleveraging episodes in EMDEs?
- How often have credit booms been accompanied by investment booms?
- How has output growth evolved during credit booms and deleveraging episodes in EMDEs?

The results indicate that while investment often rose sharply during previous credit booms, this has not been so for credit booms since 2010. This pattern is cause for concern since, when credit booms unwind, GDP growth tends to contract more if the credit boom was not accompanied by an investment surge.

Data and methodology. Credit to the nonfinancial private sector consists of claims—including loans and debt securities—on households and nonfinancial corporations by the domestic financial system as well as external creditors. Details of the dataset can be found in Annex 3.1A.

A credit boom is defined as an episode during which the private sector credit-to-GDP ratio is more than 1.65 standard deviations above its Hodrick-Prescott (HP) filtered trend in at least one year (World Bank 2016b; Ohnsorge and Yu 2016). An episode starts when the deviation first exceeds one standard deviation and ends when the credit-to-GDP ratio begins to fall. Conversely, a deleveraging episode is defined as an episode during which the private sector credit-to-GDP ratio is more than 1.65 standard deviations below trend in at least one year. The deleveraging episode starts when the ratio falls more than one standard deviation below trend and ends when the credit-to-GDP ratio begins to climb.

Note: This box was prepared by Shu Yu.

Credit booms and deleveraging episodes are studied within a 7-year event window that covers their peak or trough years ($t=0$), the three prior years, and the three following years. In the sample used here, there have been 59 credit booms and 28 deleveraging episodes in EMDEs. A typical credit boom lasted about 1.7 years, while an average deleveraging episode lasted about 1.4 years.

Investment behavior during credit booms and deleveraging episodes

Credit booms have typically been associated with rising investment. During the median credit boom over the past two to three decades, real investment grew by 1 percentage point of GDP above its long-term (HP-filtered) trend until the peak of the credit boom (Figure 3.1.1). In a quarter of previous credit booms, the real investment-to-GDP ratio dropped about 2 percentage points below its long-term (HP-filtered) trend over the two years after the peak. Investment swung sharply in the most severe credit boom and bust episodes. For example, during the Asian financial crisis of the late 1990s, in the median affected EMDE, investment contracted by 3 percentage points of GDP in 1998 and by 5.6 percentage points of GDP in 1999.¹

Similarly, investment growth slowed during deleveraging episodes. Real investment dropped below its long-term trend by about 2 percentage points of GDP during the last three years of the median deleveraging episode (Figure 3.1.1). After the trough of a typical deleveraging episode, real investment growth bounced back and, within three years, rose near or slightly above its long-term trend.

Credit and investment booms together

Although investment growth tended to rise during credit booms, not all credit booms were associated with investment booms. For instance, Mendoza and Terrones (2012) document that the coincidence between investment booms and credit booms in EMDEs was about 34 percent (26 percentage points lower than the coincidence in AEs). The moderate coincidence of credit booms and investment booms may reflect credit booms that mainly fueled consumption (Mendoza and Terrones 2012; Elekdag and

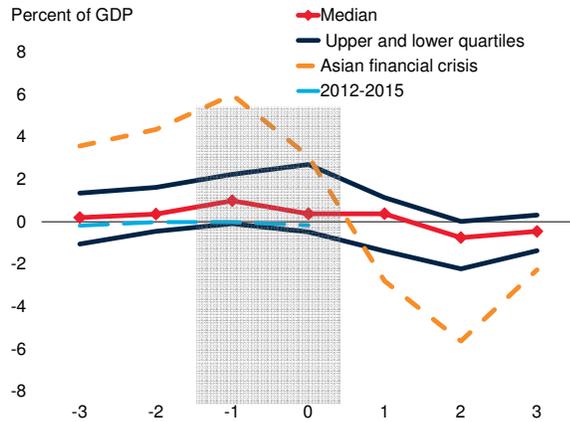
¹The directly affected EMDEs include China, Indonesia, Malaysia, Mongolia, the Philippines, and Thailand.

