

Understanding the Slowing Growth Rate of the People's Republic of China

DWIGHT H. PERKINS*

It is increasingly accepted that the gross domestic product (GDP) growth rate of the People's Republic of China (PRC) is slowing down, but the reasons for the slowdown are not yet well understood. Part of the reason is that growth in all countries that reach high-income status slows down when they reach a global research income level that is still far below the level of the highest income countries. In the PRC, on the supply side, this is happening because total factor productivity (TFP) is slowing down whereas, because of slowing labor force growth, it would have to increase in order to maintain near double-digit GDP growth. On the demand side, a low share of household income in GDP has required the PRC to maintain an unusually high rate of investment in transport infrastructure and housing, but the rapid growth in both of these areas is coming to an end. Environmental investment could take up the slack and keep aggregate demand at a level that would fully employ resources. Finally, the PRC has reached the point where the manufacturing share of GDP has peaked and will begin to decline as the economy becomes increasingly service based, but services seldom grow at the double-digit rates that manufacturing is sometimes capable of.

Keywords: TFP, GDP growth rate, housing construction, transport investment, environmental investment, service-based economy

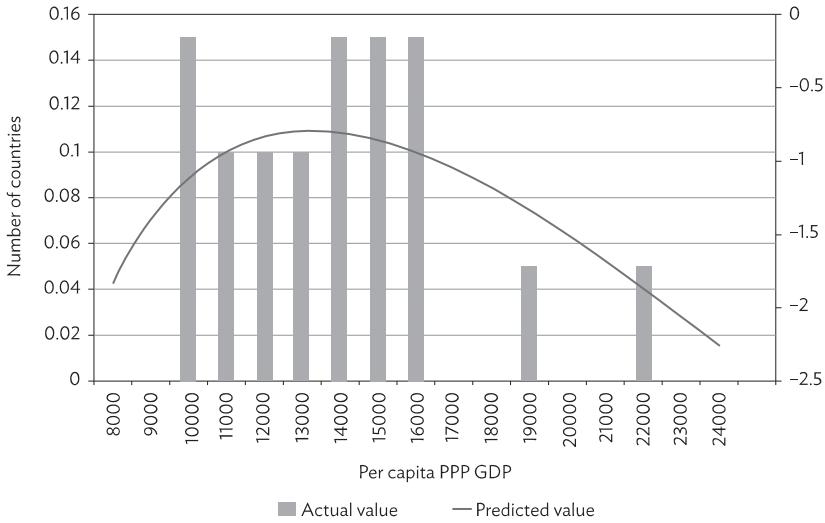
JEL codes: E6, O43, O47, P42

I. Introduction

It has become increasingly accepted within the People's Republic of China (PRC) and outside that the PRC's slowing growth rate is a long-term phenomenon, not a temporary or cyclical downturn. The future rate of growth can fluctuate from year to year depending on world economic conditions and on the PRC's domestic policies—notably whether the government calls for a fiscal and monetary stimulus or not—but there are compelling reasons for believing that the long-term trend in the growth rate is sloping downward. The PRC's gross domestic product (GDP) may well grow at 5% or 6% for the next 1 to 2 decades and possibly a point or two faster than that for the next few years. If there is a fiscal stimulus comparable to what occurred during 2009–2010, the rate could be even higher but with likely long-term effects that would be negative.

*Dwight Perkins: Harold Hitchings Burbank Professor of Political Economy, Emeritus, Department of Economics, Harvard University. Phone: +1-617-495-2110. Email: dwight_perkins@harvard.edu.

Figure 1. **Per Capita Income at which Growth Decelerated**
(Y = Number of countries; X = Per capita PPP GDP)



GDP = gross domestic product, PPP = purchasing power parity.

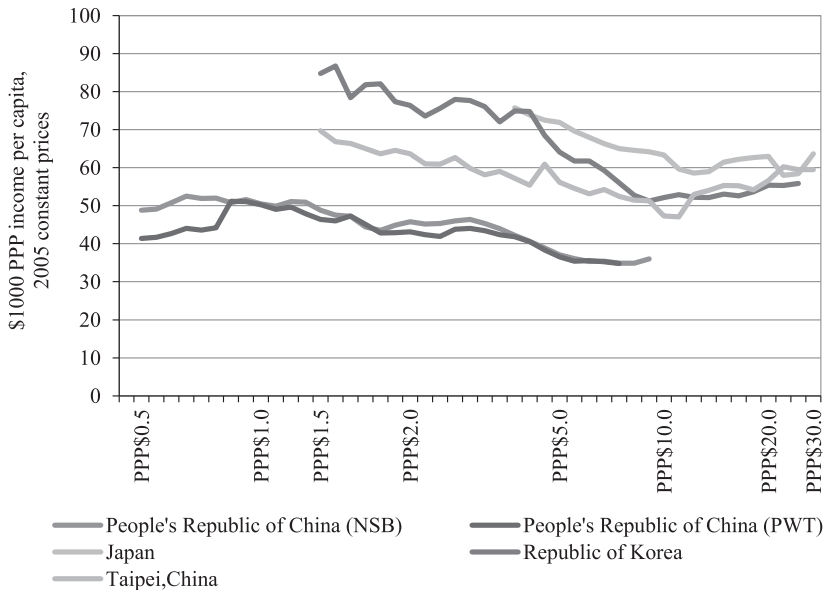
Note: This figure is based on countries that achieved high-income status except for those whose high income was mainly the result of petroleum exports.

Source: Eichengreen, Barry, Dwight Perkins, and Kwanho Shin. 2012. *From Miracle to Maturity: The Growth of the Korean Economy*, p. 33. Cambridge: Harvard Asia Center, distributed by Harvard University Press.

The slowdown in growth at purchasing power parity (PPP) per capita GDP of between \$10,000 and \$16,000 is normal and most high-income countries existing today experienced such a decline when per capita GDP reached this level (Figure 1). The causes of this decline involve structural changes such as the end of a rural labor surplus, that can be readily shifted to higher productivity urban occupations, and the gradual shift away from manufacturing to services. To some degree, it is also the case that middle-income countries can no longer simply copy what the high-income countries did when they were at the middle-income level and must depend increasingly on their own innovative capacity with its inevitable mistakes and dead ends.

In the PRC's case this slowdown is occurring at a time when the country has a very unusual GDP structure on the expenditure side that complicates what the country needs to do to maintain healthy development in the near and more distant future. Put succinctly, the household consumption rate as a share of GDP is much too low, and the investment rate is too high. The data and how they compare with other economies in East Asia are presented in Figures 2 and 3. There have been challenges to the reliability of these estimates, and it is likely that the official Chinese figure for household consumption as a share of GDP is in reality somewhat lower than it would be if such things as the implicit share of housing in consumption

Figure 2. Share of Household Consumption in GDP



GDP = gross domestic product, NSB = National Statistical Bureau, PPP = purchasing power parity, PWT = Penn World Tables.

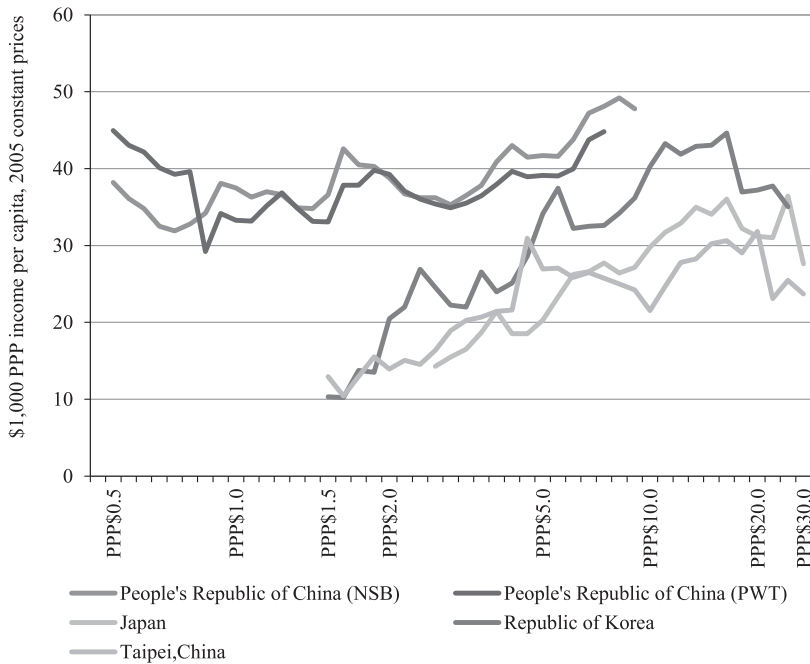
Note: Matching shares of household consumption to GDP per capita and placing the economies in a single figure for comparative purposes is an inexact process. The patterns, however, are clear even though one has to approximate the consumption level for any given per capita income. The consumption shares are those in current prices.

Sources: Author's computations; Heston, Alan, Robert Summers, and Bettina Aten. *Penn World Tables 7.1*. Center for International Comparisons of Production, Income and Prices, University of Pennsylvania; National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*, p. 62. Beijing: China Statistics Press.

were properly measured. Adjusting for these possible biases, however, still leaves the household consumption share unusually low.

Another way to view this structure is to realize that the low household consumption share virtually requires that the investment share be excessive. An unusually high investment rate in turn will typically mean that the marginal rate of return on investment and overall total factor productivity (TFP) will be lower than it would be if the investment share were smaller. There is reason to believe that is the case in the PRC at present and may well be the case in the years ahead. In contrast, the PRC in the 1980s and through the first years of the 21st century maintained a high rate of TFP growth and avoided a declining rate of return on investment in part because of large shortages in transport and housing resulting from 2 decades of neglect of these sectors before 1978. Later in this essay, we shall deal with the nature of these high transport and housing investment requirements and why their absence in the future will not justify a similarly high rate of investment in the decade or two ahead.

