

BOX 3.4 Interactions between public and private investment

Both public and private investment have decelerated in EMDEs since the global crisis. Although the effect of public investment on private investment has been mixed, the impact is more likely to be positive in the presence of economic slack, accommodative financial conditions, sizable investment needs, sound institutions, and available skilled labor. The effect on private investment is uneven, but public investment generally does not “crowd out” private investment.

Public investment accounted for 31 percent of total investment in EMDEs and 15 percent of total investment in AEs, on average, over the period 2010-15. Initiatives to boost public investment, including as part of a fiscal stimulus, could therefore directly lift GDP considerably. In addition to this direct effect on activity, public investment has at times proven a catalyst for private investment.

This Box analyzes recent trends in public and private investment and the effects of public investment on private investment and growth. In particular, it addresses the following questions:

- How have public and private investment evolved since the 2008-09 crisis?
- What are the macroeconomic implications of public investment?
- Which policies can increase the benefits of public investment?

The box documents the weakening public and private investment growth in EMDEs. An extensive literature suggests that public investment can significantly raise output and trade and help support better infrastructure. In addition, it is associated with lower income inequality. The evidence on the impact of public investment on private investment, in contrast, is mixed. Policy measures can be implemented to increase the benefits from public investment and mitigate fiscal pressures.

Evolution of public and private investment since the 2008-09 crisis

Post-crisis public investment slowdown. The fiscal stimulus implemented in many countries in 2008-09 to counter the economic impact of the financial crisis lifted public investment growth above long-term averages in both AEs and EMDEs. In AEs, this boost has subsequently reversed: public investment contracted sharply in 2011, while the cumulative growth rate after 2011 has remained negative (Figure 3.4.1). In EMDEs, public investment growth also has been weak and has remained below its long-term average, with the exception of 2012. From 2014-15, it began to ease further. This pattern largely reflected

sizable initial fiscal stimulus and subsequent policy tightening in large EMDEs, especially China, which accounts for more than half of EMDE public investment.

However, in the majority of EMDEs, public investment growth was below its long-term average throughout 2010-15 (Figure 3.4.2). In most regions, public investment growth slowed from pre-crisis averages but remained robust above long-term averages in 2008-09. Thereafter, investment growth slowed steadily in all regions, except Sub-Saharan Africa (SSA), to below long-term averages. This slowdown may partly reflect increasing financing constraints as fiscal space eroded following fiscal stimulus during the crisis.

Private investment growth slowdown. In AEs, public investment moved broadly counter-cyclically with private investment: surging during the private investment collapse of 2008-09 and contracting in the wake of the crisis as private investment stabilized and began to recover from its deep 2008-09 contraction. A similar pattern occurred in EMDEs during the recession of 2008-09, when surging public investment offset a halving in private investment growth to 7 percent (from 16 percent in 2006-07). After the 2010 rebound, however, private investment growth slowed in synchronization with public investment growth. In more than half of all EMDEs, private investment growth during 2010-15 remained below the long-term average. It was weakest in ECA, mainly as a result of spillovers from the Euro Area crisis, and MENA, where political uncertainty in the wake of the Arab Spring weighed on sentiment.

Macroeconomic implications of public investment

An extensive literature, summarized in several recent survey papers (Straub 2011; Estache and Garsous 2012; Pereira and Andraz 2013; Bom and Ligthart 2014), has discussed the macroeconomic benefits of public investment. These benefits have included higher growth, more trade, and less income inequality. The effects of public investment on private investment and public finances appear to be more mixed.

- *Growth.* Investment to build public capital lifts growth in AEs, although estimates vary widely. Estimates of the output elasticity of public capital averages 0.14 but ranges from -1.7 for New Zealand

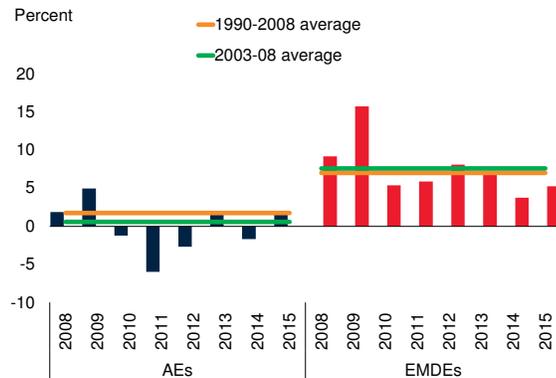
Note: This box was prepared by Yoki Okawa.

