Can China Rise to High Income?

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Introduction

In 2014, China's GDP per capita reached US$7,500. But its GDP growth decelerated further to 7.4 percent from 7.7 percent a year ago. The combination of these two indicators raises the question if China will be able to continue its steady economic growth, to avoid the "middle-income trap" and to become a high-income economy in the coming decade. Sustainability of Chinese growth has always been a contentious subject. But the challenge has never appeared to be more real than this time since, historically, most other countries failed to graduate into high-income status after reaching similar stage of development. And, more alarmingly, Chinese growth has been slowing quite visibly and persistently for the past several years.

The issue of "middle-income trap" started to attract nationwide attention in China following publication of the report "China 2030" prepared jointly by the World Bank and the Development Research Center of the State Council in early 2012 (World Bank 2030). The report reveals a pretty downbeat fact – of 101 middle-income economies in 1960, only 13 became high income by 2008. Later in 2012, the Asian Development Bank and the National School of Development of the Peking University also published a joint report "Growing beyond low-cost advantage" exploring the same issue (Zhuang, Vandenberg and Huang 2012).

Whether or not China is able to avoid the middle-income trap is probably one of the most important economic questions facing the world today. Success can lift living standards of 1.4 billion people, and failure might lead to economic and social instability in China. If China succeeds, it will most likely replace the United States to become the world's largest economy, which should have important implications for global economic structure and international economic governance. If China fails, then the world would lose one-third of the global economic engines and many commodity exporters might dive further in the current economic downturn.

Economists are divided on the subject. On the one hand, Justin Lin believes that the growth potential of the Chinese economy is probably still around 8 percent, given its large technological gap from the advanced economies, large-scale infrastructure investment and continuous structural readjustment. It is possible for China to achieve an average of above-7 percent growth in the coming decade. He identifies at least four preconditions for sustaining China's long-term growth, including well-functioning markets, a minimum amount of investment, continuous structural upgrading and effective government (Lin

and Zhang 2015). Conditional on these assumptions, Lin predicts that China will join the high-income club by around 2020.

On the other hand, in a recent joint paper, Larry Summers and his collaborator point out that the correlation across decades in national growth rates is surprisingly low, typically in the range of 0.2 to 0.3. It is also inconsistent with many prevailing theories of growth that seek to explain growth performance in terms of highly stable national features like culture, institutional quality, or the degree of openness. They suggest that the prevailing pattern of regression to the mean in growth rates should create substantial doubt about extrapolative forecasts of China's growth. They believe that there is a significant risk of a major growth slowdown in China at some point over the next decade (Pritchett and Summers 2014).

While Lin and Summers arrive at complete opposite conclusions about China's growth outlook, the logics of their analyses actually are not that different. For instance, on the surface, Lin makes an extrapolative prediction, while Summers emphasizes on mean reversion. But Lin's reasoning about "advantage of backwardness" can be viewed as a broad process of regression to the mean – China's growth potential is being lowered over time, although the growth rate can still be relatively high given its income level. Perhaps a more fundamental difference between Lin's and Summers' analyses is if one should make prediction for a single country's growth outlook based on experiences of a large group of countries. The fact that 13 out of 101 middle-income economies in 1960 actually rose to high income suggests that there are important economy-specific stories.

Given that most countries will not be able to avoid the middle-income trap, the more relevant question is what makes an economy performing more like the successful 13 mentioned above, not the remaining 88? In essence, the middle-income trap is about an economy's ability to continue to grow more rapidly than the most advanced economy of the world, the United States at the moment, after reaching the middle-income status. A low-income economy can successfully engineer a takeoff by taking advantages of its low cost, such as cheap labor. As it reaches the middle-income level, income level and cost base become much higher. Therefore, a critical test for the middle-income challenge is the economy's capability to build new industries with higher levels of technology and value-added. All the 13 economies mentioned above succeeded in upgrading their industrial structure, while the other 88 economies were stuck in either resources or low value-added manufacturing and services.

Clearly the key words are technological innovation and industrial upgrading. Both the World Bank and the Asian Development Bank reports made some important policy recommendations (Table 1). The two sets of recommendations have significant overlaps. Both highlight importance of supporting innovation and industrial upgrading. They also focus on measures to structural reforms to improve functioning of markets, macroeconomic policy reforms, greening of the economy and maintaining good relations with the rest of the world. The World Bank also singles out social security for all, while the

Asian Development Bank emphasizes importance of services, urbanization and equality.

Table 1. Some policy prescriptions for China's middle-income transition

World Bank & Development Research Center	Asian Development Bank & Peking University
Accelerating the pace of innovation and creating an open innovation system	Stepping up innovation and industrial upgrading
Implementing structural reforms to strengthen the foundations for market-based economy	Deepening structural reform, especially reforms of enterprises, labor and land markets
	Developing services and scaling up urbanization
	Reducing income inequality
Expanding opportunities and promoting social security for all	
Strengthening the fiscal system	Maintaining macroeconomic ad financial stability
Seizing the opportunity to "go green"	Promoting green growth to conserve resources and protect the environment
Seeking mutually beneficial relations with the world	Strengthening international and regional economic cooperation

Source: World Bank (2012); Zhuang, Vandenberg and Huang (2012).

