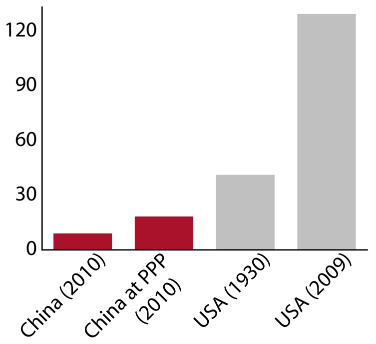
Capital stock

How much is too much?

by Andrew Batson and Janet Zhang

Still tiddling...

Capital stock per capita, US$ '000 at constant 2005 prices



Source: GK Dragonomics estimates; US Bureau of Economic Analysis

Does China invest too much? This ever-popular question is often answered by pointing to the very large share of investment in China's GDP and the rapid growth in investment over many years. The conventional answer is that these figures are evidence of an out-of-control boom that will end in tears.

There is no question that the flow of new investment in China is very large relative to other countries, accounting for 46% of GDP in 2010. By comparison, Japan in its 1970s boom topped out at 36%, while Korea's share hit 39% in the 1990s. But these numbers are not the whole picture. Economic output is the product of all available factors of production, including investments made in previous years that are still useful. It is therefore helpful to know the capital stock, the total amount of physical capital available in the economy. This is calculated as the value of accumulated past investment, adjusted for depreciation and price changes (it does not include human capital, intangible assets, land or natural resources).

This exercise provides a different and revealing perspective on the vexed question of whether China is structurally over-invested. Our figures show that China has indeed built up its capital stock very rapidly. But we do not believe that China has "too much" investment, for the following reasons:

• In per-capita terms, China has only a tiny fraction of the capital stock possessed by developed nations. China has plenty of room to accumulate more capital as it continues to develop.

• The size of China's capital stock relative to its own GDP is also well within international norms. There are no glaring signs that China is burdened with Japan-like levels of excessive investment, which that nation took decades to accumulate.

• China's capital-output ratio has been rising in recent years, meaning that growth in investment is accompanied by lower GDP growth rates than in the past. But this is less evidence of a terminal decline in efficiency than of a natural process of capital deepening as the economy develops.

China has plenty of investing to do in the coming decades

In a big, messy country like China it will not be a challenge to find examples of excessive and wasteful investment schemes. Yet that does not mean the entire economy is an excessive and wasteful investment scheme. China's new investment figures will probably become somewhat less outrageous once the effects of the 2009-10 stimulus fade away. But the country still has plenty of investing to do in coming years and decades.

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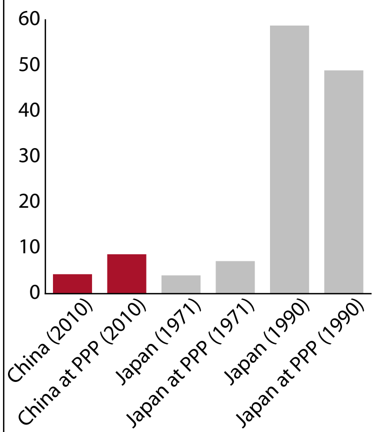
He's still got more than me

Since China is a big country, its total capital stock will naturally be large relative to smaller countries. So it is best to do international comparisons on a per-capita basis. Our calculations show that China's capital stock, at constant 2005 prices, amounted to about Rmb61,000 per capita in 2010, or roughly US$9,000 a head at market exchange rates. Compared to developed countries, this is actually a very small figure. According to the accounting of the US Bureau of Economic Analysis, the American capital stock was about US$129,000 per capita in 2009. So China has only 6-7% of the US's capital stock per capita at market exchange rates, or about 13% at purchasing power parity. Indeed, China's capital stock per capita today is less than a quarter of what the US had achieved by the onset of the Great Depression.

Comparison with Japan tells a similar story: China's capital stock per capita in 2009 was about 7% of Japan's at market exchange rates, and 18% at PPP. The more relevant comparison is probably with the Japan of an earlier era. Japan's official data suggest it had reached China's current level of capital stock sometime around 1970, depending on which price index and exchange rate you prefer to use. Even after the investment boom of the past two years, China looks rather like the Japan of an earlier high-growth period and not very much like the Japan of the later bubble years. This should not be surprising, as the same conclusion can be drawn from a range of other indicators, from rates of urbanization to per-capita GDP to the share of the workforce in agriculture.

...and plenty more to build

Capital stock per capita, US$ '000 at constant 1990 prices



Source: GK Dragonomics estimates, Japan Cabinet Office

China has clearly built a lot of infrastructure and manufacturing capacity, and the scale of its housing boom is historic. But anecdotes purporting to show that China has much capital than it needs cannot be substantiated by the aggregate data. In fact, developed economies require much higher levels of capital than China has been able to accumulate so far. If China is to ever become the developed nation its leaders dream of, it will have to keep investing for many years in order to bring its capital stock up to the necessary level.

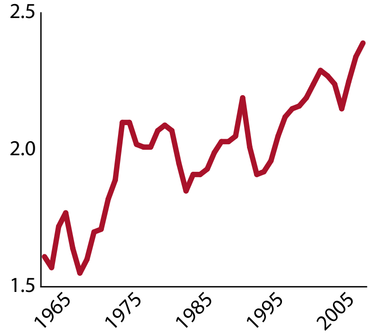
Anecdotes claiming that China has more capital than it needs are not supported by the data

Middle-of-the-road investor

A different way of investigating the question of whether China has "too much" investment is to look not at its capital stock relative to other countries, but relative to its own level of development. Most research shows that the level of a country's capital stock does not diverge too far from its GDP; this relationship is formally known as the capital-output ratio. For most countries, measured capital-output ratios are usually around 2 or 3. Poor countries often have lower capital-output ratios, which makes intuitive sense because they tend to have less capital-intensive economies.