BOX 3.4 Interactions between public and private investment (continued)

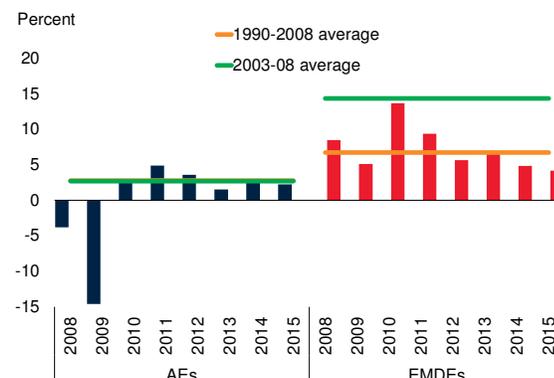
FIGURE 3.4.1 Public and private investment growth

In AEs, public investment growth has moved broadly counter-cyclically to private investment growth since 2008. In EMDEs, the counter-cyclical public investment boost of 2008-09 offset a sharp slowdown in private investment growth, but was followed by a period of slowing public and private investment growth. Private investment weakness was most pronounced in BRICS and commodity-exporting EMDEs.

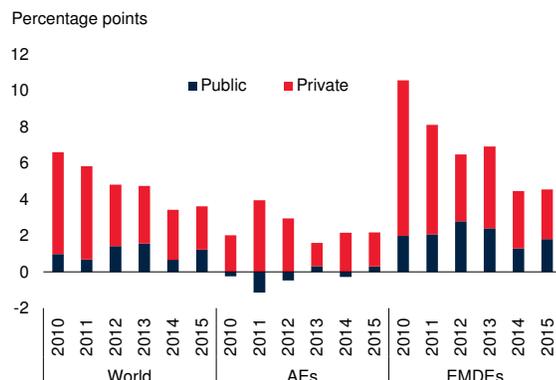
A. Public investment growth



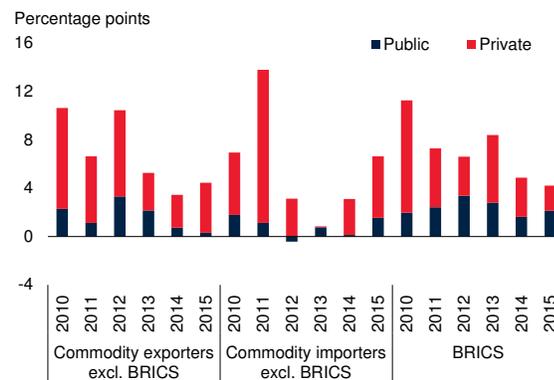
B. Private investment growth



C. Contributions to investment growth



D. Contributions to investment growth



Sources: Eurostat, General Statistics Office of Vietnam, Haver Analytics, International Monetary Fund, Ministry of National Economy of the Republic of Kazakhstan, OECD, Reserve Bank of India, Sri Lanka Ministry of Finance, World Bank.

Note: Public and private investment growth rates are weighted average of gross fixed capital formation growth rates in the public and private sectors, respectively, in constant 2005 U.S. dollars. The sample includes 20 advanced economies and 99 EMDEs for 1990 to 2015.

to 2.0 for Australia. Estimates of the long-run effect are about three times estimates of the short-run impact. Local government capital generates somewhat higher output gains than central government capital, with considerable cross-regional spillovers (Pereira 2000; Bom and Ligthart 2014). Estimates of the output elasticity of public investment are typically smaller for EMDE than for AEs, possibly reflecting the heterogeneity within the former group (Straub 2011; Kraay 2014). Estimates of the output elasticity

of infrastructure capital are somewhat higher than those for general public capital. In EMDEs, the level of infrastructure capital can have a sizable effect on labor productivity. The higher infrastructure capital of upper-middle income EMDEs (relative to lower-income EMDEs) increases output per worker by 5.2 percent in the long run (Calderon et al. 2015).