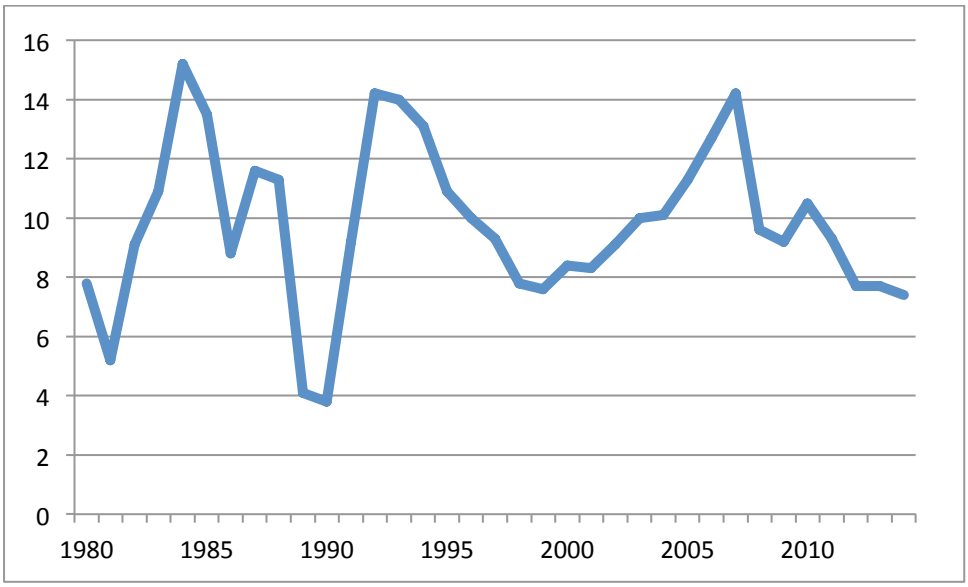
The central policy question of this paper concerns the critical reforms necessary for China to continue its relatively rapid, albeit slower than before, economic growth in the coming decade. We do not intend to provide a comprehensive analysis of the "middle-income trap" question. Instead, we like to shed light on three important issues related to this subject. First, is the current growth slowdown temporary or permanent? An important issue to explore is where the new trend growth rate settles once influences of all the cyclical factors fade away. Second, can China actually transform its growth model, which is often characterized as rapid growth performance and serious structural imbalances? It is critical to nail down the policy strategies that underpinned this unique economic pattern. And, finally, what does China need to do to foster its capability of technological innovation and industrial upgrading? Roles played by the government versus market are often at the center of such policy discussion.

The rest of the paper is organized as follows. Section two tries to explain the key reasons for the recent slowdown of Chinese economic growth. Section three analyzes the current growth model and triggers for change. And section four discusses the necessary policy actions in order to foster China's ability in technological innovation and industrial upgrading, followed with some concluding remarks in the final section.

Understanding recent slowing of Chinese growth

Between 1980 and 2014, China's real GDP grew by an average of 9.8 percent a year and its GDP per capita rose from US$200 to US$7,500 (Figure 1). Economic growth took downturns several times, especially in 1989-90 and 1998-99. In 2012, GDP growth slowed again, to 7.7 percent from 9.3 percent a year earlier. This time, however, growth slowdown looks more persistent, staying at 7.7 percent in 2013 and edging down to 7.4 percent in 2014. At the start of 2015, there was further evidence of weakening economic activities. The National Bureau of Statistics (NBS) put the first-quarter GDP growth at 7 percent, but several market institutions estimated it at only 5 percent or below.[1]

Figure 1. China's annual GDP growth rate, 1980-2014 (%)



Source: National Bureau of Statistics of China and CEIC Data Company.

An important question is if the current growth slowdown is cyclical or structural. In a recent study, Dwight Perkins (2015) points out that the reasons for the slowdown are not yet well understood. On the supply side, this is happening because total factor productivity (TFP) is slowing down. On the demand side, a low share of household income in GDP has required the country 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. And, finally, China 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.

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[1] According to a report compiled by wallstreetcn.com, Capital Economics, Citibank, Conference Board and Lombard Street, respectively, estimated China's first-quarter GDP growth in 2015 at 4.9 percent, 4.6 percent, 4.0 percent and 3.8 percent (http://wallstreetcn.com/node/218370).

Perkins is apparently of the view that current growth slowdown is mainly driven by structural factors, although some factors might be overcome fully or partially. For instance, slowing investment in infrastructure projects could be compensated by investment in environmental protection. Most Chinese economists share the Perkins assessment that future growth likely will be slower in the future. In addition to the reasons outlined by Perkins (2015), there is an important on-going demographic transition (Cai and Lu 2013). During the Asian financial crisis when the Chinese government first proposed that 8 percent GDP was necessary for maintaining full employment, the labor force was increasing by 8 million a year. Now it falls by 5 million a year. This is clearly a negative factor for economic growth.

Most forecasts of China's future growth potentials point to steadily lower levels over time. The World Bank and the Asian Development Bank reports expect growth to fall to 5-6 percent by 2030 (Table 2). It is interesting to notice that even the relatively more pessimistic predictions, such as those by the Asian Development Bank report (Zhuang, Vandenberg and Huang 2012) and by Cai and Lu (2013), assume that China should be able to achieve high-income status by 2020. Justin Lin's prediction is more upbeat, as he believes that current growth slowdown is mainly a cyclical phenomenon, driven down primarily by weakening external demand (Lin and Zhang 2015). Even Lin admits that the growth potential is coming down as its development reaches higher level.

Table 2. Some estimates of China's growth potential (%)

Economists/Institutions	Predictions
World Bank/Development Research Center	2011-15: 8.6%; 2016-20: 7%; 2021-20: 5.9%; 2026-30: 5.0%
Asian Development Bank and Peking University	2011-20: 8.0%; 2021-30: 6.0%
Fang Cai and Yang Lu	2011-20: 7.2%; 2016-20: 6.1%
Justin Lin and Fan Zhang	2011-30: 8.0% (actual performance: >7.0%)

Source: Compiled by the author.

Beyond the downward shift of trend growth, policymakers and market participants are also concerned about possible bottoming of economic growth. It is important to understand that currently there are two economic cycles in the working, forcing down the growth rate. A shorter term cycle is a typical macroeconomic cycle – as external demand weakens, growth slows. This cycle can be affected by traditional macroeconomic policies, such as monetary and fiscal expansion. An increasing number of evidences points to possible bottoming during the second or the third quarter of 2015, including improvement in production, bank lending and de-stocking, following repeated easing of monetary policies from the beginning of the year.