BOX 3.1 Investment-less credit booms (continued)

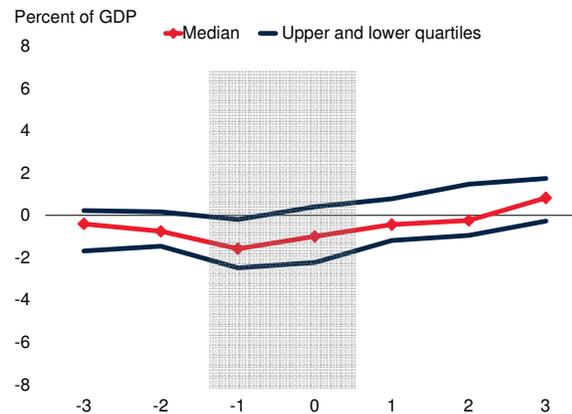
FIGURE 3.1.1 Investment growth during credit booms and deleveraging episodes

In EMDEs, in the median credit boom, investment grew by about 1 percentage point of GDP above its long-term trend until the credit boom peaked. It dropped below its long-term trend by 1-2 percentage points of GDP before deleveraging episodes reached their troughs.

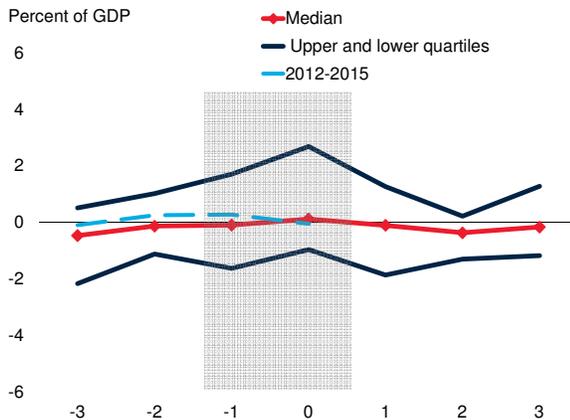
A. Investment during credit booms



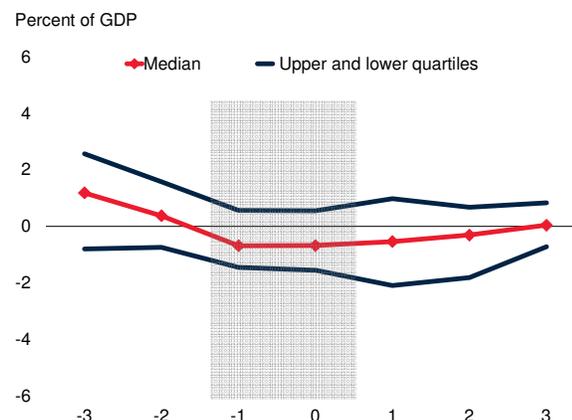
B. Investment during deleveraging episodes



C. Consumption during credit booms



D. Consumption during deleveraging episodes



Sources: Bank for International Settlements; Haver Analytics; International Financial Statistics, International Monetary Fund; World Development Indicators, World Bank. Notes. The red lines show sample medians while the blue lines show the corresponding upper and lower quartiles. A credit boom is defined as an episode during which the cyclical component of the nonfinancial private sector credit-to-GDP ratio (using a Hodrick-Prescott filter) is larger than 1.65 times its standard deviation in at least one year. The episode starts when the cyclical component first exceeds one standard deviation and ends in a peak year ("0") when the nonfinancial private sector credit-to-GDP ratio declines in the following year. A deleveraging episode is defined correspondingly. To address the end-point problem of a Hodrick-Prescott filter, the dataset is expanded by setting the data for 2016-18 to be equal to the data in 2015. Sample is for available data over 1980-2015 for 55 EMDEs. 2015 data are not available for Gabon, Nigeria, Senegal, and Venezuela, RB. Data are not available for Argentina until 1994, Brazil until 1993, China until 1984, Hungary until 1989, Poland until 1992, Russia until 1995, Saudi Arabia until 1993, and Turkey until 1986. Please see the main text of World Bank (2016b) for a detailed description of the sample.

A.B. The cyclical component of investment in percent of GDP (derived by Hodrick-Prescott filter). The yellow dashed line is the median annual investment growth rate of the six EMDEs (China, Indonesia, Malaysia, Mongolia, the Philippines, and Thailand) that were affected by the 1997 Asian Financial Crisis (year 1997 is set to be t=0). The light blue dashed line for 2012-15 shows the sample median for the corresponding period.

C.D. The cyclical component of private consumption in percent of GDP (derived by Hodrick-Prescott filter). The light blue dashed line for 2012-15 shows the sample median for the corresponding period. 2015 data are not available for Bahrain, Bolivia, Costa Rica, Hungary, India, Jamaica (also for 2000-01), Kazakhstan, Kuwait, Oman, Panama, Thailand, Tunisia, and data are not available for Zambia and Venezuela, RB (in 2014).