- *Links between public and private investment.* The impact of public investment on private investment

BOX 3.4 Interactions between public and private investment (continued)

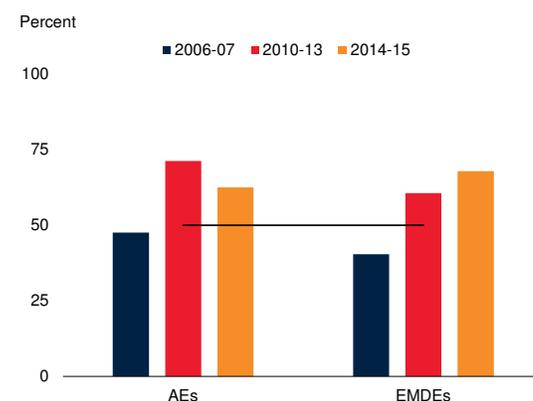
depends on the presence of economic slack, the stances of fiscal and monetary policy, possible financial market reactions, the magnitude of investment needs as well as the institutional and physical environment. Public investment that increases the fiscal deficit in an environment of tight monetary policy, large government debt, and limited economic slack can “crowd out” private investment (Mankiw 2012). Such crowding out has been demonstrated in AEs (Erden and Holcombe 2005) as well as in EMDEs that are not open to trade and financial flows, have weak institutions, or small skilled labor forces (Cavallo and Daude 2011; Warner 2014; Presbitero 2016). In contrast, public investment has been found to “crowd-in” private investment (through positive effects on prospective demand and activity, and increased investor confidence) in some EMDEs, including the lowest-income countries and those with stronger institutional safeguards but sizable infrastructure needs (Cavallo and Daude 2011; Dreger and Reimers 2014; Eden and Kraay 2014; Bahal et al. 2015; Cerra et al. 2016).

- *Trade.* Better public infrastructure, especially trade-facilitating infrastructure, can increase international trade. Improved port and airport facilities and telecommunication quality raise export and import volumes significantly (Nordas and Piermartini 2004; Ismail and Mahyideen 2015). By one estimate, bringing the trade-facilitating infrastructure of below-average member countries of the Asia Pacific Economic Cooperation Forum (APEC) to half the APEC average increased intra-APEC trade by about 10 percent (Wilson et al. 2002).
- *Income inequality.* Infrastructure capital and income inequality are negatively correlated in both AEs and EMDEs (Calderon and Serven 2014), although the presence of a causal relationship is still debated. Enhanced public infrastructure may reduce income inequality as well as promote growth if it benefits the poor more than proportionally (Ferreira 1995; Getachew 2010; Fournier and Johansson 2016).
- *Fiscal space.* Increased public expenditure can put pressure on government finances, at least in the short-run and especially if the government already has a sizable deficit or debt. In the long-run, well-executed high-yielding public investment programs, including in low-income countries, can generate tax revenues that exceed their initial cost, especially if the financing cost is low (Buffie et al. 2012). For AEs with

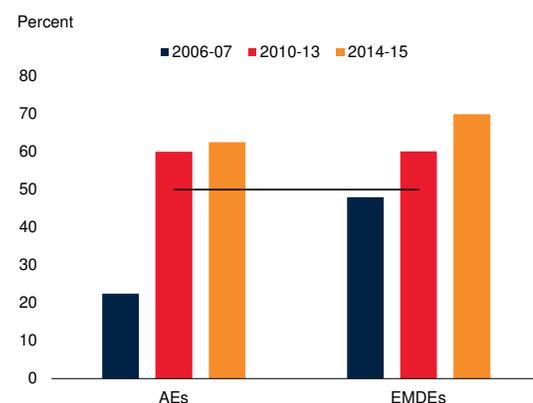
FIGURE 3.4.2 Comparison of public and private investment growth with long-term average

In the majority of EMDEs, both public and private investment growth since 2010 have been below their long-run averages.