But this bottoming likely will be temporary and short-lived. In fact, this happened before. For instance, when the government saw 7.4 percent growth

record for the first quarter of 2014, it stepped efforts of the so-called “mini stimulus” and “target easing” in order to stabilize growth. Growth stabilized in the second quarter at 7.5 percent, but slipped to 7.3 percent again in the third and fourth quarter. The reason that bottoming of growth during the second quarter of 2014 and, again, possibly during the second/third quarter 2015 is temporary is that there exists another longer term cycle – transition of industrial structure. In short, while the old leading industries are rapidly losing competitiveness, the new leading industries are yet to take the stage to lead the economy forward.

Economists often decompose an economy into three key parts – consumption, investment and export – based on expenditure side definition of GDP. China’s economic growth for the past three decades has been powered mainly by two engines, export and investment. Consumption has been relatively weak. Supporting these two growth engines is a rapidly expanding manufacturing industry. One part of the manufacturing industry, mainly labor-intensive and low value-added, supported export growth. And the other part, mainly heavy machinery and investment goods, facilitated investment expansion. Combination of these two formed the foundation for the global manufacturing center and underwrote the so-called “China miracle”.

Unfortunately, both of these engines are now losing steam. The export sector already weakened significantly. Chinese exports used to expand at 20-30 percent pace. But now basely increases by 5 percent. Obviously, export performance may improve if the global economy recovers more strongly. However, it is almost impossible for Chinese growth to repeat the 20-30% average growth. China has turned from a small economy country into a large country economy in the global market. Since it now accounts for 12 percent of world export market, any adjustment to its demand and supply is likely to trigger significant changes in the rest of the world, illustrated by the popular phrase of “whatever China buys, it becomes more expensive; and whatever China sells, it becomes cheaper”.

More importantly, the traditional Chinese export industries are all built on cheap costs, which have risen dramatically for the past decade or two. For instance, migrant workers’ wages have been growing by around 15 percent a year for more than 10 years. Such drastic changes in costs of labor and many other inputs are quickly putting many industries out of business. The costal economy, which is more export-oriented, used to be the most dynamic part of the Chinese economy. Much of it is now in deep trouble. But in a way, this is a result of past success – rapid economic growth lifts cost of production. This, in turn, erodes competitiveness of many existing industries.

The other part of the dynamic manufacturing industry is also in trouble. The heavy industries producing investment goods suffer from very high overcapacity rates, averaging at 40 percent. China’s investment rate was only around 30 percent at the start of economic reform. It rose to close to 40 percent right before the global financial crisis. As a response to significant growth slowdown in 2008-09, the Chinese government adopted the so-called “4 trillion yuan stimulus package” focusing mainly on infrastructure projects.

This quickly lifted the investment rate to 48.5 percent in 2009. The unusual investment boom not only underscored Chinese economic growth but also supported the so-called super-cylce of the global commodity market. However, the boom may be behind us – both moderating GDP growth and lowering investment rate point to secular weakening of demand for investment goods.

Therefore, the cyclical downturn of the economy will continue. Any near-term growth bottoming will likely be temporary, until new leading industries are solidly established, replacing the labor-intensive manufacturing and heavy industries, to carry Chinese growth forward. Of course, many new industries are already in the forming, such as online shopping, internet finance, express delivery, computer and telecom software and hardware, large machinery equipment, heavy trucks, electrical and construction machineries, etc. These are all expanding rapidly, with some already taking significant roles in the world market. But it will take at least one to two years before these new industries can fill the gaps left by labor-intensive and heavy industries and become the cornerstone of Chinese growth.

Transforming the Chinese growth model

More worrying than growth slowdown is weakening productivity. Harry Wu (2014) demonstrates recently that total factor productivity (TFP) growth decelerated steadily from 1.5 percent a year during 1992-2001 to 1.2 percent during 2002-2007 and further to 0.2 percent during 2008-2010 (Table 3). The Domar estimates of TFP fell even faster, from 5.0 percent to 2.3 percent and to -2.3 percent, during the same period. Recent disappointing performance of productivity is probably related to the aftermath of the “4 trillion yuan stimulus package” introduced in 2008. But the weakening trend also shows unsustainability of the growth model. Therefore, improvement of the growth model should be the first step toward avoiding the middle-income trap.

Table 3. Estimates of total factor productivity of Chinese industry (%)

	1980-1991	1992-2001	2002-2007	2008-2010
Output	8.6	12.7	18.8	13.3
Labor	0.3	0.0	0.3	0.1
Capital	2.4	1.8	2.2	2.5
Material	6.7	9.4	15.1	10.5
TFP	-0.8	1.5	1.2	0.2

Source: Wu (2014).

In order to change the growth model, one needs first to understand how it was formed. And one of the most important determining factors for China’s current growth model is its reform strategy. In the literature, economists have developed diverse analytical frameworks to explain changes in the Chinese economy during the past decades. Justin Lin, Fang Cai and Zhou Li argue that the key to this success was the transition from the heavy industry-

oriented to comparative advantage-oriented development strategy (Lin et al. 1995). Barry Naughton coins the term ‘growing out of the plan’ to describe China’s incremental growth of the market-oriented, private sector, while maintaining support for the old, state-owned enterprises (Naughton 1995). Jeffery Sachs and Wing Thye Woo, however, point out that Chinese economic success can be explained mainly by its convergence with the typical market system of East Asia (Sachs and Woo 2000).

Despite the differences in their perspectives, these economists all agree that the essence of the Chinese economic reform is the transition from a centrally planned system to a free market system. However, China actually adopted a very unique transition strategy during the reform period: the two dual-track approaches, one between state- and privately owned enterprises, and the other between product and factor markets.

When economic reform started in the late 1970s, the Chinese government maintained its support to the state-owned enterprises (SOEs) but encouraged the private firms to grow. In contrast to the “shock therapy” later adopted by the former Soviet Union, this gradual dual-track approach ensures economic and social stability during the transition period, since no worker was fired and no firm was shut down. The intention was for the non-state sector to grow more rapidly, making the state sector increasingly less important over time (Naughton 1994).