BOX 3.1 Investment-less credit booms (continued)

Wu 2013). In a quarter of past credit booms, consumption rose above its Hodrick-Prescott filtered trend by 3 percentage points of GDP during the peak of the credit boom. Consumption on average fell below trend by about 1 percentage point of GDP during deleveraging episodes (Figure 3.1.1).

Following former studies and in parallel to credit booms, investment surges are defined as years when the investment-to-GDP ratio is at least one (1.65 for investment booms) standard deviation higher than its long-term Hodrick-Prescott filtered trend. Similarly, episodes of investment slowdown are defined as years in which the investment-to-GDP ratio is at least one standard deviation below its Hodrick-Prescott filtered trend.²

Investment surges in AEs occurred with credit booms more often than in EMDEs, with a more rapid rise in investment. In EMDEs, about 40 percent of credit booms were accompanied by investment surges around the peak year of a credit boom (Figure 3.1.2). More than 65 percent of investment surges that coincided with credit booms during the peak year qualified as investment booms in advanced economies, but only 56 percent of such investment surges turned out to be investment booms in EMDEs.

After the global financial crisis, the coincidence between credit booms and investment surges during the peak year of a credit boom dropped significantly (Figure 3.1.2). By 2007, about half of the EMDEs in a credit boom were also in an investment surge. However, from 2010 onwards, there is virtually no EMDE that was both in a credit boom and in an investment surge. The number of EMDEs in a credit boom increased from two in 2010 to ten in 2015 (Azerbaijan, Bolivia, China, Cote d'Ivoire, Kenya, Kuwait, Oman, the Philippines, Qatar, and Turkey) while the number of EMDEs in investment surges dropped from eight to four.³ In AEs, both the number of countries in a credit boom and the number of countries in an investment surge fell from around five to almost zero.

In several countries, rapid credit growth fueled above-average consumption growth (Bangladesh, Bolivia, India, and Ghana) but no investment surge. During the period

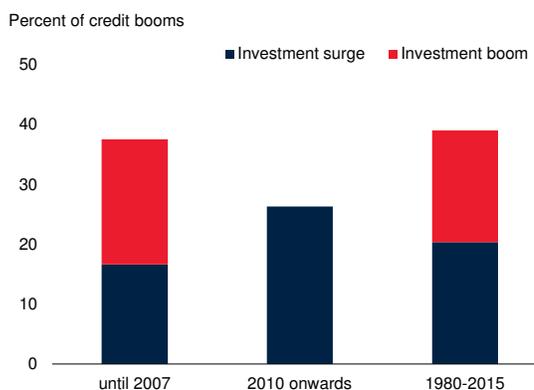
²The results are similar when investment growth, instead of the investment-to-GDP ratio, is used.

³The four countries are Colombia, Namibia, the Philippines, and Saudi Arabia. The identification of Saudi Arabia is not supported by investment growth data.

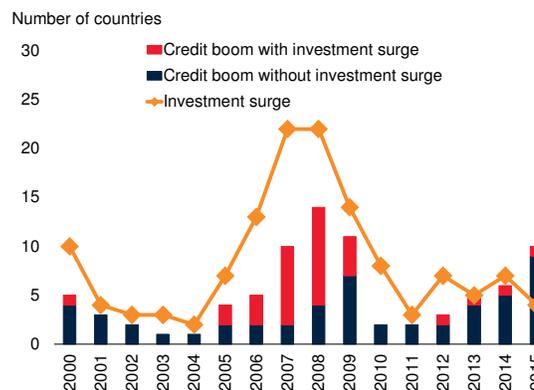
FIGURE 3.1.2 Coincidence between investment surges and credit booms

Before the global financial crisis, about 40 percent of all credit booms in EMDEs were accompanied by investment surges around the boom's peak. Only one quarter of credit booms since 2010 have been accompanied by investment surges (and virtually none by investment booms).

A. Investment surges during past booms in EMDEs



B. Investment surges during recent credit booms in EMDEs



Sources: Haver Analytics; International Financial Statistics, International Monetary Fund; Bank for International Settlements; World Development Indicators, World Bank.

Notes. Credit booms are defined as in Figure 3.1.1. Investment surge is defined as years when the cyclical component of the investment-to-GDP ratio is at least one standard deviation (1.65 for investment booms) above the HP-filtered trend, while investment slowdown is a year when the cyclical component of the investment-to-GDP ratio is at least one standard deviation below the HP-filtered trend. Data availability as in Figure 3.1.1.