Figure 3. Share of Investment in GDP



GDP = gross domestic product, NSB = National Statistical Bureau, PPP = purchasing power parity, PWT = Penn World Tables.

Sources: Author's computations; Heston, Alan, Robert Summers, and Bettina Aten. *Penn World Tables 7.1*. Center for International Comparisons of Production, Income and Prices, University of Pennsylvania; National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*, p. 62. Beijing: China Statistics Press.

II. The Low Household Consumption Share in GDP

The PRC began the reform period in 1978 with consumption already accounting for a low share of GDP, and that share has fallen steadily since. The initially low consumption level was partly because most investment went into heavy industry in urban areas, while restrictions on rural-to-urban migration prevented a large majority of the population from sharing in the income generated by that investment. Meanwhile, urban wages were held down by the potential availability of low-cost surplus labor in the countryside.

Migration restrictions encouraged more capital-intensive production methods than would normally occur in a country with low per-capita income and a large labor surplus.¹ As a result, household incomes in the PRC were a low 55.9% of GDP in

¹There is a seeming contradiction between the observations that migration restrictions led to more capital-intensive investment than otherwise should have been the case, while those same restrictions did not increase pressure on urban wages. This was due in part to the ability of urban employers to draw on a large pool of urban women workers who had not previously been employed; but to the extent there was wage pressure, the government could have simply

1981.² The freeing up of migration beginning the 1980s made it even easier for enterprises to hold down wages despite a loosening of government wage controls. In 2012, compensation of employees was still only 51.5% of GDP, although if household property income were added to the 2012 total, the share would probably not have declined.³

Household savings had been low in 1981 but has risen substantially with a further reduction in consumption demand. One indicator of the rise in household savings rate is the accumulated bank deposits of households. Such deposits were only 29.5% of annual household income in 1981, but amounted to 154.3% of household income by 2012, when households also had more places other than bank accounts to invest their savings.⁴

The solution to raising household consumption as a share of GDP is to raise household incomes as a share of GDP and reduce the average household saving rate. The government for a number of years has wanted to achieve a higher household consumption rate, but this is difficult to do. Incomes are now largely determined by market forces and the main way for income share to rise is for wages to rise faster than GDP. As Cai and Du (2011) and others have shown, wages of unskilled migrant workers do seem to be growing faster than GDP now and are catching up with the wages of low-skilled registered urban workers.⁵ This wage acceleration results mainly from the end of the growth of the total labor force due largely to the one-child policy and even more to the drying up of the rural labor surplus. Surveys have shown that most of the registered rural labor force between the ages of 18 and 40 have already left farming and taken up urban jobs.

Future rural-to-urban migrants will come mainly from the children left behind in the village whose parents have taken up work in the cities. They will likely leave the village as soon as they complete their education and reach working age, but the number of these migrants will be smaller than in the past. Consequently, the productivity dividend from transferring rural workers in low productivity jobs to higher productivity urban jobs will be much lower than in the recent past.

With this demographic situation, will wages continue to grow faster than GDP for a decade or two and thus raise the share of household income in national income?

allowed enterprises to hire workers from the countryside. Both wages and the right to hire were tightly controlled by the government. In fact, in the 1980s, the enterprises on their own began to contract with rural townships and village enterprises to take over some of the more labor-intensive components of their products.

²The GDP figure for 1981 was taken from National Bureau of Statistics (2012). The household income share was derived by adding the per capita income of the rural population multiplied by the total rural population to the total national wage bill (mainly for urban employees). There were effectively no urban property incomes in 1981 (State Statistical Bureau 1981, 429–31).

³Compensation of employees is different from total household income because households also had some income from property in 2012 (although very little in 1981). In the US household income share in national income was 81.9% (2012) or 70.5% of GDP but 22.8% of that household income came from proprietors income, rental income, and dividends. The Chinese share from these latter sources would presumably be smaller.

⁴The 1981 data are from the *Statistical Yearbook of China 1981* (State Statistical Bureau 1981, 408–409).

⁵See, for example, Cai and Du (2011, 601–10).

Will non-wage sources of household income also rise relative to wage income, and will the non-wage income be distributed across a large proportion of the population or just be highly concentrated among a few? I have no answer to these questions and the data on relevant international experience is not readily available except for a few high-income countries.

The main way that government policies can affect the growth of household incomes is not through direct intervention in the labor market. The government can increase rural spending out of existing income by taking over a larger share of education and health costs. Whether this will increase nationwide expenditure, however, will depend on how these extra payments are financed. By freeing up bank interest rates, the government can also directly influence household non-wage income, and assuming that freed interest rates will be higher than the current repressed rates, that will increase incomes of much of the population. Increasing direct subsidies to the poor is another direct way of raising incomes. None of these measures by themselves are going to raise the share of household consumption in GDP dramatically, but taken together, they could make a large difference.

The direct effects of raising the rate of interest on bank deposits by 2 percentage points could raise consumption by slightly over 1% of GDP, and using government subsidies to raise the income of the bottom 10% of the urban population and the poorest 20% of the rural population by 20% could raise household consumption by over 2% of GDP, assuming that these subsidies were not financed through increases in taxes on households.⁶ Subsidizing rent payments made by rural-to-urban migrants would not only lead to better housing for these migrants but would also increase their income and consumption directly. How these latter two steps can be accomplished and the unanticipated consequences they may generate is a topic well beyond the scope of this essay.

Government measures designed to lower the rate of savings are more numerous at least potentially. In general, there is much the government can do, and to some degree is already doing, to remove part of the precautionary motive for a high savings rate. Two major motivations for the high precautionary reason for savings are the cost of health care and the lack of access by much of the population to pensions. The government has introduced universal health insurance and is working toward a national pension system, but these have a long way to go before they deal with enough of the problem to have a major impact on the savings rate. National health and pension insurance systems are complex and need to be designed carefully from the start. Getting rid of the *hukou* or household registration system and its restrictions on migrants, for example, is a good first step, but one cannot simply replace it by putting all of the migrants under the existing urban health and pension systems.

⁶Calculations made by the author using data from household surveys published in the *China Statistical Yearbook 2013* (National Bureau of Statistics 2013).

Table 1. **Foreign Trade Growth Rates (%)**

	Export Growth	Import Growth
1979–1989	25.0	25.1
1990–1999	23.5	20.1
2000–2007	24.5	23.3
2008–2013	6.6	8.7

Note: Export growth rates in the last period may have been influenced by currency speculation leading to over-invoicing of exports in order to move foreign exchange into the PRC. These figures are for exports and imports in current prices and are not deflated by price indices.

Sources: National Bureau of Statistics. 2014a. *Zhongguo Tongji Zhaiyao 2014*, (China Statistical Abstract 2014) p. 90. Beijing: China Statistics Press.

If the PRC succeeds in raising the share of household consumption in GDP, then consumption will be rising faster than GDP on a sustained basis. That in turn will mean that the domestic market for household goods and services will also be growing faster than GDP. That may not absorb all or even most of the unused capacity among Chinese manufacturers, but it will help offset the fact that the market for Chinese manufactured household goods will not be as hard hit by the sharp slowdown in exports of these items in recent years. As we will discuss in the next section, the recent slowdown has been dramatic and is probably irreversible.

III. The Slowing of Export Growth

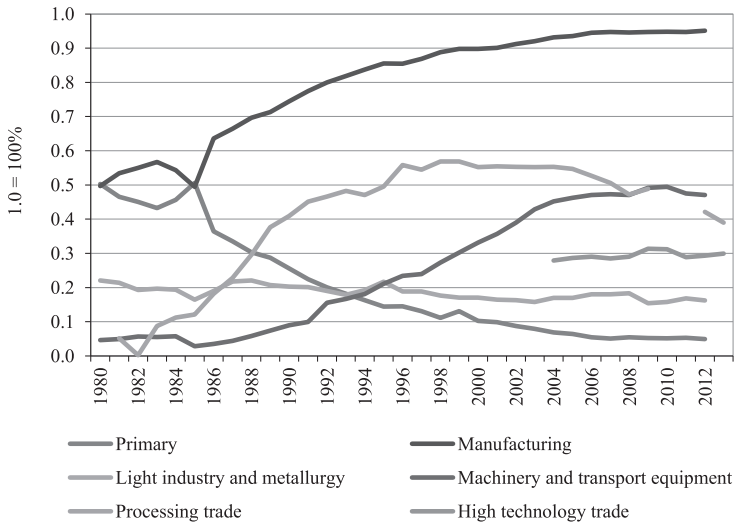
For roughly 30 years, Chinese manufacturers not only enjoyed a fast-growing domestic market as household incomes rose, they also benefitted from an even faster growth of export demand for their products. One reason for this sustained rapid rise in exports was that the PRC started the reform period with an unusually low level of exports. Exports in 1978 were 4.5% of GDP using the official exchange rate to convert exports in dollars into yuan.⁷ The reforms over time changed that situation dramatically and exports rose to 24.1% of GDP by 2013. The rates of export growth that produced this large rise in the export share are presented in Table 1.

In 1978, the PRC's exports amounted to only \$9.75 billion and formed a tiny share of world exports, but in 2012, Chinese exports reached \$2,209.6 billion, or about 11.1% of world merchandise exports (World Trade Organization 2012, 24). This is the largest share of any country in the world—roughly equivalent to the exports of the entire European Union (EU), a third more than the United States (US), and more than double the export share of Japan.

Throughout the 1980s and 1990s, one could argue that the PRC's export statistics exaggerated the true size of the country's export trade, as so much of that

⁷If the exchange rate of CNY1.7 per dollar overvalued the Chinese currency as seems likely, the share of exports in GDP would be even lower than 4.5%.