This strategy worked quite well for a while, evidenced by strong growth performance. Entering into the 1990s, however, the Chinese economy encountered three major crises, all caused fully or partially by financial problems of the SOEs. This first was the fiscal crisis, as government revenues as a share of GDP dropped from 36 percent at the start of reform to close to 10 percent at the beginning of the 1990s. The government had to implement a series of fiscal reforms in order to increase government revenues. The second was the SOE crisis, as the state sector as a whole made net losses in the mid-1990s. The government then adopted the drastic reform strategy of “grasping the big and letting go the small”, essentially privatizing about half million SOEs with a couple of years. And the third is the banking crisis, as the average non-performing loan ratio (NPL ratio) reached 30-40 percent amidst the height of the Asian financial crisis. The authorities then introduced a series of banking reform steps, including cleaning up the bad assets, inject state capital, introducing foreign strategic investors and listing in capital markets.

After a series of reforms in the 1990s, the state sector made significant progress. The number of SOEs was substantially reduced, leaving only about 120 gigantic SOEs at the central government level, while the average size ballooned dramatically. Most of the SOEs are now in strategic industries, such as telecom, banking, airline, railways and hospitals. Many of them are, in fact, incredibly profitable. However, most economists believe that these SOEs are profitable mainly because they are either in monopoly industries or they receive implicit subsidies. This is why the government’s latest comprehensive reform program announced in late 2013 still identifies SOEs as a key reform area.

The “implicit subsidy” relates to the second dual-track approach adopted by the Chinese government. Since the government intended to continue to support SOEs, it had to intervene in factor markets in order to provide inputs to inefficient SOEs. This gave rise to the dual-track strategy between product and factor markets. Free markets for products ensure that production decisions are based on demand and supply conditions in the economy. Distortions in factor markets are a way of providing incentives for economic entities and, sometimes, overcoming market failures (Huang 2010; Huang and Tao 2010; Huang and Wang 2010).

Factor market distortions include the household registration system that limits labor mobility between rural and urban areas; direct controls of bank deposit and lending rates; setting of energy, especially oil, prices by state agencies; and, offering discounted land-use fees to investors. In most cases, these distortions depress input costs. Labor is a special case, however, as it is unclear if labor market segmentation lowers or increases labor cost. But labor cost was low for a long time because of abundant agricultural labor or unlimited labor supply, in a typical Lewis dual-economy. Taking financial repression as an example, the authorities not only depressed the bank deposit and lending rate but also guided credit allocation, mostly in favor of the SOEs.

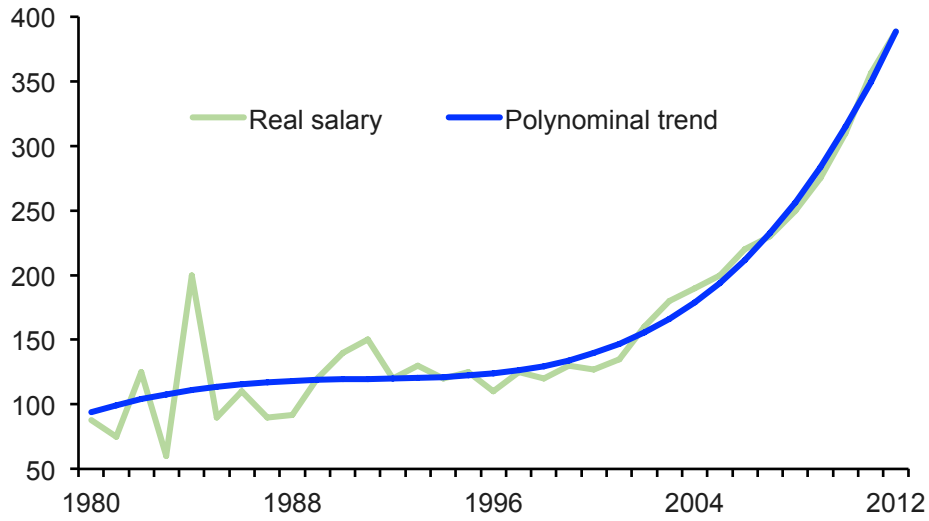
Low input costs are like subsidies to companies but taxes on households. They boost production profits, increase returns to investment and improve the international competitiveness of Chinese exports. Low input costs also serve as a mechanism for redistribution of income from households to companies. Over the years, corporate profits grew much faster than household income, as household income was largely capped by stagnant wage rate. This income “redistribution” was also behind the rapidly growing saving rate in during past decades as corporate saving rate is much higher than household saving rate. Going one step further, we find that factor market distortions also redistribute income from small and medium enterprises to large corporation and from low-income to high-income households.

Depressed input costs contributed to rapid economic growth. Over time, however, they also cause some structural problems. Firstly, extraordinary incentives lead to a continuous rise in the shares of exports and investment in GDP. Secondly, a rise of the share of corporate profit in the national income increases the national saving rate, as corporate saving rate is generally higher than household saving rate. Thirdly, income inequality among households deteriorates, as low-income households rely more on wage income while high-income households rely more on corporate profits and investment returns. Fourthly, the consumption share of GDP declines over time because household income grows more slowly than GDP. And, fifthly, the unusually low costs of energy, capital and other resources have also resulted in wasteful behavior on the part of producers.

The good news is that low production costs already start rise and some distortions begin to change (Huang et al. 2011). For instance, the labor

market shows clear signs of supply shortage, which is evidenced by accelerating wage increases in recent years (Figure 2). The so-called Lewis turning point (LTP) – the transition of the labor market from surplus to shortage – has important implications for China's macroeconomy (Huang and Cai 2010). Rapid wage growth, especially that at the lower end of the market, cuts into profit margin. Therefore, it reverses past redistribution of income from households to corporates. As these implicit subsidies for Chinese companies are reduced, export and investment activities soften and, therefore, the economy rebalances.

