

Working Paper Series

Macroeconomic Policy and Financing for Development Division

CHINA'S PRODUCTIVITY : PAST SUCCESS AND FUTURE CHALLENGES

WP/16/06

June 2016

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Please cite this working paper as:

Zhang, Yanqun (2016). China's productivity: past success and future challenges. MPFD Working Paper, No. WP/16/06. Bangkok: ESCAP. Available from www.unescap.org/publications.

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MPFD Working Papers
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by

Yanqun Zhang

June 2016

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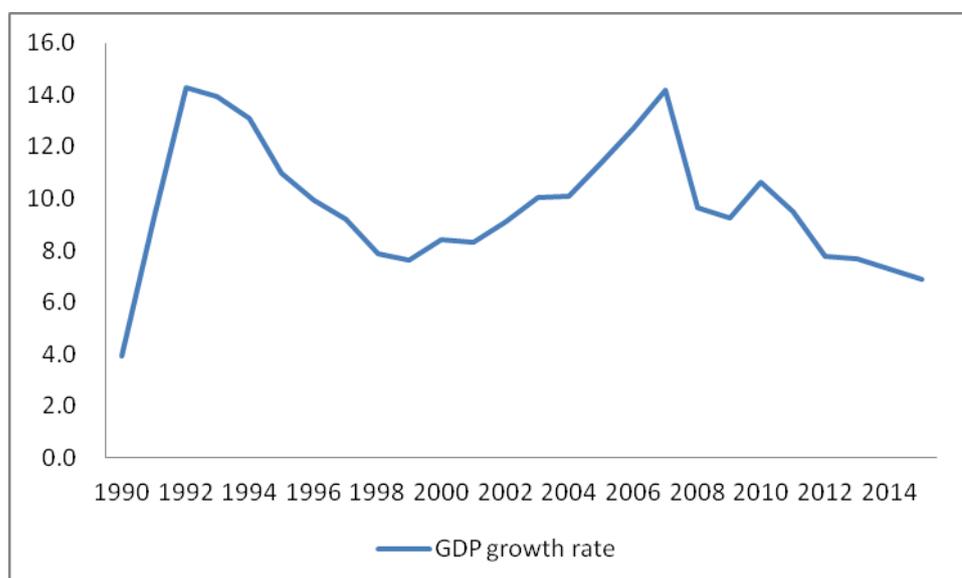
* This paper was prepared as a background paper for the *Economic and Social Survey of Asia and the Pacific 2016*.

I. Introduction

During the last three and half decades, China has achieved unprecedented economic growth, with the average annual GDP growth rate being 9.3% for 1978 to 2014. At that rate, real GDP doubles every seven years. China's real per capita GDP has risen from only 5.5% of the U.S. level in 1978 to about 25% in 2014. In 2014 the per capita GDP has reached about \$7584 US dollars (current price, World Development Indicators), or \$12608 international dollar (2011-year PPP constant price, World Development Indicators), which is about 31% of the level of high-income OECD countries. As a result, China has transformed from one of the poorest agricultural countries in the late 1970s to the second largest economy in the world, accounting for 16.6 percent of global GDP in 2014. China and other emerging markets now represent the majority of the growth of global demand, and have become one of the major engines for the global economic growth.

China's economic growth has shown a declining trend since the breakout of the global financial crisis in 2008, especially after 2011 (Figure 1), and is still under the downward pressure, which is likely to continue in the next couple of years, according to the IMF's and other forecasts. GDP growth decreased to 7.3% in 2014, and 6.9% in the first three quarters of 2015, which were lower than the average in the last three decades, and the lowest since 2000. The Chinese government claims that the Chinese economy has entered a state of "new normal", meaning that the gear of growth is shifted down from high to medium-to-high speed.

Figure 1. The growth rate of real GDP



The growth deceleration is caused by both cyclical and secular factors. In response to the global financial crisis in 2008, China launched a massive stimulus package to promote growth through extensive investments which led to a significant increase in bank loans and fixed asset investment in 2009 and 2010 (Wong, 2011). Since bank loans have mainly flowed into state-owned enterprises (SOEs) or the real estate sector, the distortion of capital allocation and the overcapacity problem already existing in most industrial sectors have been deteriorated. As domestic and international demands slowed down, firms' debt leverage rate and banks' bad loans have increased significantly, which has forced the fixed asset investment growth to

decline, from 33.2% in 2009 to 14.7% in 2014. This becomes the main short-run factor for the slowdown of the GDP growth in recent years. Meanwhile, the sluggish world economy and international trade has exerted significant negative impacts on China's exportation and economic growth in the short run.