Figure 4. Sector Exports as a Share of Total Chinese Exports



Sources: National Bureau of Statistics. Various years. *China Statistical Yearbook*. Beijing: China Statistics Press; National Bureau of Statistics. 2014b. *Statistical Communiqué of the People's Republic of China on the 2013 National Economic and Social Development*, p. 43. Available online at www.stats.gov.cn/english/PressRelease/201402/t20140224_515103.html.

trade involved processing or assembly of components supplied by other economies, notably the other major exporting economies in East Asia. In effect, these other economies were producing a large share of the components in particular products and then shipping them to the PRC for assembly and shipment to their final destination. The PRC's processing trade as a share of total trade, however, peaked in 1999 at 57%, and by 2013, that share had fallen to 39% (Figure 4).

Even if eliminated all processing trade from the export figures in 2013, the PRC's exports would still nearly match the exports of Germany and the US and would be far larger than those of Japan. The share of processing trade will probably continue to fall as the PRC's wages rise and the largely labor-intensive processing trade moves out to lower-wage countries.

Export growth rates of the kind the PRC experienced prior to 2008 (well over 20% a year in nominal terms, perhaps 20% a year in real terms) are clearly not sustainable, and the rates since 2008 are probably a more realistic guide to what is possible going forward. World trade in the 8 years from 2005 to 2012 grew at 8% per year, and the PRC's rate might exceed that by a small amount if the country continues to succeed in moving up to more sophisticated and higher technology exports. If the PRC's exports were to grow at 20% a year over the next decade, the PRC would account for one-third of the world's exports, an enormous and unrealistic share.⁸

⁸This calculation assumes a Chinese export growth rate of 20% a year and a world export growth rate of 8% a year.

Table 2. **The Gross Capital Formation Rate and Capital–Output Ratio of the People's Republic of China**

	Annual Averages (% of GDP)	Capital–Output Ratio
1978–1992	33.3	3.88
1993–2002	38.1	4.41
2003–2007	41.8	3.92
2008–2013	47.1	5.26

GDP = gross domestic product.

Note: Capital and the share of capital in GDP in Chinese official sources are calculated from current price sources. When these figures are used to estimate the capital–output ratio, some of the movement in the ratio can be attributed to differences in the price deflator for GDP and that for capital. In these calculations, therefore, constant price GDP data are used and the percentage rate of capital formation was applied to those figures. The capital–output ratios in the table use the total capital accumulated in 1978–1991 divided by the increase in output in 1979–1992 (1992GDP–1978GDP), etc.

Sources: Author's computations; National Bureau of Statistics. 2014a. *Zhongguo Tongji Zhaiyao 2014* (China Statistical Abstract 2014), pp. 23–5. Beijing: China Statistics Press.

Japan's share of world merchandise exports, by way of comparison, rose rapidly from the 1950s through the 1980s reaching 9.9% of the world total in 1993, but that share has since fallen to about 4.5% (World Trade Organization 2012, 22). The PRC will have to vigorously upgrade the efficiency and quality of its manufacturing sector (and also its service sector) if it is to maintain its share of world exports. Continuing to increase that share will be an even bigger challenge.

A slowdown in export growth, however, does not necessarily mean that GDP growth would also slow down. A decline in net exports (exports minus imports) would mean a decline in aggregate demand, and hence GDP growth, other demand variables staying the same, but a decline in export growth rates alone could involve simply a shift in production to other items in demand. The impact on GDP growth depends on a further assumption that it is much easier and more profitable (i.e., provides a higher rate of return) to expand existing production and market share than it is to develop new products of greater technical sophistication and sell them against established firms in those sectors. The PRC is succeeding in doing this, but at a much slower pace than was the case with labor-intensive products where the country in the past had a large cost advantage over most competitors.

IV. The Rising Share of Investment in GDP Expenditure

The PRC's rate of capital formation as a share of GDP has been rising steadily since the beginning of the reform period in 1978 from a base level that was already high compared with other developing economies as a result of investment increases in the pre-reform period. The data for the reform period are presented in Table 2.

By way of contrast, gross capital formation in Taipei, China peaked at 32% of GDP in 1979–1981 and that in the Republic of Korea peaked in the 1990s at 37%,

a decade that most analysts feel saw a poorly thought-out investment acceleration by many of the large companies (*chaebol*). If the increase of 8.9% in the capital formation rate in the PRC from 1993 to 2002 and 2008 to 2012 had not occurred, the PRC's GDP growth rate after 2002 would have been 1 percentage point lower (9.4% versus 10.4%) even if the increase in capital formation had a zero rate of return. The assumption of a zero rate of return on the additional capital formation in the latter period may not be far off reality given the large increase in the capital–output ratio in the period 2008–2012. The higher capital–output ratio in 1993–2002 than the periods before and immediately after probably reflects the unusually (up to that time) high rate of investment in 1993–1995 (average per year of 41.1%) that resulted in a high rate of inflation (for the PRC) of 18.6% per year during those years.

Clearly, part of the story of the PRC's slowdown in GDP growth can be attributed to the rising inefficiency of investment. We shall take some initial steps to try to understand the sources of that inefficiency, but a full accounting would require at a minimum a sector-by-sector analysis of the sources of this rising inefficiency. That is far beyond what can be undertaken in this short essay.

Outright private and self-employed investment is only 27.5% of the total (in 2012) while enterprises that are fully state owned account for 25.7%. However, there is another 33.1% made by shareholding and limited liability enterprises, a substantial share of which (probably somewhat over half) are state controlled (National Bureau of Statistics 2013, 155–56). There are published data for the return on assets in the industrial sector, and these indicate that the rate of return in private industry has actually risen substantially since 2004 from 10% to 14%. State-enterprise profits in contrast did rise slightly from 2002 to 2007 but only from 3% to just over 6% and then fell back to 4%–5% (Lardy 2014, 126). It is questionable, however, whether even this low rate of return in the state-owned and state-holding sector reflects the real return on assets for most state enterprises, as 60% of those profits are in the highly regulated gas, oil, coal, tobacco, and electric power sectors (National Bureau of Statistics 2013, 485–87).

In this section, we shall make a few comments about the impact on investment of the PRC's gradual shift toward a service-sector economy followed by brief comments on certain industrial sectors. However, our focus will mainly be on two areas of investment where the PRC is probably running into decreasing returns because the demand is not there to justify sustaining the rate of growth of production in these sectors. The two sectors are real estate, particularly housing, and certain infrastructure investments.

As the economy shifts away from manufacturing toward services, the role of investment in the economy can be expected to decline. One reason for this is that manufacturing, particularly for middle-income and higher-income countries is typically more capital intensive than most services other than transport. Wholesale and retail services are labor intensive, while education, health care, and financial and business services are human capital but not physical capital intensive. In the

case of the PRC, the ratio of investment in fixed assets to increases in output, for example, was 3.1:1 during 2010–2011, while that in services (minus real estate and transport) was 2.3:1.⁹ Thus, if the share of services rises while that of industry falls, assuming a constant rate of GDP growth, there will also be a decline in the share of investment in GDP which will have to be made up by increasing consumption. Transport and real estate will be discussed separately below.

Some of the investment in industry in the PRC during the most recent few years has almost certainly been excessive. This is most obviously the case with the extraordinary expansion of the steel and cement industries during this period. These industries continued to expand capacity to meet immediate high demand notably from housing and transport that, as we shall argue below, was likely to level off or decline in the future.

The PRC, as of 2013, produced 48.5% of the world's crude steel and 59.3% of the world's cement in 2012.¹⁰ It is widely believed that state enterprises, as part of government efforts to stimulate the economy, expanded capacity right through the world recession, whether or not domestic and export demand for the output of those assets was likely to grow at a rate that would justify that investment. An in-depth (sector-by-sector) analysis of the investment behavior of state-owned industrial enterprises is beyond the scope of this essay, but clearly, these enterprises are prone to political intervention, which helps explain why their rate of profits is so far below that of the private sector.

One can say more about the likely future investment in three broad sectors of the economy: real estate, including residential housing; transport; and water and the environment. These three sectors have by far the largest investments other than manufacturing. Together they constituted 42.8% of all investment in fixed assets in 2003 and 2012. The first two are likely to slow down and contribute to a slower GDP growth overall, while water and the environment are likely to see further investment growth, possibly a very large rise.

V. Housing Supply and Demand

Investment in real estate in general and in the construction of residential housing has played a major role in the overall rise in investment as a share of GDP, particularly beginning around the year 2007. Real estate and housing investment

⁹Transport was eliminated because it is highly capital intensive and will be discussed below. Real estate was eliminated from the service sector because the data for real estate services in GDP include only such items as real estate company rental services, while the fixed asset investment in real estate enter GDP through other sectors (notably but not exclusively via construction). The asset/value-added ratios are calculations of the author from data published in the *China Statistical Yearbook 2013* (National Bureau of Statistics 2013, 54 and 159–61). The figures are not strictly speaking capital–output ratios because the fixed asset data involves some double counting whereas the output data are value added.

¹⁰Data obtained from the World Steel Organization (available online at www.worldsteel.org, accessed 23 January 2014) and the European Cement Association (2014).

has in turn been a major source of demand for cement and steel. It is not possible to say much about the future growth of investment in office buildings, as it depends on sources of demand that are not transparent, but it is possible to say something systematic about the demand for residential housing.¹¹ For much of the past 3 decades, urban housing construction was filling the gap in housing supply resulting from almost complete neglect of housing construction during the 2 decades prior to the beginning of reforms in 1978. By 1978, the average per-capita housing space in urban areas was 7.2 square meters (m²). By 2010, this figure had risen to 31.6 m² and it has continued to rise slowly since then. The major question now is whether the current rate of housing construction that filled the gap left by decades of neglect is sustainable over the next 1 to 2 decades.