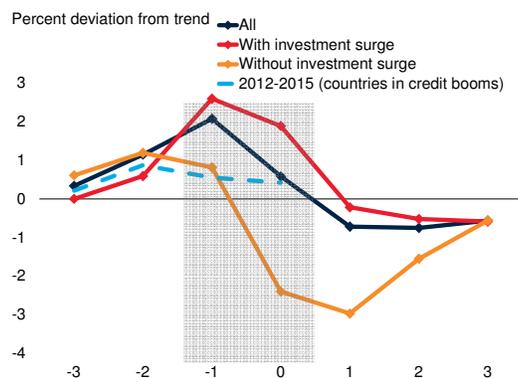
A. Investment surges during the peak year (t=0) or the following year (t=1).

BOX 3.1 Investment-less credit booms (continued)

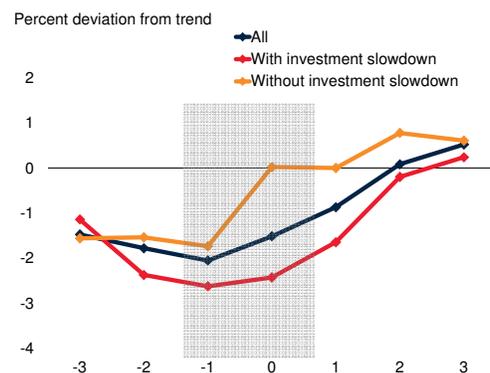
FIGURE 3.1.3 Output growth during credit booms and deleveraging episodes

In EMDEs, output on average grew above its trend by 2 percent during credit booms and fell below trend by 2 percent during deleveraging episodes. Output growth during credit booms tended to be stronger when accompanied by investment surges. During deleveraging episodes, declines were deeper when accompanied by investment slowdowns.

A. GDP during credit booms



B. GDP during deleveraging episodes



Sources: Bank for International Settlements; Haver Analytics; International Financial Statistics, International Monetary Fund; World Development Indicators, World Bank.

Notes. Credit booms and deleveraging episodes are defined as in Figure 3.1.1. Investment surges and slowdowns are defined as in Figure 3.1.2. Data availability as in Figure 3.1.1.

A. Group medians for the cyclical components of GDP in percent of its trend (derived using a Hodrick-Prescott filter) for all credit booms (in blue), credit booms with investment surge (occurred in 1 year around $t=0$, in red), and credit booms without investment surge (in yellow). The mean cyclical components of GDP in percent of its HP-filtered trend for the ten countries (including Azerbaijan, Bolivia, China, Cote d'Ivoire, Kenya, Kuwait, Oman, the Philippines, Qatar, and Turkey) in credit booms in 2015 during 2012-2015 are in light blue dashed line.

B. Group medians for the cyclical components of GDP in percent of its trend (derived using a Hodrick-Prescott filter) for all deleveraging episodes (in blue), deleveraging episodes with investment slowdown (occurred in 1 year around $t=0$, in red), and deleveraging episodes without investment slowdown (in orange).

between 2012 and 2015, consumption in EMDEs was about 0.5 percentage point of GDP above trend, near or above its median expansion during past credit boom episodes (Figure 3.1.1).

Output during credit booms and deleveraging episodes

In general, output has expanded during credit booms, but by less than investment (Mendoza and Terrones 2012). Before the median credit boom peaked, output increased, on average, by about 3 percent above trend in cases where there was an investment surge and by about 1 percent above trend before the peak years of credit booms in cases when there was no investment surge (Figure 3.1.3). As credit booms unwound from their peaks, output dropped below trend by more than 2 percent over two years in the absence of investment surges, but by less than half as much when there were investment surges. The more disruptive unwinding of credit booms without investment surges may reflect the lack of a boost to potential output from capital accumulation that could be provided by an investment surge. In the recent wave of credit surges since 2012, EMDE output has evolved similarly to that of past credit booms without investment surges.

During the median deleveraging episode, output fell by almost 2 percent below trend (Figure 3.1.3). If accompanied by an investment slowdown, the decline in output was sharper as output fell from about 1 percent below trend in the run-up to the deleveraging to about 3 percent below trend around its trough. It took about three years for output to move back to its trend after a deleveraging episode.

Conclusion

Since 2010, several EMDEs have experienced rapid private sector credit growth. In contrast to many pre-crisis episodes, however, these credit surges have typically not been accompanied by investment surges. Output growth during the most recent credit surges has also been lower than in previous episodes. While output has contracted as credit booms have unwound, it has contracted more when credit booms have occurred without investments surges.