The debate on whether China's rapid growth is sustainable has been on-going for several years. In the debate, one major argument for the non-sustainability of China's high growth is built on the belief that the Chinese growth is driven by extensive investments, hence the growth is not through productivity improvement, but is heavily dependent on capital-deepening and exports. This is evidenced in the large share of capital formation in GDP, and increases significantly after the financial crisis in 2008 and the subsequent stimulus policy.

Another argument is related to the so called middle-income trap. International experience suggests that, when a country's per capita GDP reaches the threshold of around \$15,000 or \$11,000 in year 2005 purchasing power parity dollars, high growth became to slow down (Chen, Jefferson, and Zhang, 2009; Eichengreen, Park and Shin, 2014). If the economy attains such a middle-level income and stuck at that level, it is called to have fallen into the middle-income trap. Since China's per capita GDP is already very close to the first threshold (about \$11,000 PPP constant price in 2005, World Bank Indicators), the concern about whether the Chinese economy can avoid the middle-income trap and jump to the high-income economy has emerged and become one of the hot topics in academic discourse and policy discussions in recent years.

The driving forces for rapid economic growth in China during the last decades can be attributed to the demographic dividends, resource reallocation from low to high efficient sectors, and the increase of labor productivity, which can be decomposed as total factor productivity (TFP) and capital/output ratio (Akio, 2015). Before 2010 the ratio of population aged at 15-65 to total population has steadily increased, but began to decline after that, which means demographic dividends cannot make further big contributions as it has done before. After many years of institutional reforms, the contribution due to resource allocation through reforms has declined or diminished. Further economic development will have to mainly rely on the growth of labor productivity. With the diminishing demographic dividends, capital returns will reduce and the contribution from the improved capital/output ratio will decrease. The TFP growth will play a crucial role in economic growth (Akio, 2015; Cai, 2013).

Empirical evidence from China shows that growth of the TFP has made important contributions to China's spectacular growth for the last three decades (Perkins and Rawski, 2008; Brandt and Zhu, 2010; Zhu, 2012, Feenstra, Inklaar and Timmer, 2015). Without significant growth in total factor productivity, the persistent economic growth in China would not have been possible (Zhu, 2012). According to the Penn World Tables version 8.1, the average growth rate of TFP in China is about 3.5 percent per year for 1978 to 2011, accounting for about 40 percent of GDP growth. Studies using aggregate data combining TFP information from both agriculture and non-agriculture sectors typically find that TFP growth contributes approximately half of China's labor productivity growth (Bosworth and Collins, 2008; Perkins and Rawski, 2008).

Since rapid productivity improvement has contributed a large proportion to economic growth in China, how to further promote productivity growth will be the focus for China to achieve middle-to-high speed growth and attain the growth target in the future.

According to China's 13th five-year (2016-2020), which was issued recently in October 2015, China will enter moderately prosperous society by 2020, and the per capita income will be

doubled as that in 2010. To achieve this target, Chinese government has set the economic growth as the priority, and determined to transform economic growth from relying on investment and exports to be driven more by domestic demands and innovations. A series policies and measures have been taken to foster the institutional reform and structural transformation. The ongoing strategy for institutional reform will bring new engine for the economic and productivity growth. But in the same time, there exists uncertainty and risk during this process.

In this paper we discuss the development of China's productivity, its role in the economic growth, and the sources behind it during the last three and half decades and in the future. The following issues are addressed:

- Describe the development of structural changes in China in the last three and half decades;
- Document growth of the aggregate and sector TFP in China, the driving forces behind them, and their contributions to GDP growth;
- Analyze the relationship between labor income and TFP growth;
- Illustrate the policies and strategies the Chinese government has taken to foster productivity progress;
- Estimate potential growth of TFP and economic growth in the future.