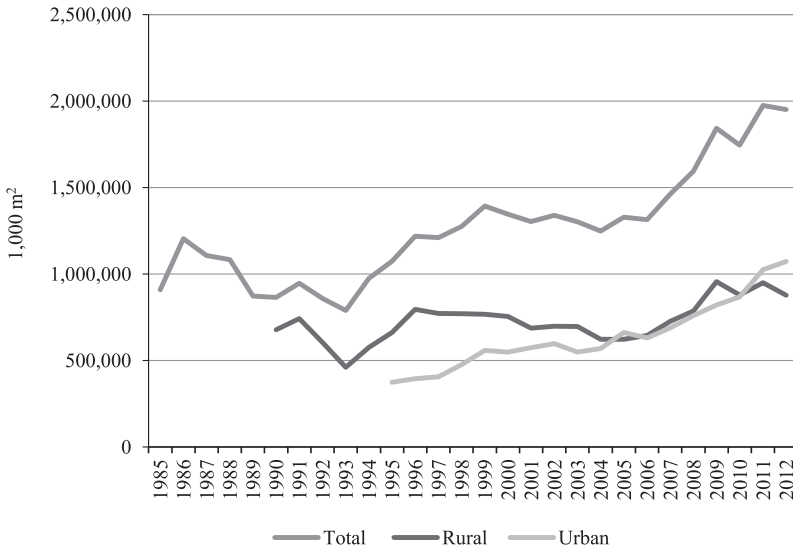
Before addressing this question, however, the nature of housing demand in the PRC needs to be clarified. Some of the demand was created by local governments and developers building houses that were not sold to consumers or even to investors and thus remained empty, although that was not the major reason for the large demand for housing that occurred in the late 1990s and after 2000. If households were purchasing housing out of current income, a decision to reduce this expenditure would simply involve increased expenditure on something else and the growth rate in aggregate demand would be unaffected. In the PRC, however, virtually all urban housing prior to the late 1990s had been owned by the state and both by state-owned enterprises or the government more directly. When housing was privatized, it was sold mainly to current occupants at prices far below market value. Urban residents thus received a large wealth windfall when they sold their property at market prices, and the windfall was further magnified by rapidly rising housing prices. Many then proceeded to use that windfall to purchase much better housing than they could previously afford.¹² This was, in short, a one-shot major increase in demand that cannot be repeated because most housing other than that for low-income urban residents had already been privatized. Housing demand going forward will therefore have to depend mainly on household current income plus whatever mortgage borrowing they can negotiate, which itself depends to a large degree on estimates of their current and future income.

The data on annual rates of completed housing are presented in Figure 5, while the shares in GDP of investment in the completed housing through time is presented in Figure 6.

¹¹Demand for government office buildings, for example, depends to a large degree on whether government officials in a decision-making position want better offices or larger office space, and that may have little relationship to the rise in the number of government office workers or other easily measurable reasons for building new offices. Private office space will also depend on such things as the size of corporate profits or the desire of a chief executive to move offices closer to where he lives, among many other impossible to forecast motivations.

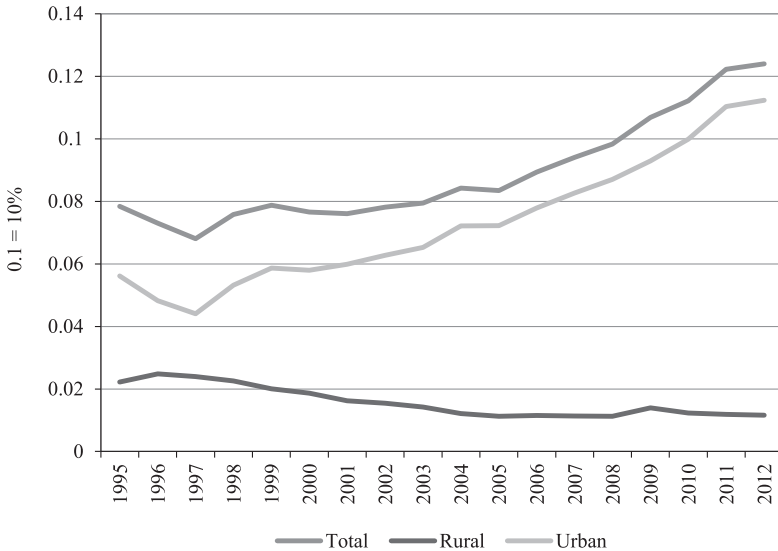
¹²Many of these transactions involved government decisions to demolish the existing housing after privatization that would have involved compensation to the owners. Anecdotal evidence suggests that this compensation was closer to market values than to the original highly subsidized purchase price. In some cases, those forced out of particularly valuable locations could extract a kind of monopoly rent over and above the normal price for that land.

Figure 5. Residential Housing Completed Annually



Source: National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*, pp. 183 and 195. Beijing: China Statistics Press.

Figure 6. Residential Housing Expenditure as a Share of GDP



Note: The urban figure was derived by subtracting the rural figure from total investment in residential construction. The residential construction value figures used here are gross expenditures not including housing repairs and are different from housing investment value-added expenditure in the national accounts. Thus, the share in this figure overstates the contribution of real estate expenditures to GDP by a substantial margin. The trend, however, should not be substantially different if we had data on value-added expenditure on residential housing.

Source: National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*, pp. 154–95. Beijing: China Statistics Press.

During the past 27 years, the PRC constructed 25.9 billion m² of housing of which 11.6 billion m² was constructed in urban areas with 39% of the urban total (4.55 billion m²) constructed during the 5-year period 2008–2012. Unfortunately we do not have a reliable estimate of the total urban housing stock. Using census data, Yao (2013b, 1) estimates that the total urban housing stock in 2010 was 16.8 billion m². The National Bureau of Statistics (2013, 11) however, reports a figure of 31.6 meters per capita for urban areas which, if multiplied by the official figures for the urban population in 2010, would imply a housing stock of 21 billion m² (23.4 billion m² in 2012).¹³ Thus, somewhere between a fifth and a quarter of all housing in use in 2012 was built during the 5 short years.

This level of housing construction in value terms over the past 7 years (2007–2012) accounts for a substantial portion of the increase in gross capital formation in the PRC over those years. With 2005 as base year, the share in GDP of housing investment rose from 8.3% to 12.4% of GDP, the latter figure an unusually high level even for rapidly growing developing countries. The entire increase was accounted for by investment in urban housing, not rural housing.

To understand whether this level of housing construction is sustainable, one must make assumptions about the following:

- (i) The rate of demolition of the existing urban housing stock. Demolition is different from depreciation since the latter includes the deteriorating quality of existing housing in the absence of upkeep and repairs. No attempt here will be made to estimate what these upkeep and repair expenses might be, although they will no doubt be substantial.
- (ii) The rate that housing stock will be provided for new urban residents and for existing urban residents who do not currently have even minimally adequate urban housing. These comprise mainly migrants from the rural areas who are already in the cities or are likely to move to the cities over the next 1 to 2 decades.
- (iii) The expansion in the existing housing stock to accommodate increased demand for larger homes by the existing registered urban population as their incomes continue to increase.
- (iv) The degree to which families own more than one dwelling and the degree to which these are vacation homes designed for seasonal use or simply a form of investment. If houses are mainly for investment, it then becomes important

¹³Housing space per capita sometimes includes only the direct living space of the family, while it can also include such things as hall space in apartment buildings. In that respect, what the figures reported here cover is unknown to this author.

to know what percentage of these investment properties is unoccupied. If the unoccupied share is very large, that alone would be evidence that the real estate market had been overbuilt and the bubble would be likely to burst. Unfortunately, we do not know of any estimates of the occupancy rate of Chinese urban housing.

One serious estimate of the rate of demolition of existing housing is again by Yao (2013b, 2). She estimates the rate of demolition during 2006–2010 to be 370 million m² per year. If this rate were to continue through 2020, there would be little or no housing by that date in urban areas built before 1990.¹⁴ That may be a possibility but is it likely? Tearing down apartments with the shared kitchens and bathrooms that were common in pre-1980 housing has largely been completed outside of *hutong* areas in Beijing and similar places. For illustrative purposes below, I will assume a demolition rate of 200–300 million m² per year, a figure still double or more the official rate during 2003–2004.

Most rural-to-urban migrants at the beginning of the second decade of the 21st century lived in very crowded substandard conditions ranging from tents to dormitories to rental space with as many as six to eight people per room. Most migrant households would probably be in the bottom 40% of the urban population if we had a measure of their income. The average annual income of urban households in the second 20% of the urban population, reckoned from the bottom, was CNY50,000 (\$8,000). Those in the bottom 20% earned CNY27,000 (\$4,400).¹⁵ People at this level of income cannot afford to purchase a 90 m² apartment at CNY490,000 (\$79,000), the average sales price of commercial real estate in all of the PRC. Some, however, might be able to purchase a smaller apartment 30 or more years old particularly in the smaller cities. Most housing for recent migrants, however, will have to be public housing with subsidized rents. The actual construction rate for migrant housing, therefore, is likely to be determined more by government policy than just by migrant demand.

According to the 2011 report of the National Population and Family Planning Commission, the number of migrants at that time was 221 million, and 76% of those wanted to live permanently in cities.¹⁶ Another 300 million are expected to move from rural to urban areas over the next 30 years. These figures imply that there will be a need for housing for roughly 370 million people over the next 2 decades. That suggests an immediate need for the 170 million people who want to remain permanently in the cities now plus 10 million more each year. Assuming

¹⁴This calculation is also based on Yao's (2013b) estimate of the age structure of the housing stock in 2010.