A. Countries with public investment growth below 1990-2008 average



B. Countries with private investment growth below 1990-2008 average



Sources: Eurostat, General Statistics Office of Vietnam, Haver Analytics, International Monetary Fund, Ministry of National Economy of the Republic of Kazakhstan, OECD, Reserve Bank of India, Sri Lanka Ministry of Finance, World Bank.

Note: Public and private investment growth rates are weighted average of gross fixed capital formation growth rates in the public and private sectors, respectively, in constant 2005 U.S. dollars. The sample includes 20 advanced economies and 99 EMDEs for 1990 to 2015. Figures show the share of EMDE and AEs (in percent) in which public and private investment growth was below the 1990-2008 average during the periods specified. Line indicates half of the sample.

BOX 3.4 Interactions between public and private investment (*continued*)

economic slack and accommodative monetary policy, infrastructure investment can also be self-financing over the long-run (Abiad et al. 2015; Holtz-Eakin and Mandel 2015). However, if the productivity of public investment is low, for example because of an already-high stock of public capital, it is likely to leave a long-term legacy of higher debt (Holtz-Eakin and Mandel 2015; ECB 2016).

Policies to increase the benefits of public investment

- *Improve efficiency of public investment.* The difference between the output and revenue gains associated with public investment and its fiscal cost can be made more favorable by strengthening the efficiency of public investment. Public investment is generally less efficient in EMDEs than in AEs (Albino-War et al. 2014; Dabla-Norris et al. 2012). Its efficiency can be increased in EMDEs through a strategically planned, well-prioritized, rigorous and transparent project selection process and through strengthened institutions to fund, manage, execute, and monitor project implementation (Albino-War et al. 2014; IMF 2015; Rajaram et al. 2010).
- *Mitigate short-term fiscal pressure.* Public investment and public infrastructure investment, in particular, is characterized by large initial expenses that need to be

weighed against long-term returns. Even efficient and, over the long-term, self-financing public investment projects may pose short-term fiscal challenges. External financing, especially through concessional loans, can mitigate short-term domestic financing constraints (Buffie et al. 2012). Well-designed public private partnerships, particularly with foreign private sectors, can help reduce fiscal pressure as well. Developing and strengthening a pipeline of infrastructure investment projects can attract investors with lower costs (McKinsey Global Institute 2016).

Conclusion

Post-crisis, slowing public investment growth in EMDEs has accompanied a steady decline in private investment growth. Public investment can raise output in the short run as well as in the long run, and stimulate trade. Public infrastructure is negatively related to income inequality, although the presence of a causal relationship remains debated. Evidence on the effects of public investment on private investment is mixed. However, public investment is more likely to crowd in private investment in the presence of economic slack, accommodative financial conditions, sizable investment needs, well-developed institutions, and a sufficiently skilled labor force. Improved project selection and monitoring, as well as better governance, may enhance the benefits from public investment.

direction of causality remains a matter of debate (Ferreira 1995; Getachew 2010; Calderon and Serven 2014).

- *Health investment.* Gaps in health investment relative to the levels needed to reach sustainable development goals remain substantial (UNCTAD 2014; Wagstaff, Bredenkamp, and Buisman 2014). Investment in health yields both microeconomic and macroeconomic benefits that are associated with aggregate gains in human welfare. Healthier individuals are more productive, better at creating and adapting to new technologies, and inclined to invest more in education (Aghion, Howitt, and Murin 2011). They also have a longer life expectancy and are likely to save more, which feeds back into investment (Zhang et al. 2003). This

relationship holds across and within countries and for numerous measures of health outcomes (Weil 2014). At the macroeconomic level, better health outcomes are associated with higher growth.¹⁶ By one estimate, a 1-year improvement in a population's life expectancy is associated with 4 percent higher output (Bloom, Canning, and Sevilla 2004).

- *Educational investment.* Education investment gaps relative to the Sustainable Development Goals also remain sizable (UNCTAD 2014). Yet education investment that improves worker skills or reduces skill mismatches can raise worker incomes and productivity, as well as benefit firms. For individual workers, the

¹⁶World Bank (2007); Barro (2013); Baker et al. (2014); Barro and Lee (2015).