The remainder of the paper is arranged as follows : in section 2 we introduce China's economic growth and structural transformation in the last three and half decades. Section 3 reviews the estimation of China's productivity growth. Section 4 discusses the sources behind the TFP growth. Section 5 discusses the institutional reforms need to be taken to foster the growth of TFP. Section 6 introduces the strategies the Chinese government has taken to promote productivity and economic growth. Section 7 discusses the potential TFP and economic growth in the future

II. Economic Structural Changes and Labor Productivity

A. Structural changes in the last three decades

During the process of rapid economic growth, China's economic structure has undergone fundamental changes. Output and employment of agriculture have decreased steadily. From 1990 to 2014, the share of agriculture output in GDP declined from 26.7% to 9.2%, though they were kept roughly constant in the recent decade (Figure 2). The output share of the service sector in GDP grew from 32.4% to 48.1%, and began to surpass that of the secondary industry in 2012. For a long period in the past, development of China's service sector has been far behind; the GDP share of the service sector was less than that of the secondary industry. Internationally, it was much smaller than not only the average share of industrial countries, but also the world average. Therefore the increase of the GDP share of the service sector can be regarded as a good sign of structural improvement. Too small a GDP share of the service sector reflects the unbalanced development structure of China, and hence fostering the development of the service sector is desirable.

Figure 2. Shares of consumption and capital formation in GDP

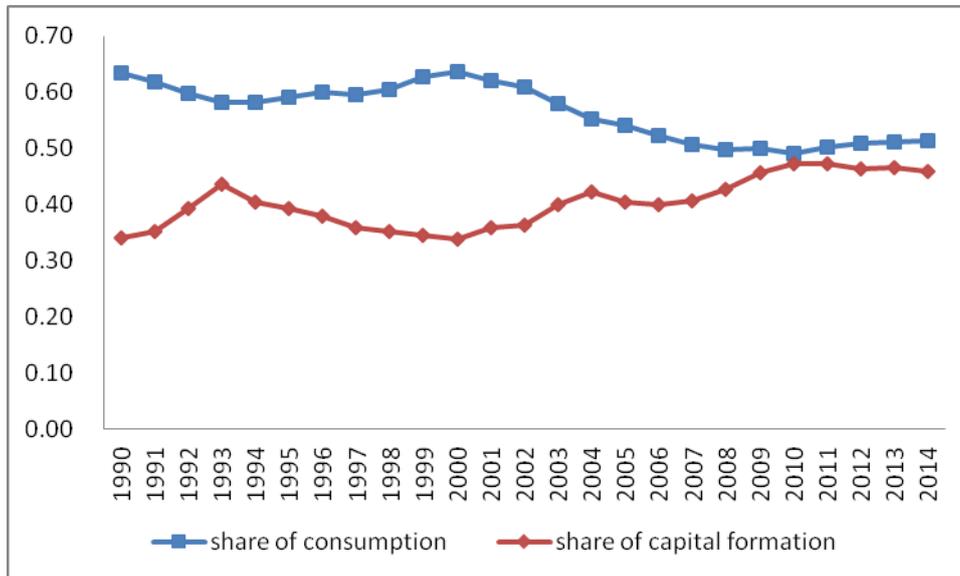


Figure 3 shows the development of employment shares of agriculture, industry, service, and state owned sectors in GDP. The graph indicates that since the early 1990s when the reform of state owned firms was launched, the share of the state sector in urban employment has steadily declined from 61% in 1990 to 16% in 2014. The employment share of the agriculture sector has declined from 70.5% in 1990 to 29.5% in 2014. Employment shares of the secondary and tertiary industries however are on the rise. Since 1995, the employment share of the tertiary industry has begun to surpass the secondary industry. In 2014, employment shares of the secondary and tertiary industries are 29.9% and 40.6%, respectively.