Figure 2. Migrant workers' monthly wage (yuan in 1978 price)



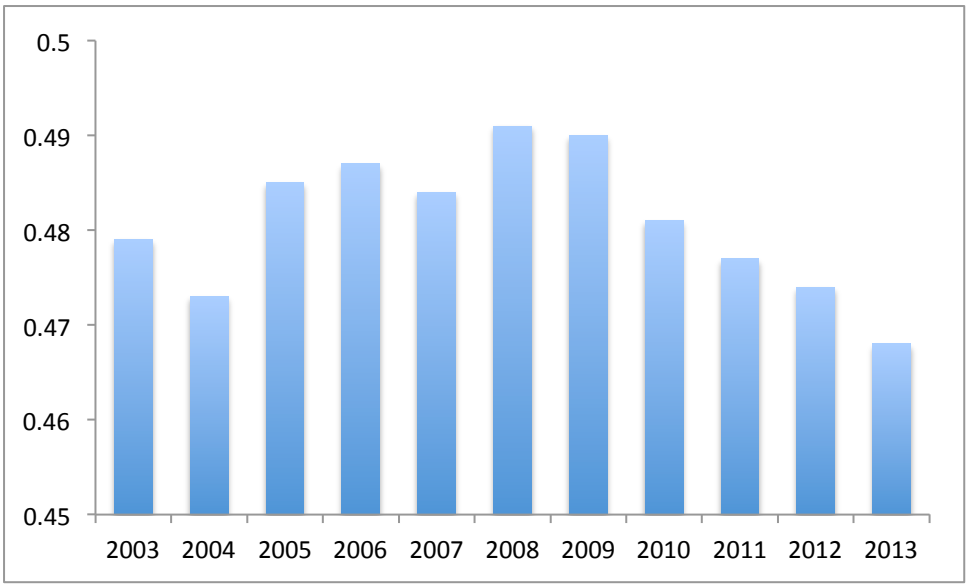
Source: National Bureau of Statistics of China and CEIC Data Company.

It is a universal phenomenon that growth slows as an economy develops; this is because the reduced distance from the technological frontier of the developed world means the economy can benefit less from backwardness (Lin 2012). But the growth slowdown is probably magnified in China by changing demographics, including labor shortages and a diminishing working-age population. For the same reason, rapidly increasing wages could create inflation pressure over time, as rising costs can only be absorbed by higher output price, narrower profit margin or faster productivity growth, or a combination of the above.

So, increase in household income as a result of changes in the labor market also contributed to rising consumption share of GDP in recent years. When an 'unlimited labor supply' exists, rapid industrialization is accompanied by a stable wage rate and, therefore, a declining share of wage income in GDP. This is reversed when a labor shortage emerges: wages rise rapidly and the share of wage income in GDP starts to grow. In fact, labor income has also increased from 41 per cent in 2007 to 47.1 per cent in 2009, which, in turn, has boosted consumption relative to GDP. This was also what happened in Korea and Taiwan in the mid 1980s, when their consumption shares started to recover following their respective LTP.

Rapid wage growth was probably also behind the recent improvements in income distribution highlighted by the NBS, since low-income households rely more on wage income and high-income households rely on investment returns or corporate profits (Figure 3). If the past trend was households subsidizing corporations, then the new trend is redistribution of income from corporations to households, as rising labor costs increase wage income but squeeze corporate profits. This is probably why, in rapidly developing economies, the so-called Kuznetz turning point (when income distribution shifts from deteriorating to improving) often follows the Lewis turning point (Huang and Cai 2010).

Figure 3. Official estimates of Gini coefficient, 2003-2013



Source: National Bureau of Statistics of China and CEIC Data Company.

Other changes in factor markets are also taking place. For instance, rapid growth of shadow banking transactions led to disintermediation of the banking sector and contributed to the so-called "back door liberalization of interest rate". All these changes are behind the emergence of "new normal of the Chinese economy" – slower growth, accelerating industrial upgrading and rebalancing economic structure. But this is only at the beginning. Further changes require implementation of more comprehensive reform agenda, such as the one announced at the Third Plenum of the Eighteenth Party Congress, which contains reform measures in 60 areas. But the key really is to complete the transition to the market system by eliminating the two dual-track strategies. And this means further reform of the SOEs and removal of remaining distortions in factor markets.

Fostering capability of innovation and upgrading

Rebalancing of the economy is only the first step toward avoiding the middle-income trap. A more important step is to continuously move up the technological ladder and achieve productivity improvement. The real

challenge of the middle-income trap is an economy's capability of repeatedly developing new competitive industries and companies after reaching the middle-income level. Countries failing to do that would be stuck in the middle-income range, unable to compete with either more advanced economies (because of lower efficiency) or less developed economies (because of higher costs).

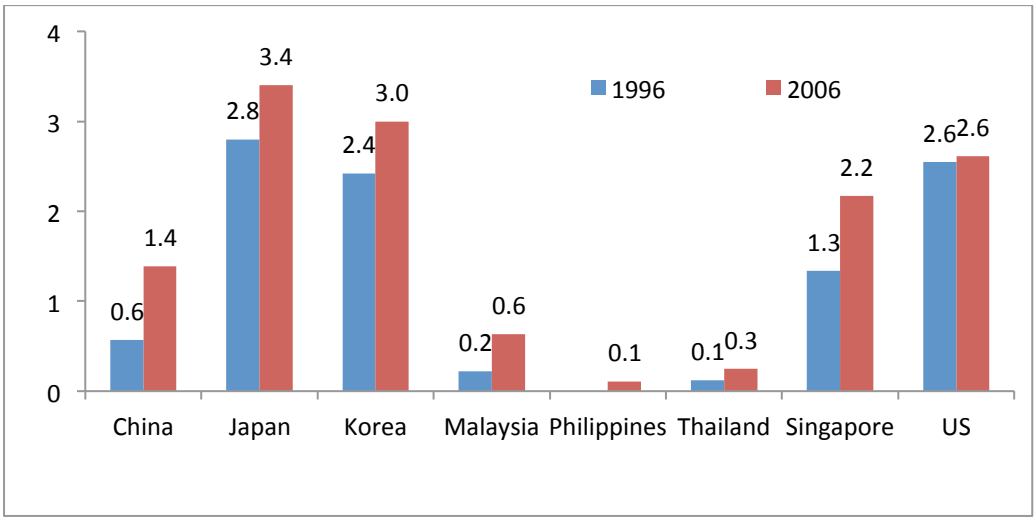
In a recent study, Yingjie Feng and Yang Yao (2014) review descriptive characteristics of a large group of economies. They find that economies successfully rising to high income are often characterized by high saving rates, robust manufacturing sectors, high levels of education, more advantageous demographic structures, a peaceful environment and more equal income distribution. China is quite similar to those successful economies in all of these aspects except for its rising inequality. Therefore, China still has great potential for growth, but some deliberate policies on income distribution are needed, especially in increasing the education levels of rural youth and providing adequate training to migrant workers.