¹⁵These figures are based on the per capita disposable income of urban households in these groups multiplied by the number of people per household. The US dollar figures assume an exchange rate of CNY6.2 per dollar.

¹⁶"Mass migration, major problems," *Chinadaily.com.cn* 10 October 2011. The 221 million figure is from the 2010 census and is for residents whose household registration is in a different place other than in the same city. It thus includes some people who are not rural-to-urban migrants.

Table 3. **Annual Demand for Housing**
(Million m²)

Demand	Size
Replacing demolished housing	200–300
Housing for migrants	370–493
Improved urban housing	120–290
Total annual demand	690–1,083

Source: Author's calculations.

a family size of 3 and an apartment size of 80 m², housing construction for this purpose would average 493 million m² per year (somewhat more in the early years because of the backlog of demand and somewhat less in later years). If the average family size was 3.5 and the apartment size was 70 m², the figure would be 370 million m² per year. The average cost of urban housing construction per square foot in 2012 was CNY2,184, not including the purchase of land. If that were the cost of construction of public housing, perhaps adding some payment for land, the cost for public housing would come to CNY808 billion to CNY1,077 billion (1.6% to 2.1% of GDP in 2012, a lower percentage in later years).

Estimating the pace at which the PRC's existing urban residents will upgrade their housing, presumably mainly by buying new, larger, or higher quality apartments, is very difficult.¹⁷ The average annual increase in the size of the PRC's apartments per household has generally ranged between 0.5 m² to a bit over 1.23 m² per year since 1992 (Yao 2013a, 1). The lower figure implies a figure of 120 million m² per year and the higher figure about 290 million m² annually. Putting these speculative estimates together, one gets a total annual demand of around 690–1083 million m² per year over the next 2 decades (Table 3). It should be underlined that this estimated range assumes a robust program to house rural-to-urban migrants. Without such a program, the projected demand for housing would be much lower. As of 2014, the government has yet to make a commitment to provide public housing for migrants of anything like this magnitude.

Finally, it needs to be emphasized that this speculative forecast is a long-term forecast and not a comment on whether or not the housing market of 2014 is overbuilt or housing prices are too high. In 2014, there is probably still a demand for housing as an alternative investment to putting money in banks at low interest rates even if the housing remains empty for long periods (but demand of this sort will evaporate if prices begin to fall). This source of demand should also fall as individuals in the PRC are allowed to invest in a wider range of assets (including overseas stock markets), and interest rates on bank deposits rise to market-determined levels.

It is also the case that the urban population had been growing during the past 5 years (2008–2012) at a little over 20 million people per year, double the rate of

¹⁷People could also expand the size of their existing housing by buying out and remodelling the interiors of neighboring apartments.

the projections used above, although some of this presumably involves redrawing of urban boundaries rather than actual new migrants. Official statistics indicate that urban employment increased by 12.5 million people annually over the same period (2008–2012). Similarly, employment in the secondary and tertiary sectors rose by 12.7 million per year. Employment in the primary sector (mainly agriculture) has fallen by roughly 10 million per year. Population growth is now under 0.5% per year or 6.5 million people per year (down from 13 million per year in the 1990s). It is the smaller figure of 6.5 million that is an indicator of the size of the pool of labor in the countryside that will be available to move to the cities 10 to 15 years from now (or will have already moved as children with their migrant parents by then).¹⁸

The overall conclusion is that for the next several years there will probably be enough demand to sustain urban housing investment at a level comparable to that of the recent past of around 1 billion m² per year (or somewhat less), but it seems unlikely that demand will grow further. Housing investment as a share of GDP should decline as GDP rises. This is very different from the most recent decade (2003–2012) when investment in urban housing rose by 23% per year and completed housing floor space rose by 6% per year.

VI. Transport Investment and GDP Growth

As in the case of housing, the PRC following the Soviet model neglected transport investment throughout the centrally planned command period prior to 1978. Since that time, a substantial share of investment has gone to the sector, but it was only in 1998, during the Asian financial crisis, that construction of a high-speed highway (expressway) system began to expand by several thousand kilometers (km) a year, accelerating to nearly 10 thousand km a year during 2009–2013. That length, as of the end of 2013, reached nearly 104.5 thousand km (65.3 thousand miles), longer than the US interstate highway system (46.9 thousand miles).

At roughly the same time, the Chinese government began making large investments in new airports for provincial capitals and other major cities, and 5 years to a decade or more later, large new terminals were opened at Baiyun Airport in Guangzhou, Pudong Airport in Shanghai, and Capital Airport in Beijing. More than 40 new airports elsewhere are in the current five-year plan. The PRC's first major high-speed railway, from Beijing to Tianjin, began operating in 2008. Since then, new lines have been opening throughout the country and the length operating in 2012 was just over 10 thousand km with an additional 1,672 km added in 2013. With plans to complete four north–south lines and four east–west lines linking all

¹⁸For more in-depth analyses of the state of the Chinese urban housing market in 2014, see Yao and Gately (2014), and Yao (2014).

of the most populated parts of the country, the total length is expected to reach 18,000 km by 2017.¹⁹

A central question about this investment is whether it is being built in response to demand or well ahead of demand. Within the large coastal cities such as Beijing and Shanghai, there is little doubt that construction of highways has been meeting an immediate high level of demand. The expressways around Beijing and in the lower Yangtze delta between Nanjing and Shanghai are jammed with vehicles most of the time. The total number of passenger vehicles plus trucks in the PRC was roughly 120 million in 2013, while the US, with a somewhat shorter expressway system, had 254 million registered passenger vehicles plus large numbers of trucks. At 12 million new passenger vehicles and 10 million other motor vehicles produced a year (the level of production in 2013), the PRC would catch up with the US in terms of number of vehicles in roughly another 7 years or a bit longer if older automobiles and trucks going out of service are taken into account and even longer if many of these vehicles are exported.²⁰

Furthermore, the PRC also has a far superior passenger rail transport system to that in the US, and that has also been expanding. Not many Chinese today, unlike Americans, travel long distances by automobile, although that is much less true of trucks, so it will be more years before the PRC's mileage used per vehicle matches that of the US. That said, the PRC's population density alone will almost certainly force the country to follow a path different from the US. If the PRC, as per capita incomes rise to high income levels, were to duplicate the automobile ownership and use of the US, the country would have over a billion passenger vehicles on its roads mostly in an area that is only modestly larger than US territory east of the Mississippi River.

A more relevant comparison would be Europe, where there are over 300 million vehicles and only 66,000 km of "motorways" (in the EU plus members of the European Free Trade Association) but with a good high-speed rail system.²¹ The PRC's passenger rail volume has increased by only 3.1% per year since 1990, although, the rate increased after 2002 to 6% per year, in part no doubt due to rising incomes. Civil aviation carried only 17% of the volume of passengers as railroads in 2012, and the long-distance rail lines to a degree compete with domestic air travel. At the time that this is being written, however, both continue to show robust growth.

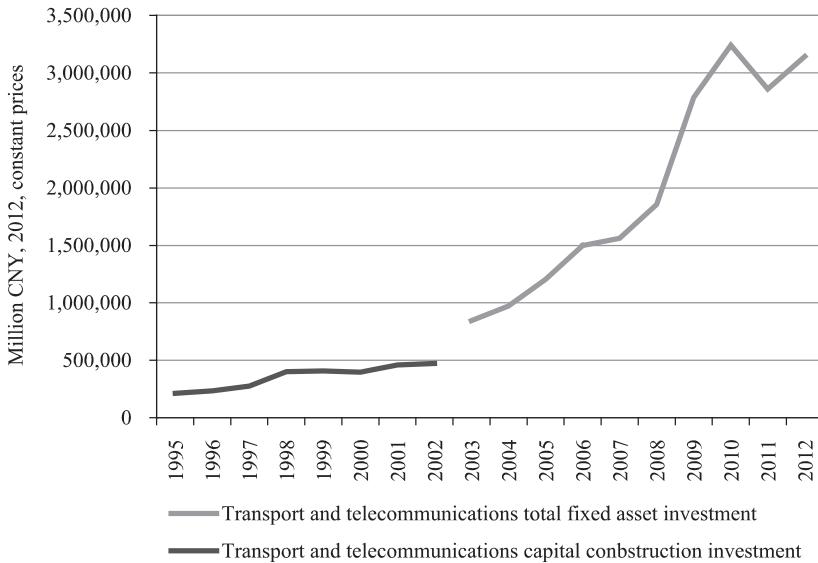
This discussion suggests that the demands on traffic capacity of all kinds may not justify continued investment growth in this area at the accelerated pace of the

¹⁹ Available online: www.travelchinaguide.com/China-trains/high-speed/

²⁰ To get a full picture of future demand for use of highways, one would have to get an estimate of exports and imports of vehicles plus the number of trucks on the roads and the average distance travelled by each vehicle over a year.

²¹ This estimate is calculated using data from *European Road Statistics 2011* (European Union Road Federation 2011, 16–17).

Figure 7. Investment in Transport and Telecommunications



Note: The data were divided by the price index for investment in fixed assets to convert the reported data to constant 2012 prices. Total fixed asset investment is more inclusive than capital construction investment but data broken down by sector are only available after 2003.