Figure 3. Output shares of agricultural, secondary and tertiary sectors in GDP

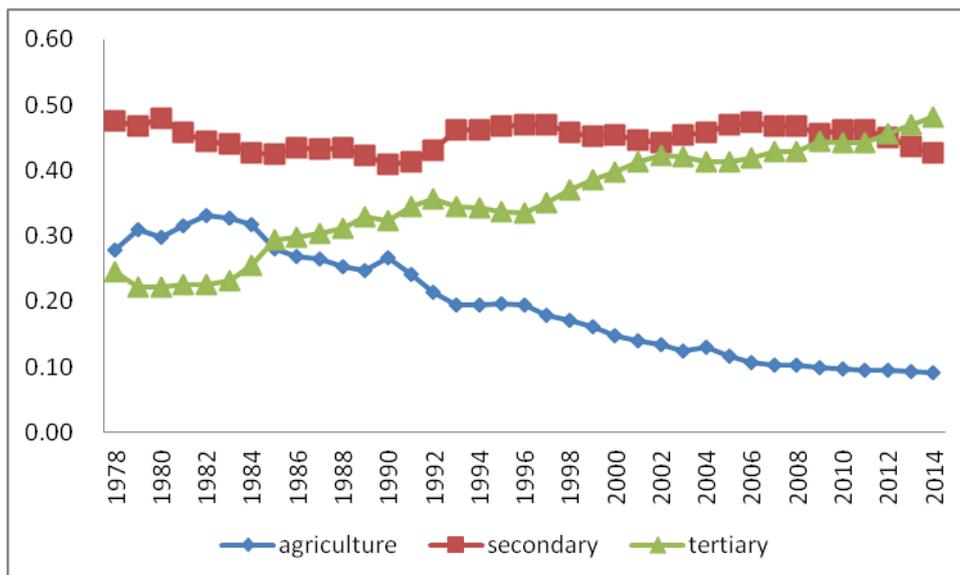
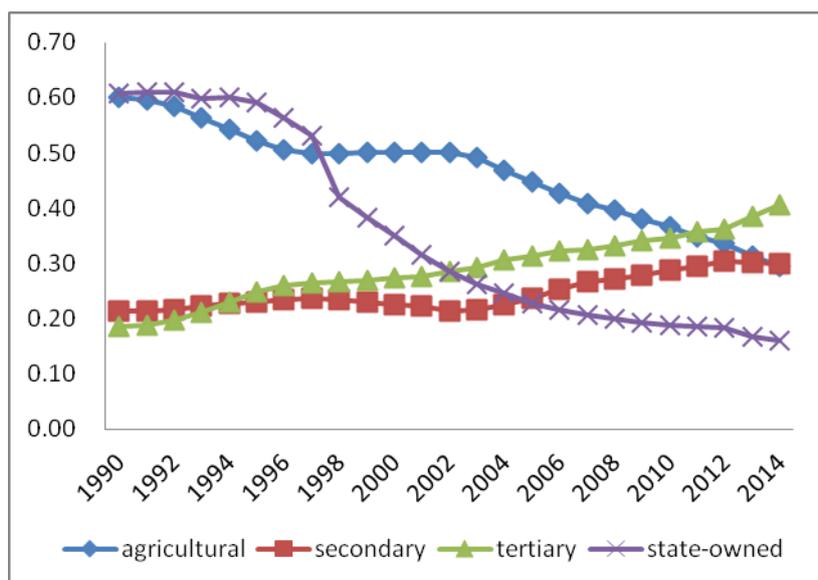


Figure 4 shows the contributions of consumption, investment to GDP. From 2000 to 2010, the

share of consumption in GDP has steadily decreased, while that of capital formation has increased. By 2010, the share of consumption dropped to only 49.1%, much less than that of the industrial, and most developing countries. This reflects that since the financial crisis in 2008 the Chinese economic growth has relied too much on extensive investment in fixed assets, which is not sustainable when the capital returns have declined. Starting in 2011 however, with the slowdown of investment growth, the share of consumption began to increase, which is in line with the government's strategy to transform the development pattern from relying too much on investment and exports to increasing the GDP shares of consumption and domestic demands.

Figure 4. Employment shares of agricultural, secondary, tertiary and state-owned sectors



B. Labor productivity in various sectors

Figure 5 displays the labor productivity (calculated as output divided by employment) in agricultural, secondary and tertiary industries. It can be seen that labor productivity in the secondary industry is the highest, which is about 5.7 and 1.5 times as that of agricultural and the tertiary industry, respectively. Figure 6 shows the relative labor productivity of agricultural and the tertiary industry to the secondary industry (calculated as labor productivity of agricultural/tertiary divided by that of the secondary sector). The outcome indicates that before around 2000, the ratios increased significantly, but they become more or less constant after that time. This may be due to the possibility that the labor productivities in industrial sector has been growing faster than in agricultural and tertiary sectors before 2000 but at almost the same pace as others since about 2000.