Some commentators argue that China is unable to innovate since most of its industries are built on low-cost advantage, with copied technology from advanced countries. More importantly, China's protection of intellectual property rights (IPR) is insufficient. All these observations are probably true. But learning from the others is a natural process of catch-up for low-income economies. And such experience is not limited to China alone. The same happened to Japan and the four Asian tigers several decades earlier. In an interesting article, Charles Morris (2012) describes in detail how the Americans stole textile technology from the United Kingdom in the 19th century.

But it is wrong to extrapolate from the above observation that there is no innovation in China. Innovation has been happening every day. In the 1980s and the 1990s, millions of farmers in the Pearl River Delta and the Yangtze River Delta turned into self-trained entrepreneurs. China already created some internationally competitive companies like Huawei and Alibaba. Today, many young and not-so-young people think about starting their own businesses or creating their own products.

Data suggest that China is already experiencing a science and technology takeoff, which is happening at a much earlier development stage compared with international experiences. In 1996, R&D expenditure accounted for 0.6 percent of GDP. In 2006, it more than doubled to 1.4 percent. This was still lower than Japan's 3.0 percent, Korea's 3 percent, Singapore's 2.2 percent and America's 2.6 percent. However, it was already significantly ahead of many developing countries (Figure 4).

Figure 4. R&D intensity of China and selected countries, 1996 and 2006 (%)

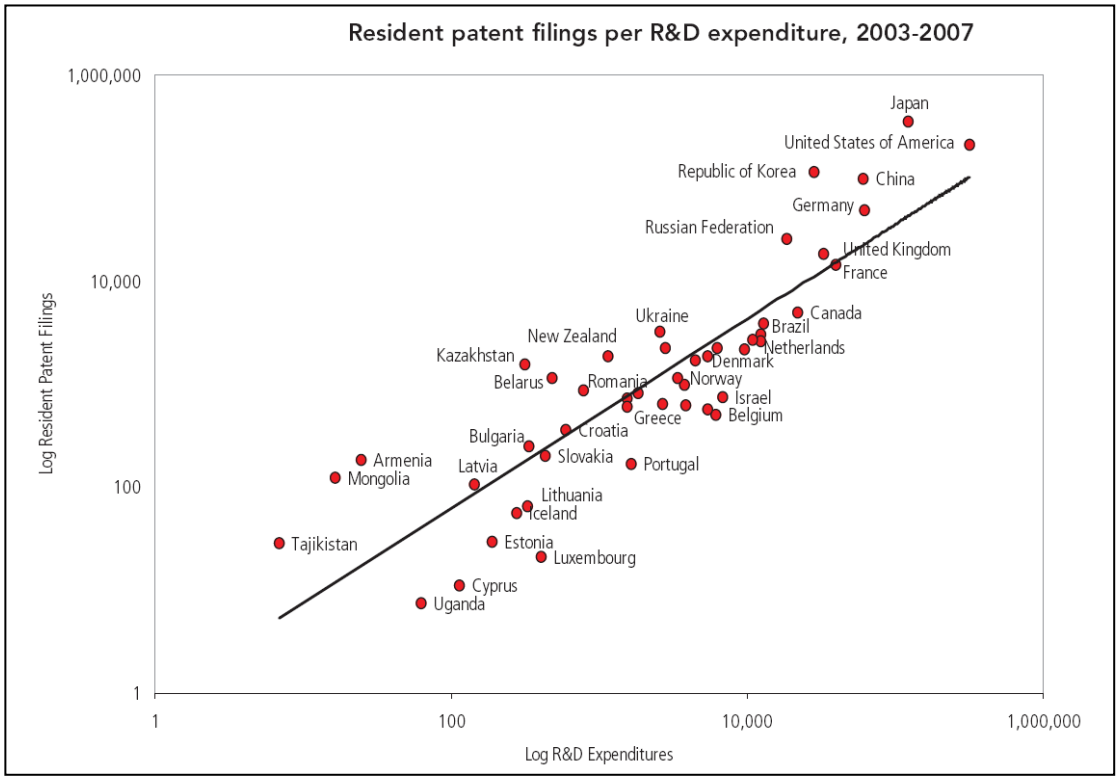


Source: World Bank.

Jian Gao and Gary Jefferson (2007) examine cross-country behavior of R&D expenditure. They find that, on average, a country's R&D started to take off (or crossing the level of 1 percent of GDP) when its PPP measured income per capita at $8,000 in 1999 prices. When this happened in China, its PPP measured per capita income was $3,600. They offer three potential explanations for this somewhat unusual phenomenon. The first is the relatively low illiteracy rate. At 16.5 percent, China's adult illiteracy rate in 1999 was similar to those of Brazil (15.1 percent) and Turkey (15.4 percent) with substantially higher incomes, and well below that of India (43.5 percent). The second is market size. And the third is proximity to dynamic economies. Arguably China's greatest asset is its close physical and cultural proximity to Hong Kong and Taiwan and to a lesser, but still significant degree, to Korea, Japan, and Southeast Asia.

China is already one of the three largest R&D spenders in the world, alongside the US and Japan. Even if measured by resident patent filing per R&D expenditure, China is also among the top group (Figure 5). China is the only middle-income country in that top group. This is probably an even more important evidence of the early takeoff of China's science & technology. Admittedly, most of the Chinese patents concentrate at the bottom of the technological ladder. This is consistent with the country's level of economic development. It would not be fair to compare China's innovation capability with that of advanced economies. However, going forward, it remains to be tested whether China can rely on innovation to continuously improve quality of the economy.

