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Bridges to somewhere

The variable benefits of investing in infrastructure

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SHANGHAI, which already boasts 14 subway lines, a high-speed maglev service, two huge modern airports, some 20 expressways and a bullet-train departure every three minutes, is about to add one more piece of infrastructure—the headquarters of the new BRICS development bank. China is setting up the bank together with the four other members of the BRICS club of big emerging markets: Brazil, Russia, India and South Africa.



Fittingly, the bank will focus on infrastructure lending to poorer countries. China is also pushing to establish another multilateral lender, the Asian Infrastructure Investment Bank, which, as its name suggests, will concentrate on the same thing. With these two new banks, China is exporting a central feature of its development model to the rest of the world. It spent 8.5% of its GDP investing in infrastructure from 1992 to 2011, according to the McKinsey Global Institute. That was more than any other country, and well above the developing-country norm of 2-4% of GDP.

Given China's growth—its economy expanded seven-fold during that time—the wisdom of investing in infrastructure seems self-evident. Research generally turns up a positive relationship between infrastructure investment and growth, especially in poorer countries. According to one broad survey of the literature by the World Bank, making Latin America's infrastructure as good as East Asia's would increase annual growth rates by as much as five percentage points in the countries with the worst roads and phones.

Yet it is difficult to isolate the precise effect on growth of any given project. Investment normally gives an immediate lift to GDP, whether it involves a bridge to nowhere or one to a crowded island. What matters is the long-run impact. Over time, infrastructure can gin up growth in two main ways. It can generate a rise in incomes if reduced transaction costs promote trade. And it can raise growth rates if it leads to greater information sharing and thus improved productivity. But these effects are hard to measure because infrastructure investment often coincides with economic growth, casting

doubt on causality. Did the new roads boost growth or did faster growth increase demand for them?

China provides an ideal testing ground. Not only has the government thrown vast sums into construction, it has also directed the money at places where demand is not always apparent, making it easier for economists to isolate the effects of the investment as an independent variable. A growing body of research looks at the impact of China's infrastructure binge.

In a recent working paper, Yang Wang and Binzhen Wu of Tsinghua University look at the high-altitude railway connecting the province of Qinghai to Tibet. It is, they argue, as close to a natural experiment as possible. The region was one of China's poorest, meaning that prior growth did not prompt the investment. The route was determined by its technical feasibility, not the economy of the local area, making it akin to a randomised trial. The impact, they find, was vast: a 33% increase in GDP per person in counties that got the railway compared with those that did not. That equates to about 12 billion yuan (\$1.9 billion) extra GDP a year, exceeding its 33 billion yuan cost in just three years. The main channel for this rise in income was the new-found ability of local manufacturers to sell to a national market.

But returns on infrastructure, like any investment, can fall off steeply. In a working paper released last year, Michael Ward of the University of Texas at Arlington and Shilin Zheng of the Chinese Academy of Social Sciences study China's massive telecoms rollout of recent decades. Only 1% of the population had fixed-line phones in 1990; by 2006 that number had risen nearly 30-fold. In addition, by 2010 two-thirds of the population had acquired mobile phones. From 1990-99, the first decade of the telecoms boom, they calculate that phone services contributed two percentage points to China's growth rate, a huge dividend. From 2000-10, the contribution was down to half a percentage point.

If you build it, they will go

Moreover, the impact on different regions can be uneven. An assumption underpinning China's investment policy is that connecting the hinterland to transport should support its development. But the construction of an early phase of China's national trunk highway system—35,000km of highways, built from 1992 to 2007 at a cost of \$120 billion—suggests that is not always the case. In a new article, Benjamin Faber of the University of California, Berkeley, finds that GDP growth was reduced by about 18% over time in smaller counties that were connected to the highway system relative to ones that were not. Industrial output shrank when goods streamed in from more advanced areas, displacing local products. In other words, better infrastructure sometimes saps, rather than invigorates, poorer regions.

Finally, the design of infrastructure clearly matters. In a paper published last year, Nathaniel Baum-Snow of Brown University and four other researchers look at ring roads, much in vogue among Chinese planners. Using detailed maps and satellite images, they measure population dispersion from 1990 to 2010. Ring roads exercise a magnetic pull on businesses, causing about

20% of people to move to suburbs. Some decentralisation is welcome, creating more living space. But sprawl on such a scale threatens to undermine the clustering effect that makes big cities fertile ground for innovation.

None of this research undermines the view that infrastructure spending is good for long-term growth. But as China encourages the world to throw money at roads and airports, it is a salutary reminder that pouring concrete is just one part of development.

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