Figure 5. Labor productivity of agricultural, secondary and tertiary sectors

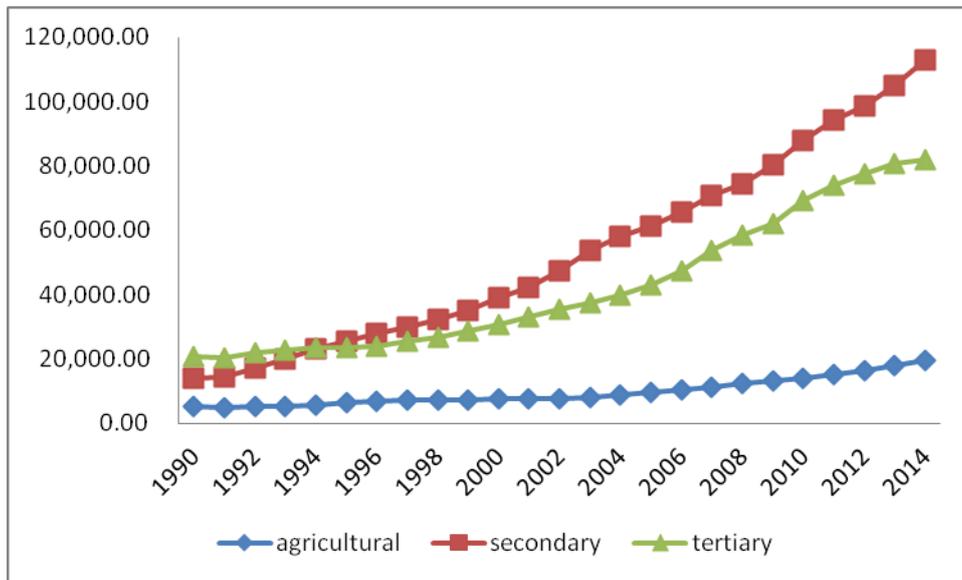


Figure 6. Ratios of labor productivity: agricultural/secondary and tertiary/secondary sectors

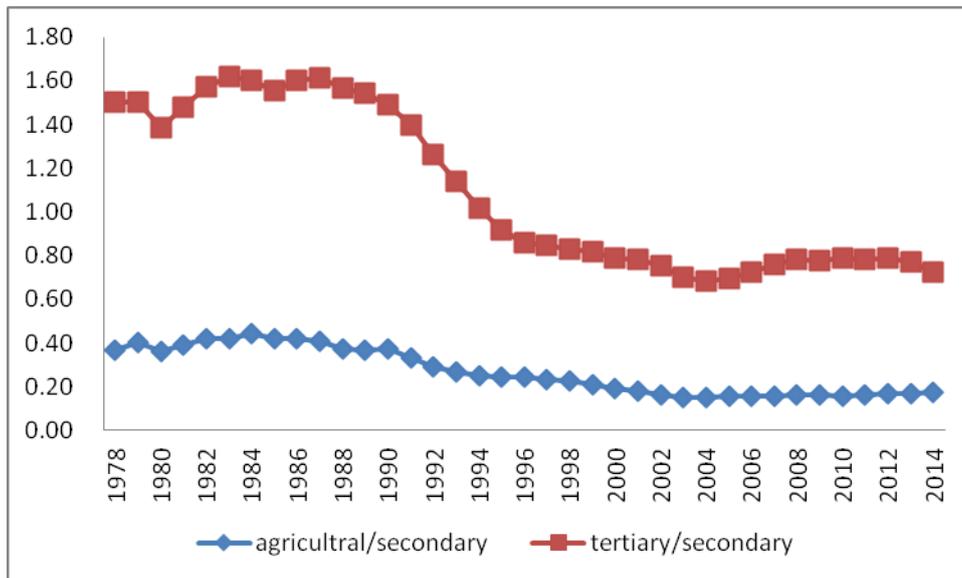
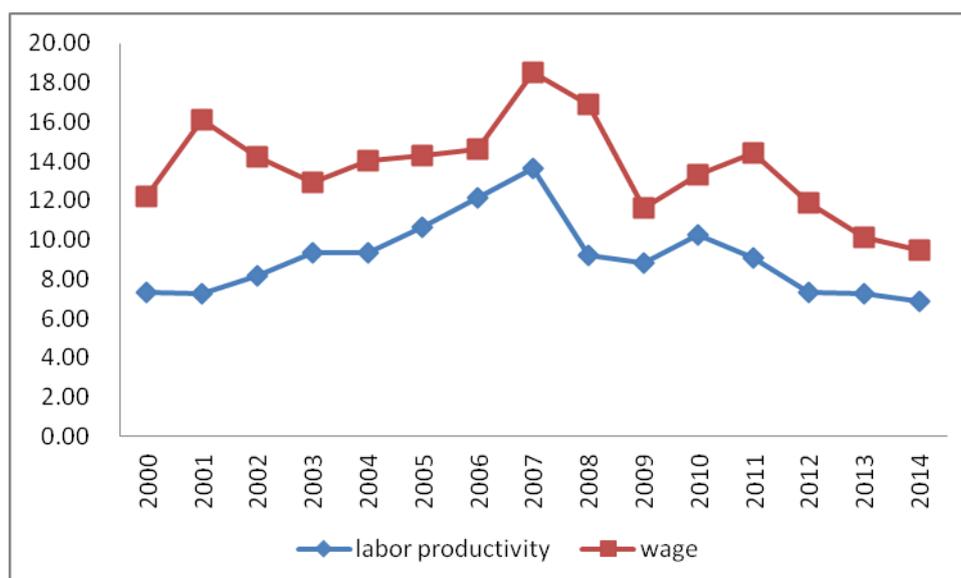