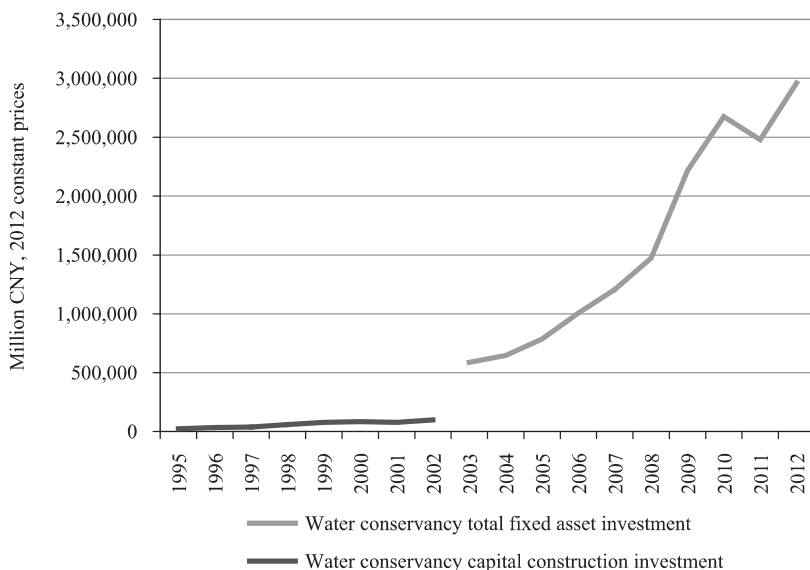
Sources: National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*, pp. 160, 347, and 2003, p. 197. Beijing: China Statistics Press.

past decade. The data for total investment in transport and communications in real terms are presented in Figure 7.

Investment in transport and telecommunications over the period 2004–2012 grew at an average annual rate of 14.3% per year, substantially faster than the rate of growth of GDP; the rate of growth during 1996–2002 was somewhat slower at 12.1% per year. However, the earlier growth was only slightly faster than GDP growth. In the more recent period, the share of transport and telecommunications investment in GDP rose from 4% in 2003 to 7.3% in 2010 as the stimulus investment took effect, but fell back to 6% in 2012. Also, involved in the 2010–2012 period was the temporary slowdown in railroad investment due to scandals in the railway ministry.

Is an investment in transport of 6% of GDP likely to continue indefinitely into the future? Even if it does, the rate of increase in investment would likely fall to the rate of growth of GDP. Gross investment, to be sure, will grow partly because recurrent costs for system maintenance will rise rapidly as the transport system ages, but it is net investment that will drive increases in GDP. We have also made no attempt to estimate the portion of investment in these figures that is set aside for telecommunications rather than transport. The likely increase in demand for transport services going forward, however, does not appear to justify continued expenditures at the current level. This conclusion, however, is somewhat speculative since it is not based on careful analysis of the Chinese transport systems, where

Figure 8. Investment in Water Conservancy and the Environment



Note: The data were divided by the price index for investment in fixed assets to convert the reported data to constant 2012 prices. Total fixed asset investment is more inclusive than capital construction investment but data broken down by sector are only available after 2003.

Sources: National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*, pp. 160, 347, and 2003, p. 197. Beijing: China Statistics Press.

filling key gaps in that system would or would not be highly productive, but such a study is far beyond the scope of this essay.

VII. Water Conservancy and the Environment

Investment in water conservancy and the environment has followed a path very similar to investment in transport up through 2013. Slower but substantial growth before the 21st century was followed by accelerated growth faster than the rate of growth of GDP after the year 2000 (Figure 8). The prospects for future growth in investment in water conservancy and the environment, however, are different from those for transport. The northern part of the country reaching from Shandong Province and the North China Plain to Gansu and Qinghai Provinces in the northwest has a severe shortage of water relative to the region's demand for water.²² The demand for water in the north is outstripping supply. As a result, the main sources of water in the north, the aquifers under the North China Plain and elsewhere, are being mined,

²²West of Qinghai and Gansu is mostly desert except for the oases along the historical silk route and the far western portions of Xinjiang, but there has never been a realistic prospect for bringing water to this mainly desert region. Similarly the far northern part of the northern region (the northern part of Inner Mongolia) is the Gobi desert.

leading to a steady fall in the level of these aquifers and the possibility that they could dry up.

The water problem has been recognized for some time now, and the PRC over the past decade has invested well over CNY400 billion (over \$70 billion) in the largest single project, the transfer of water from the Yangtze River to the dry northern provinces. The project is designed to move water along three routes to the north, and the eastern-most route has already begun moving water northward. The central route is nearing completion, but the western route is still in the planning stage. Even more ambitious efforts to move water from further south, including from rivers that are also important to Southeast and South Asia, are being talked about. Whether these future possibilities are feasible, and even whether or not the diversion of the Yangtze River water to the north will solve more problems than it creates, remains to be seen.

Large-scale water conservancy investments, therefore, are likely to continue for some time. Over time, it will become increasingly apparent whether continued investments to move water northward will lead to an unacceptable fall in the level of the Yangtze River itself and its tributaries. If further diversion of water is required and economizing efforts in areas of water shortage reach their limits, the main alternative would be to begin shifting industries and urban centers to the south. To some degree, this shift to the south could occur without government direction as individuals and enterprises move to areas where water is more plentiful.

Water conservancy is a kind of environmental investment, but while much of the PRC's water is severely polluted and some feel the Yangtze diversion could make it worse, the issue of investment in the environment goes far beyond water. The air quality problems of many of the PRC's major cities are well known. The PRC's contribution to greenhouse gases and climate change is also widely discussed. The data on investment in fixed assets, however, probably do not capture much of the current investment that is going into efforts to curb the increases in air and water pollution. Much of the investment in dealing with air pollution would normally show up in the accounts of industrial enterprises and in such areas as the higher cost of motor vehicles due to emission controls.

While it is not known, at least to the author of this essay, how much is being spent in the PRC at present to improve the environment, there is little doubt that large sums will have to be spent in the future, especially if the PRC gets serious about reducing its impact on the rise in greenhouse gases. The only way the PRC can have a major impact on its contribution to greenhouse gases is for it to dramatically reduce its dependence on coal. The PRC's coal production since 2000 has increased at a rate of 7.8% per year, and the share of coal in energy consumption has only declined from 69.2% to 66.6% over that period (2000–2012). Energy from gas, hydropower, nuclear, and wind power together rose from 8.6% to 14.6% of total energy consumption, with rapid increases in the imports of petroleum making up the difference of 19% to 21% of energy consumption.

Even these modest structural changes in energy demand have involved large investments. More dramatic changes in coal use, to say 50% of energy consumption, would involve enormous investments in gas pipelines, hydroelectric dams, and nuclear power plants, particularly if energy consumption continued to grow. Coal still accounts for 37% of electricity produced in the US, and its declining use is still a politically contentious issue. The much larger investment (particularly as a share of GDP) needed to bring coal use down in the PRC will also generate resistance from a wide variety of sources. Estimating the likely size of that investment, however, is well beyond what is possible in this essay.

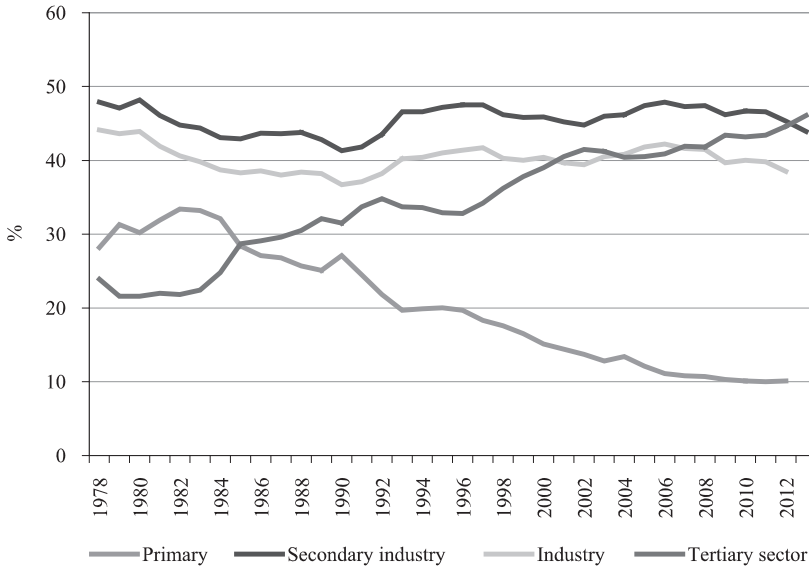
Reducing coal consumption is also an essential component for reducing air pollution, but a great deal can be accomplished in that area by reductions in particular uses for coal (for household heating use for example) rather than an overall sharp decline in use, and that has been occurring in the PRC. Air pollution can be addressed through a range of other investments as well. Some of these methods such as closing small inefficient power plants and replacing them with larger more efficient plants were tried with some success during the 11th five-year plan. A careful estimate of the impact of this effort and of other hypothetical policies such as a carbon tax suggests that the impact was well under 1% of GDP, and when health and other benefits were taken into account, that impact was positive, not negative (Nielsen and Ho 2013).

We do not have an estimate of the up-front costs of ending air pollution overall. From the experience of both Japan and the Republic of Korea, however, we do know that serious air pollution can be eliminated without having a clearly noticeable impact on GDP, although neither used anything close to the amount or share in total energy of coal consumed by the PRC. Whatever that precise up-front cost figure may be, given that the PRC will have to maintain an abnormally high rate of investment for at least the next few years to fully employ its resources, a strong case can be made for shifting investment equivalent to several percent of GDP to dealing with air and water pollution. Much of that investment would be done by the polluting enterprises themselves, and the efficiency of that investment would probably be higher if an increasing number of these enterprises were under private management.

VIII. The Transition from a Manufacturing Economy to a Service-Based Economy

As per capita incomes rise, the structure of the economy initially experiences a shift in production and employment from the agriculture sector to industry, but when per capita incomes rise further, there is another shift from industry to services—that is, industry's share in GDP and employment levels off and begins to decline, while the share of services in GDP and employment continues to rise. The latter shift occurs at anywhere from \$8,500 per capita GDP (PPP in 2000 prices) to a little over

Figure 9. Sector Shares in GDP



Source: National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*. Beijing: China Statistics Press.