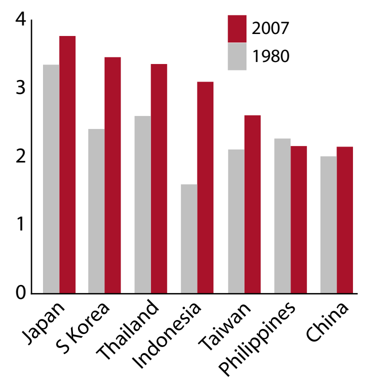
Yet it is hard to make much of small differences in the capital-output ratio between countries. This ratio varies quite a bit among countries, with few readily discernible patterns. Some of this variation could reflect differences in countries' endowments of resources not included in the capital stock, such as land and natural resources. All of these things are

Costlier growth...
China's capital-output ratio (net capital stock relative to annual GDP)



Source: GK Dragonomics estimates

...but still cheap
Capital output ratios in Asia (net capital stock relative to GDP)



Source: Asian Productivity Organization, GK Dragonomics estimates

used to produce GDP, but different countries will combine them in different ways.

There are occasional outliers, though, and one of them seems to be Japan. The capital-output ratio implied by Japan's official data on capital stock is a rather low 2. But some analysts doubt that this series captures the full extent of Japan's capital accumulation in recent decades. Several outside estimates of Japan's capital stock result in a capital-output ratio that is high by international standards, on the order of 3.5-3.8. These results seem to accord with the standard view that contemporary Japan is in fact heavily over-invested.

Where does China stack up? Our estimate puts China's capital-output ratio at 2.4 in 2010, in current prices, which seems boringly middle-of-the-road. To double-check this indicator, we recalculated the ratio using several different depreciation rates and price standards. The range of potential outcomes is wide, from 2.1 to 2.9, but none of them are extreme. So the level of China's capital output ratio does not seem to be a glaring indicator of an economy massively overburdened with excess investment.

Factories don't come cheap

While we do not think the stock of capital in China is excessive in absolute or relative terms, there is a separate question of how efficient the flow of new investment is. The headline measure of fixed-asset investment has grown 26% annually in nominal terms in recent years, a pace that does not appear to leave much time for careful weighing of the costs and benefits of new projects. It is worth noting that this measure probably gives a misleading impression of the rate of China's capital accumulation, because it doesn't account for capital that is worn out and needs to be replaced. The real growth in the capital stock, which includes depreciation, averaged 10% annually during the first two decades of China's reform era. Then growth picked up to 13% in 2003-08, and jumped to 15% during the massive stimulus of 2009-10.

Because the capital stock has been growing faster than GDP in recent years, China's capital-output ratio has been rising. For most of China's reform era, the ratio had been roughly steady around 2, but has been on a generally rising trend since 2003. This could be evidence that new investment is becoming progressively less efficient, as a given increase in investment does not cause an equivalent increase in output.

We do not think the upward drift in China's capital-output ratio over the last several years is in itself particularly worrying. While developed countries tend to have capital-output ratios that are stable over extended periods, developing countries do not. This is precisely because the accumulation of capital stock is part of the development process. Researchers at the World Bank found that capital-output ratios for lower–income countries rose from around 1.6 in 1960 to around 2.0 by 1973, and kept rising through 1990. Some more recent estimates by the Asian Productivity Organization show that trend has continued for most developing countries in Asia.

The increase in China's capital-output ratio should therefore largely reflect the economy's transition from traditional agriculture, which is labor-intensive, to more capital-intensive modern manufacturing. Since this transition has come a fair way already, capital is clearly not as scarce in China as it once was. The total capital stock is now nine times larger than it was in 1990.

But the fact that most indicators of the return on investment remain stable and relatively high seems to indicate there is still an incentive for further capital deepening. While this is difficult to estimate precisely, noted economist Bai Chong'en and his coauthors in a 2007 study estimated that the return on capital investment in China was 20%, down slightly from 25% in 1979-1992, but the same as in 1993-1998.

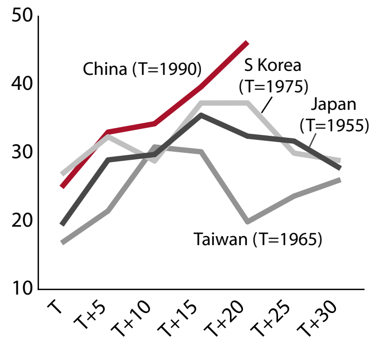
Another set of data supporting this view is industrial profit margins. These have remained steady at above 6% since 2004, compared to a low of 3% in the late 1990s. It does not appear that China's factories are losing money because of lots of unproductive investment.

More, but slower, investment

All this does not mean we think China can keep up its recent pace of investment forever. The enormous surge in investment in 2009-10 was intended as a short-term stimulus, and should not be and will not be sustained. Investment growth will inevitably slow in coming years, and the share of investment in China's GDP should start to come down from its extremely high levels. But in relative terms, the increase in China's investment ratio is comparable to other Northeast Asian economies. While the recent stimulus has postponed a transition to lower investment rates, we expect China's investment share of GDP to follow a similar trajectory and come down in coming years. But there is still much investment that can be usefully made in China, and it will not disappear as a key driver of the country's growth.

Rocket economy

Investment share of GDP after take off, pp



Source: International Monetary Fund