Figure 7 displays the growth of aggregate labor productivity and average wages. From the Figure, one can see that there is roughly a positive relationship between them, indicating that growth of labor income is associated with growth of labor productivity. Further growth of labor productivity then will play a crucial role in labor's income in the future.

Figure 7. Growth of labor productivity and wages

III. TFP Growth in Last Decades

A. Estimation of the TFP growth

Estimation of China's productivity growth has been one of the hot topics in theoretical and empirical research. Although estimation results have wide variations, most investigations come to the conclusion that during the last three decades, China's average TFP growth is about 3-4 percent per year and has contributed a large proportion to GDP growth (Young, 2003; Bosworth and Collins, 2008; Perkins and Rawski, 2008; Holz, 2009; Zheng, Bigsten, and Hu, 2009; Brandt and Zhu, 2010; Zhu, 2012, Penn World Tables 8.1). Among others, Brandt and Zhu (2010) and Zhu (2012) conducted a standard growth accounting exercise that decomposes the sources of growth into capital deepening, labor deepening, and productivity growth. They conclude that the average growth of TFP is 3.2 percent during 1978 to 2007, which is similar to estimations from other researches. According to Zhu (2012), during this period, TFP growth has contributed about 77.7% of the per capita GDP growth. In contrast, the capital-to-output ratio, namely capital deepening has contributed only 0.51 percentage point. In fact, during this period, China's capital-to-output ratio has barely increased. This finding provides the evidence that the main driving force behind China's rapid economic growth is TFP growth, not investments.

Using the same method as Zhu (2012) but extending the sample to 2011, Liu (2015) finds that the growth of TFP after 2008 has significantly decreased while the share of capital deepening to growth of GDP has increased. The estimation based on the Penn World Tables 8.1 comes to the similar results.

B. TFP growth in agriculture, state, non-state and service sectors

China's TFP performance varies across individual sectors and during different periods. For the period from 1978 to 2007, the average annual growth rate of TFP in agriculture and non-agricultural non-state sectors is 4.01 and 3.91 percent, respectively (Zhu, 2012). In contrast, the annual TFP growth in the state-controlled sector is only 1.68 percent. The non-agricultural state

owned sectors has lowest TFP growth, especially before the SOE reform started in 1993. During the first two decades of reform from 1978 to 1988 and 1988 to 1998, the TFP growth for the non-agricultural state-controlled sectors is only -0.36 and 0.27 percent a year. But during 1998 to 2007, it increased to 5.50 percent a year (Zhu, 2012).

According to Brandt and Zhu (2010), during 1978-2007, TFP growth in agriculture has contributed about half of the aggregate TFP growth. However, the role of agriculture's productivity growth has diminished over time, and will be even smaller, due to the declining shares of output and employment in the agricultural sector.