Figure 5. Resident patent filing per R&D expenditure, 2003-2007



Source: Compiled by Rio Tinto.

To further foster the country's capability of innovation and upgrading, China will need to make a lot more efforts in at least the following three areas, in addition to transition to a market economy by further reforming the SOEs and removing factor market distortions. The first is to develop a stronger education and research base and to improve human capital of workers. The second is to liberalize the financial system and provide more flexible and effective financial support to technological and business innovation. And the third is to devise an institutional environment that is conducive to both freer exchange of ideas and better protection of human and property rights.

One, China needs stronger education and research capability to support technological innovation. In general, the government should reallocate its spending from infrastructure projects to research and education, since the single most important contributor to innovation is human capital. China's illiterate rate is relatively low, compared with countries at similar stage of development. During the past ten years, however, there was strong disincentive to take higher education, especially for rural kids. The labor market exhibits a special pattern of "surplus of college graduates and shortage of migrant workers", because China's two largest industries, labor-intensive manufacturing and construction, employ mainly unskilled workers. Now the country has a migrant worker force of more than 300 million, whose average education level is junior high school. It is critical now to devise some training schemes for these migrant workers to improve their human capital.

Also, the formal education system also needs significant reform. The current compulsory education policy covers only 9 years of schooling should be extended to at least 12 years. More importantly, rural kids do not enjoy the same benefit. Inequality in education hinders social mobility. As a result, the proportion of rural kids among university students dropped drastically during the past three decades. To some extent, basic education is more important than higher education. Quality of Chinese universities is improving. Their research funding also increased significantly. But they still suffer from too much administrative control. The Ministry of Education appoints top university managers and set all sorts of criteria for academic performance. All these run against the spirit of innovation.

In short, China needs a stronger research and education base. This includes strengthening of the basic education system, training for migrant workers and basic research. The government should increase its spending in these areas but, at the same time, should refrain from heavy intervention in management of research and education institutions, particularly administrative controls of personnel and allocations of research grants.

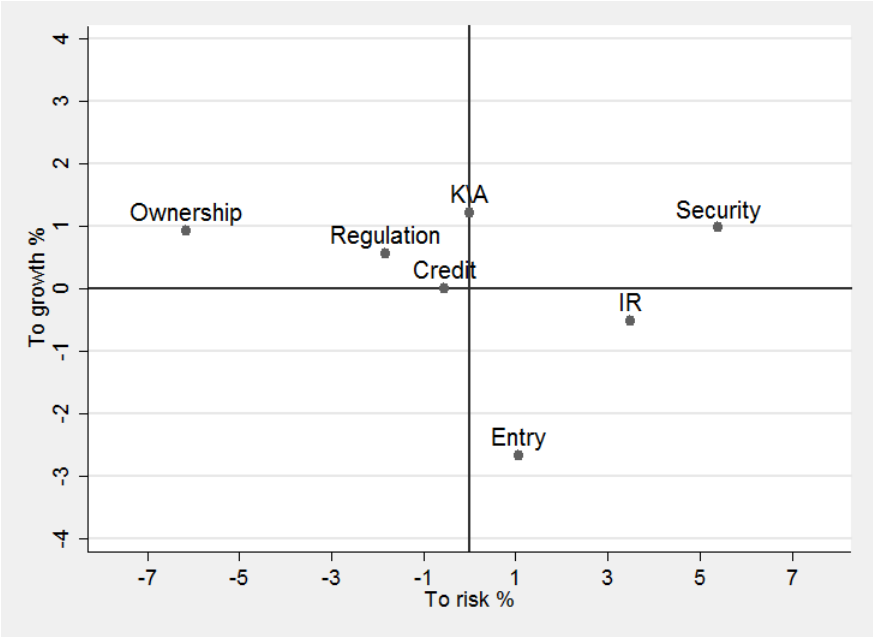
Two, China needs more liberalized and richer financial intermediation to facilitate industrial upgrading. China's current financial system was developed after economic reforms began. Today, the financial system is already among the largest in the world, whether measured by number of financial institutions or size of financial assets. The top five Chinese banks have been regularly ranked among the 10 largest in the world. However, the government still maintains heavy intervention in the financial system, including regulations of interest rate, guidance to credit allocation, intervention in foreign exchange market and controls of cross-border capital flows. Financial system is dominated by the banking sector, while direct finance through capital markets is relatively underdeveloped. As the authorities depress deposit and lending rates in the formal banking sector, there is excess demand for credit. The authorities, in turn, have to ration the credit and often allocate fund in favor of SOEs or other large enterprises.

Such a financial system does not support technological innovation and industrial upgrading. The essence of innovation is uncertainty – one success in innovation is often built on a large number of failed attempts. Therefore, innovation requires special channels of financial intermediation that can identify, price and take risks, such as venture capital and private equity. Banks are not suitable for such tasks, although were quite effective in supporting manufacturing investment and production.

The government already plans to liberalize the interest rate, lifting the upper ceiling of deposit rate during 2015, and to develop multi-layer capital markets, including money market, government bond market, corporate bond market and stock market. It takes professional investors to identify promising projects and take the risk. Without these, innovation cannot flourish. One important reform that is not yet on the government's agenda is ownership reform. In a recent study, we find that financial reforms in most areas have distinctive costs and benefits. However, two particular reform measures, financial

regulation and ownership reform, are able to both accelerate growth and to reduce risk (Figure 6). Ownership reform is important as without "hard budget constraint" for both lenders and borrowers, financial liberalization could lead to disasters.

Figure 6. Growth and risk effects of individual reform measures



Source: Huang and Ji (2015).

And, three, China also needs a set of legal and political policies that ensure order and protect rights. Protection of intellectual property rights is a basic requirement. This is an area where substantial improvement is necessary. International experiences suggest that a developing country's intellectual property rights protection improves significantly when indigenous intellectual property rights become a dominant phenomenon. China is probably reaching that turning point. Also, China is negotiating with the United States on bilateral investment treaty, of which protection of intellectual property rights is an important subject for negotiation.