\$20,000.²³ The shift of Taipei, China and the Republic of Korea's began in the late 1980s at the low end of the per capita income spectrum, while that of Japan began in the middle of that income range in the early 1970s. More generally, this shift toward services has occurred on average at a lower level of per capita income since the 1980s than before that time, though there are numerous exceptions.

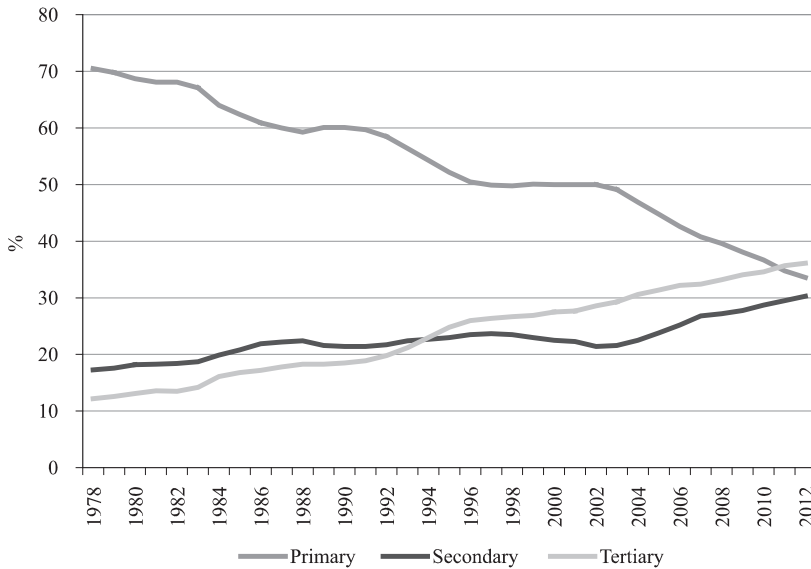
The PRC's shift out of agriculture into industry began in the 1950s and accelerated after 1984, but the share of industry in GDP and employment leveled off in the mid-1990s; that share in GDP began to slowly decline around 2008 when per capita GDP was roughly \$7,000–\$8,000 depending on whose PPP income estimates are used.²⁴ Employment in the secondary sector, however, has continued to rise, although much of that rise is due to increasing employment in construction, not manufacturing. The data are presented in Figures 9 and 10. While one cannot be certain that this decline will not be reversed in future years, the PRC appears to be in the early stages of an economy dominated increasingly by the service sector.

The relative shift from industry to services is sometimes referred to as deindustrialization, but in almost all economies, industrial production, although not

²³ These figures are for the shift in employment away from industry, but the shift in production typically begins at roughly the same time. The shift away from agriculture begins early in development and continues until very high income is reached, and so with the share of industry also falling, the service sector is therefore growing faster than GDP. See Eichengreen, Perkins, and Shin (2012, 87).

²⁴ The PRC's agricultural reforms in the early 1980s led to a high rate of growth in agriculture for a brief period and agriculture's share of GDP actually rose.

Figure 10. Sector Shares in Employment



Source: National Bureau of Statistics. 2013. *China Statistical Yearbook 2013*. Beijing: China Statistics Press.

employment, continues to grow. The service sector, however, typically grows at slower rates than the double-digit industrial and manufacturing growth rates one sees in fast-growing countries in the early stages of development. In low-income and middle-income countries experiencing near double-digit rates of growth, that high rate of growth is largely driven by industry, and particularly, manufacturing. There are exceptions, such as India, where high growth has been driven by the service sector, but those exceptions in low-income and middle-income countries are rare. In the PRC, however, the service sector grew considerably faster than GDP (10.8% per year from 1978 to 2012, versus 9.8% per year) and almost as fast as industry (11.35% per year). The share of services in GDP thus rose steadily from 23.9% of GDP in 1978 to an average of 34.1% in the 1990s and an average of 41.7% from the year 2000 onwards. Industry's share in GDP rose rapidly up until the early 1990s, but the share leveled off at roughly 41% for the next 16 years then began to decline beginning in 2009 until 2013.²⁵

The PRC's early rapid increase in the service sector, however, was not typical of low-income and lower-middle-income countries. The rising share of services during that earlier period resulted from the fact that services of all kinds during the centrally planned command era prior to 1978 were systematically neglected. Wholesale and even much of urban retail trade had been dominated by a few

²⁵The share of manufacturing and industry in GDP at the beginning of the reform period was well above 41% but this reflected the unusually high industrial prices and low agricultural prices then still in place, from the command economy era before 1978.

state-run enterprises, there were few restaurants, banking services for the public were minimal, and investment in transport was kept to a minimum. Services in the Soviet-type system were not included in what the Chinese called national income but which outside economists usually referred to as net material product. Investment in services thus did not contribute much to what was considered at that time to be economic growth.

This situation changed rapidly after 1978. Retail trade in rural and urban areas grew rapidly and was increasingly in private hands. New hotels and restaurants were opened in large numbers, the banking system was gradually modernized, and other financial institutions were created and expanded. Education and health care expenditures also rose rapidly. By 2014, the PRC's service sector appears to have caught up with the level and sophistication of the average middle-income country. Services, however, as already noted, do not typically grow at near double-digit rates. We do not fully understand why this is the case but there is a clear difference between increasing, say steel production, from 100 million tons to 300 million tons in a decade or two than from training the workers needed for expanding labor-intensive financial or business services threefold. Wholesale and retail trade, and transport services will grow primarily with the rate of growth of traded goods (this includes slower growing agriculture as well as industry) and with the rising rate of urbanization, among other things. Whatever the explanation offered for why services grow less rapidly than the double-digit increases that sometimes characterize industry, the PRC's shift toward services in the future should also contribute to a slowing of the GDP growth rate.²⁶

It is also important to note here that productivity in services is only likely to grow rapidly if much of the growth and investment in this sector is increasingly dominated by the private sector. The large state-owned banks, for example, performed particularly badly when they were first separated from the Soviet-type mono-bank system of the pre-reform period, and while the improvement in performance since then has been considerable, political considerations in allocating credit, among other problems, still play too large a role. Tight regulation of the financial system has also led to the rapid expansion of a large shadow financial system which is not really effectively overseen by anyone.

In software development, e-commerce, and related areas, it is even more difficult to imagine the state playing a large and effective direct role. The state abandoned much of its role in traditional retail trade early on in the reform period. It is difficult to identify any part of the service sector that would benefit from direct government control outside of areas such as welfare payments and other areas where market failures make government control essential. Government regulation is needed, notably of the financial sector and to internalize to firms external

²⁶In Eichengreen, Perkins, and Shin (2012, 36), a cross-country regression was run showing that the GDP growth rate accelerates when the share of manufacturing rises and then levels off as the share of manufacturing. It then falls as services come to dominate.

environmental diseconomies, but even in these areas, government regulation in the PRC has too often been poorly designed and implemented.

IX. Impact of High Investment Rates on Total Factor Productivity

How will the impact of these various shifts in demand—for housing and transport on the negative side and for the environment and consumer products on the positive side—together with structural changes on the supply side (the shift from manufacturing to services) affect the overall rate of growth? An alternative question would be to ask what the impact on GDP growth would be if these structural changes did not occur, but the analysis above has already made a strong case that the impact on the GDP growth rate of no structural change would be negative.

One way to approach an answer to the first question is to analyze the supply-side problem of maintaining a high enough rate of TFP growth to ensure an annual growth rate from 5% to 7%. It would then be desirable to breakdown the required productivity growth by sector to take into account the impact of the structural changes required in the future, but that is a difficult challenge at best and far beyond what is possible in this essay.

During the post-1978 economic reform period through to the middle of the first decade of the 21st century, the PRC experienced high TFP growth that accounted for 40.1% of the growth rate of GDP in that period (Table 4). Put differently, if there had been no TFP growth, the PRC's GDP growth rate, other things being equal, would have been less than 6% per year during 1978–2005. In the latter half of that period, however, the growth rate of TFP fell to just over half of the previous 27 years. As the capital output ratio continued to rise by 30% after that 27-year period and the rate of investment grew to nearly half of GDP, the growth rate first rose to 11.3% per year but then fell to an average of 8.2% during 2011–2013. The trend during the latter period was downward.

In a study based on data through 2005, Tom Rawski and I attempted to get an understanding of how fast TFP would have to grow over the next 1 to 2 decades (2006–2025) for the PRC to maintain a given GDP growth rate (Perkins and Rawski 2008). A summary version of those estimates (speculations) is presented in Table 5. These projections assumed that the rate of investment as a share of GDP would actually decline slightly from the 2000–2005 period where in fact it rose. But that rise, as we have seen, produced only a short-run burst in high growth followed by a sharp fall.²⁷ The additional capital investment was significantly less productive than in the recent past. Going forward, these projections suggest that TFP would have

²⁷In national income accounting, a sharp rise in the rate of capital formation as a share of GDP will itself increase the rate of growth even if that investment is not very productive. Over 2 or 3 years or more as that investment is completed, however, the rate of growth will depend on the increase in goods and services produced by that investment.

Table 4. Supply Side Sources of Growth in the PRC

Period	Growth Rate (%)				Contribution to Growth (%)		
	GDP	Fixed Capital	Educated Labor	TFP	Capital	Educated Labor	TFP
1953–1957	6.5	1.9	1.7	4.7	12.7	14.9	72.4
1958–1978	3.9	6.7	2.7	-0.5	73.7	39.7	-13.4
1978–2005	9.5	9.6	2.7	3.8	43.7	16.2	40.1
2006–2011	11.0	14.4	2.1	2.1	72.0	8.6	19.4
1953–2005	7.0	7.7	2.6	2.1	47.7	21.4	30.9

Note: The estimates for 1953–2005 were taken from Perkins and Rawski (2008, 839) while those for 2006–2011 were computed using the same basic methodology. Those interested in pursuing this methodology further are referred to the said essay and the authors' websites that include the appendixes to that essay. The educated labor figures and fixed capital figures were computed by Dr. Zhang Qiong using the same methodology as the earlier data, and I am grateful to her for sharing these estimates. The GDP and raw labor data were obtained from the National Bureau of Statistics (2012, 24 and 43) and National Bureau of Statistics (2011, 60 and 112). As the share of labor income in gross national income has fallen steadily and was a low 45% of income in 2010, the shares of labor and capital used to compute the TFP residual were .45 and .55 respectively, while the labor and capital income shares in national income for the earlier years were .53 and .47 respectively.

Sources: Perkins, Dwight, and Thomas Rawski. 2008. Forecasting China's Economic Growth to 2025. In *China's Great Economic Transformation*, edited by Loren Brandt and Thomas Rawski, pp. 829–86. New York: Cambridge University Press; National Bureau of Statistics (various years).

Table 5. Hypothetical Projections of the Future Sources of GDP Growth (%)

	GDP	Fixed Capital	Raw Labor	Education Enhanced	TFP Growth
1979–2005	9.5	9.6	1.9	2.7	3.8
2006–2015	9.0	9.8	0.7	2.0	3.6
2016–2025	9.0	8.2	-0.3	1.0	4.9
2006–2015	6.0	8.1	0.7	2.0	1.4
2016–2025	6.0	5.6	-0.3	1.0	3.0

Note: This is a shortened version of a table in Perkins and Rawski (2008, 852–53).

Source: Perkins, Dwight, and Thomas Rawski. 2008. Forecasting China's Economic Growth to 2025. In *China's Great Economic Transformation*, edited by Loren Brandt and Thomas Rawski, pp. 829–86. New York: Cambridge University Press.

to grow at 3.6% to 4.9% a year over the next 1 to 2 decades in order to maintain a GDP growth rate of 9%. The PRC in the past has managed a TFP growth of 3.6% per year but never 4.9%, and in recent years, the figure has been well below even 3.6%. When the beginning of a decline in the total labor force is taken into account, together with the fact that the investment rate is no longer rising, a 2.1% TFP growth will produce only a growth rate of around 6% a year (during 2016–2025) using the data in Table 5. This is not a forecast, but it does suggest that the PRC will have to maintain a higher rate of growth in productivity than in the recent past if it is to achieve a sustained GDP growth rate of above 6%. How realistic is that?

The Third Plenum of the 18th Chinese Communist Party Central Committee outlined a list of 60 points covering areas of reform that were going to be implemented. Many of these directly related to the challenge of maintaining a high rate of TFP growth. The 60 points begin with general guidelines, one of which is that the market should play the decisive role in resource allocation. The document

also calls for securing property rights protection, actively developing diversified ownership (with a particular emphasis on non-public ownership), and eliminating “administrative monopolies” of state enterprises. It also supports a variety of other measures to make the state enterprise sector more productive; to establish market rules that are fair, open, and transparent; to improve financial markets, including allowing qualified private capital; and to create a market-based system for encouraging technological innovation.

The document further states that the role of the government should be changed so that, among other things, the government withdraws from business activities that can be regulated and modulated by markets. The economy should be opened up even more to the outside world and the problem of unequal treatment of rural-to-urban migrants directly dealt with by calling for a full, if no doubt gradual, integration of the rural and urban social-service systems. There are five points dealing with legal reform, including greater transparency in courts and prosecuting bodies as well as fairness and independence of these institutions. Overall, over half of the 60 points deal with issues that are central to maintaining a high rate of productivity growth either directly or indirectly. The issue going forward is not whether this is a good list, it is. The central issue is the pace and thoroughness with which these reforms are interpreted in practice and implemented.

If resistance to these reforms is overcome and they proceed rapidly, however, they will still not fully solve the challenge of maintaining a fairly high rate of growth (6% to 8%) for another 1 to 2 decades. There is very little in the 60 points that deals directly with concrete measures to alter the current imbalance between household consumption and investment, although there are several reforms discussed that would influence that imbalance indirectly, particularly the one dealing with the unification of rural and urban social services. The PRC will probably have to maintain a fairly high rate of investment for the immediate future, but if the current rate—where nearly half of GDP is invested each year—continues indefinitely, this will undermine the ability to raise productivity growth, as it is unlikely that the government and the society at large can find and implement enough high-return investment opportunities to justify that level.²⁸ It will also make corruption more difficult to control, with profound political as well as economic implications. The PRC’s current vigorous anti-corruption campaign will have some impact reducing the level of corruption, but if the opportunities for corrupt actions due to massive public construction and over regulation continue as in the recent past, the anti-corruption effort is likely to fail with highly uncertain but likely negative consequences for economic growth.

There is also the issue that short-term shocks to the economy could derail growth for a time, and enough of them could slow the long-term growth rate further.

²⁸It is not that there are limited numbers of investment opportunities in principle, but investors have to find those opportunities, finance them, and then get them efficiently implemented. There is a reason why the demand for investment as a function of the rate of return on investment slopes downward and to the right.

This essay on long-term trends is not the place to attempt to analyze the various external and internal shocks that could derail the PRC's rapid catch-up growth. However, it does need to be pointed out that the emphasis placed in this essay on the need to rely more on sectors that generate high productivity, notably private as contrasted to state-owned enterprise, together with a liberalized financial sector, will mean plenty for how the economy will work going forward. It will no longer be possible for the state to simply order or pressure firms to invest more, nor will it be possible for the government to basically print money to bail out insolvent banks, as done in the past, or bankrupt local governments, as possibly will happen in the near future. A large and failing shadow banking system in the future, for example, would have a direct negative impact on private investment in ways that might not be the case with state investment. Continuing reliance on state-enterprise investment, however, while it might make a recession more easily handled, would also be at the price of a much lower long-term growth rate because of the weak returns to most state-enterprise investment.

The PRC over the next 1 to 2 decades faces formidable challenges if it is to keep the economy growing at a catch-up rate of 5% to 7% a year. A higher rate than that over the next 2 decades is not likely to be achievable however vigorous the reform efforts. The "easy" boosts in productivity from dismantling the old centrally planned command system are in the past, although greatly reducing the role of the state-owned enterprises in favor of private entrepreneurial leadership would clearly help keep the rate of return on investment high. Future productivity growth, however, also will depend on the technically much more difficult task of improving the performance of what is already mainly a market-driven system. The fact that the PRC must achieve this while at the same time restructuring the economy to depend less on excessive levels of investment and with slower growth in exports makes the challenge that much greater.

References*

- Cai, Fang, and Yang Du. 2011. Wage Increases, Wage Convergence and the Lewis Turning Point in China. *Chinese Economic Review* 22(4):601–10.
- Eichengreen, Barry, Dwight Perkins, and Kwanho Shin. 2012. *From Miracle to Maturity: The Growth of the Korean Economy*. Cambridge: Harvard Asia Center, distributed by Harvard University Press.
- European Cement Association. 2014. *Key Facts and Figures*. Available online: www.cembureau.eu/about-cement/key-facts-figures
- European Union Road Federation. 2011. *European Road Statistics 2011*. Available online: <http://www.irfnet.eu/images/stories/Statistics/2011/ERF-2011-STATS.pdf>
- Heston, Alan, Robert Summers, and Bettina Aten. *Penn World Tables 7.1*. Center for International Comparisons of Production, Income and Prices, University of Pennsylvania.

*ADB recognizes "China" as the People's Republic of China.

- Lardy, Nicholas. 2014. *Markets over Mao: The Rise of Private Business in China*. Washington, D.C.: Peterson Institute of International Economics.
- National Bureau of Statistics. 2003. *China Statistical Yearbook 2003*. Beijing: China Statistics Press.
- . 2011. *China Statistical Yearbook 2011*. Beijing: China Statistics Press.
- . 2012. *China Statistical Yearbook 2012*. Beijing: China Statistics Press.
- . 2013. *China Statistical Yearbook 2013*. Beijing: China Statistics Press.
- . 2014a. *Zhongguo Tongji Zhaiyao 2014*. (China Statistical Abstract 2014). Beijing: China Statistics Press.
- . 2014b. *Statistical Communique of the People's Republic of China on the 2013 National Economic and Social Development*. Available online: www.stats.gov.cn/english/PressRelease/201402/t20140224_515103.html
- Nielsen, Chris, and Mun Ho. 2013. *Clearer Skies over China: Reconciling Air Quality, Climate and Economic Goals*. Cambridge, Mass.: MIT Press.
- Perkins, Dwight, and Thomas Rawski. 2008. Forecasting China's Economic Growth to 2025. In *China's Great Economic Transformation*, edited by Loren Brandt and Thomas Rawski, pp. 829–86. New York: Cambridge University Press.
- State Statistical Bureau. 1981. *Statistical Yearbook of China 1981*. Hong Kong, China: Economic Information and Agency.
- World Trade Organization. 2012. *World Trade Report 2012*. Available online: http://www.wto.org/english/res_e/booksp_e/anrep_e/world_trade_report12_e.pdf
- Yao, Rosealea. 2013a. Hard Choices for Housing Policy. *Gavekal/Dragonomics*, September 18.
- . 2013b. Tearing Down Mountains, Building up Castles. *Gavekal/Dragonomics*, December 18.
- Yao, Rosealea. 2014. Neither Boom nor Bust for Housing. *Gavekal/Dragonomics*, March 10.
- Yao, Rosealea, and Thomas Gately. 2014. The Culprits behind the Housing Correction. *Gavekal/Dragonomics* May 21.