So far, innovation takes place mainly in areas where government regulation is light or even absent, for instance, online shopping and internet finance. Innovation activities are quite rare in monopoly industries, especially those dominated by SOEs. Therefore, the government needs to liberalize or at least lower the entry barriers to many sectors.

One of the most contentious institutional issue is if it is necessary for China to transit to a western-style political system in order to avoid the middle-income trap. For instance, Acemoglu and Robinson propose that Chinese growth has been one under extractive political institutions and, therefore, it will likely run out of steam (Acemoglu and Robinson 2012). We do think that some important steps of political reform are possible, although transition to the western-style democracy is unlikely to happen in the perceivable future. It is true that political measures are necessary to eradicate many social economic

problems, such as corruption, disparity and monopoly. But we believe that the Acemoglu and Robinson assertion may be too simplistic. First, experiences of East Asia suggest that there is probably more than just one form of political institutions that can support long-run growth. This is particularly so if the economy is still in the mode of technological catch up. Second, although institutions are very important, economic policies under the same institutions can still make a huge difference in terms of economic growth, as illustrated by the comparison of Jamaica and Barbados (Henry 2007). And, third, not only politics determines economic institutions and, therefore, growth, but economic activities can also influence politics.

The last point is the reason why we are optimistic that positive changes may take place. This is already evidenced by introduction of grassroots democracy in the countryside more than 10 years ago. A number of municipal governments in the coastal region scraped plans of constructing pollutant industrial projects after protests by local residents. Social media, such as weibo, is already an important informal channel of dialogue between the public and the government and played critical roles in purging of some corrupted senior officials.

Our overall assessment is that it is possible for China to rise to high income some time in the coming decade, although the country needs to undertake a lot of changes, especially in areas of research and education, finance, and legal and political institution. Positive changes are already happening across the country. China is leading the world in areas of internet economy and some manufacturing industry. Shenzhen has clearly become a national center for innovation, with Hangzhou and Beijing quickly catching up. But more reforms are needed to turn this innovation and upgrading spring into a nationwide wave.

One controversial issue is the role of industrial policy. To large extent it also depends on definition of “industrial policy”. In this study, we do not regard support to broad research and education and provision of finance to innovation and upgrading as industry policy. Here, industry policy refers to narrowly defined measures of the government supporting specific industries and even particular companies, using financing and subsidy policy instruments. Experiences of East Asian economies, including Japan and Korea, confirm that industrial policies did not have a positive effect on economic growth. If specific measures are needed to support an “infant industry”, they should be designed to meet two requirements. One, industrial policy should not hinder competition. Therefore, the practice of “picking the winner” should be avoided. And, two, there should be an exit plan for the industrial policy to avoid perpetuation.

Toward a high-income economy

The middle-income trap is probably the biggest challenge facing the Chinese economy today. In this paper, we address this issue by asking three questions. One, how to understand the current growth slowdown? Two, how to transform

China's growth model? And, three, how can China foster its innovation and upgrading capability?

We think that there are currently two economic cycles in the work, leading to slower growth. The first is a shorter term, typical macroeconomic cycle. Following recent aggressive monetary and fiscal policy expansion, the macroeconomic cycle may bottom during the second or the third quarter of 2015. But this bottoming will likely temporary and short-lived. The longer term, industrial transition still pushes trend growth lower until new leading industries are well established to take the economy to the next level. At the moment, some new industries are already in the forming, such as online shopping, express delivery, large machinery equipment, heavy trucks, etc. But these are not yet ready to replace the past leading industries, mainly the labor-intensive manufacturing export sector and the heavy industry investment goods producers.

Continuation of rapid economic growth requires transformation of the current growth model, which is often characterized by strong growth performance and serious structural imbalance. The current growth model, however, has its root in China's transition strategy, which may be summarized in two dual-track approaches, the first dual-track between SOEs and non-SOEs and the second dual-track between product and factor markets. Continuous protection of SOEs ensured social and economic stability during the early stage of reform but also caused social financial and fiscal consequences. The need to protection of SOEs also gave rise to the second dual-track approach, i.e. distortions to the factor markets. Factor market distortions, such as financial repression and resource price setting, are like subsidies to producers, investors and exporters but are like taxes on households. These explain why economic growth has been extraordinarily rapid. At the same time, however, structural imbalances also grew. Therefore, transformation of the growth model requires completion of the transition toward the market economy, especially abandoning of factor market distortions. This, again, requires successful reform of the SOEs.

The good news is that China's growth model is already changing, evidenced by narrowing current account surplus, rising shares of consumption and service in the economy, improving income distribution, etc. But so far, this has been mainly triggered by changes in the labor market, the so-called Lewis turning point. Liberalization of financial markets, land system and energy policy are critical for this transformation to continue.

Transformation of the growth model is only the first step toward sustainability of economic growth. A more important step is to promote technological innovation and industrial upgrading. China might be able to achieve rapid economic growth by exploiting its low cost base in the past. But now costs are already rising rapidly. Therefore, the only way to sustain economic growth is for the economy to continuously move up the technological ladder to stay competitive.

Compared to most countries at similar stage of development, China's innovation and upgrading capability is already quite high. Its share of R&D in GDP exceeded 1 percent benchmark at much lower income level than the average of the developing world. It is already one of the leading owners of patents globally, although most of the patents are at the lower end of the technological ladder.

But China still need to make significant efforts to foster its innovation capability, at least in the following three areas. The first is to strengthen the research and education base, including training of more than 300 million migrant workers. The second is to reform the financial system, including liberalizing the interest rate and developing new channels of financial intermediation, in order to provide better financial services to innovation activities. And the third is to construct new legal and political institutions that are conducive to technological innovation. This includes protection of intellectual property rights and liberalization of entry barriers to many sectors. We are not certain if China might move to the western-style democracy any time soon, but certain political changes are necessary to ensure free flows of information, to maintain order and to resolve social conflict.

In summary, with necessary reforms, we believe that China will be able to rise to high-income status and become the largest economy in the world, although it does need to overcome very high hurdles on the way.

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