Due to lack of sufficient competition in the non-tradable service sectors, particularly in those areas where large state-owned firms dominate the market, of which the service industry is the main component, productivity growth has been notably lower than that in the tradable sectors (Holz, 2006; He, Zhang, Han, and Wu, 2012). According to the estimation of He, etc. (2012), TFP growth of the tradable sector is 4.9% for 2001-2010, 5.7% for 2001-2005, and 4.2% for 2006-2010, but that of the non-tradable sectors for the corresponding periods was 2.4%, 3.3% and 1.4%, respectively. Within the non-tradable sectors, there exist great intra-sector heterogeneity (Holz, 2006; and He, Zhang, Han, and Wu 2012). Holz (2006) finds that education had the highest TFP growth during 1979-2002, while financial services had the lowest TFP growth. In addition, productivity growth differentials between the tradable and non-tradable sectors in China have been much higher than those in developed economies (He, Zhang, Han and Wu, 2012). The lower productivity growth in the non-tradable sector can be largely attributed to the over-regulation, barriers to entry, and less competition. Some service sectors, such as education, health care, banking, insurance, legal service, telecommunication, etc. are still dominated by the state-controlled enterprises, on which there are over-regulations not only restricting competition among domestic participants but also deterring the entry by overseas investors that could be innovative (Fan, 2011). The strict regulation on the entry into the service market has caused less competition pressure and low productivity growth. Opening up the service sector to private and foreign investors is crucial to foster productivity progress in the future.

IV. Sources of TFP Growth

A. Institutional reforms in agriculture

During the first two decades after China's economic reforms starting in 1978, TFP growth in agriculture had increased rapidly. According to the estimation of Zhu (2012), the TFP growth is 5.1 and 3.1 percent during 1978-1997 and 1998-2007, respectively. The rapid TFP growth has not only led to the high growth of grain production, which has solved the food deficit problem after several years of reform, but also make it possible to reallocate the employment from agriculture to non-agricultural sectors. Since the labor productivity in the non-agricultural sector is more than five times higher than that in the agriculture sector, the reallocation of workers from agriculture has been the most important source of aggregate productivity growth.

At the beginning of reforms, most productivity growth in agriculture can be attributed to the price and institutional reforms that generated strong positive incentive effects on farmers' efforts.

Before the agricultural reform started in 1978, "collective farming system" was conducted in the agricultural sector. Under this system farmers had no incentives to work hard, because their

incomes were not related to their efforts. As a result, the productivity in agriculture sector has been very low, and China has experienced recurring food crisis before 1978. In 1979, "household responsibility system" was adopted. Under the new system, the farmers were responsible for their own output, and their incomes were directly dependent on their efforts. Meanwhile, the government has gradually increased official prices for grains. Farmers were allowed to sell grains beyond a fixed quota at market prices, after they sold a fixed quota to government at official prices. These institutional and price reforms have generated strong incentives on farmers' efforts and productivity. The agricultural output and farmers' incomes have significantly increased after the reform.

Before economic reform, agricultural markets for input and output were mainly controlled and determined by government's plan. Starting around 1990, agricultural markets have gradually liberalized. Farmers could make their own decisions on their input choices with less interventions and restrictions. The liberalization of the agricultural markets has fostered farmers to adopt new technologies. Most of agriculture's growth in total factor productivity after 1990 came from technological progress (Jin, Ma, Huang, Hu, and Rozelle 2010).

In summary, Institutional reforms and technological progress have been the main sources for the rapid TFP growth in the agriculture sector. Labor reallocation from agricultural to non-agricultural sector has promoted TFP growth of the whole economy. But given the fact that the share of agriculture output and employment have recently decreased to a low level (see figures 2 and 3), the TFP growth due to the agricultural sector in the future may become smaller.

B. Resources reallocation from state to non-state sector

Before the SOE reform, state-owned sectors dominated all industries. The prices of rare materials and products of SOEs were determined by the government's plan rather than by the market. The government possessed the profits and was responsible for the losses.

The SOE reform started from the introduction of the dual-track price system (Zhu, 2012). Under this system, the SOEs should sell a quota of products at official prices, and could sell products beyond the quota at market prices, which were usually higher than the official ones. Moreover, the SOEs were allowed to keep part of their profits. The quotas have been gradually reduced and eventually eliminated. By the middle of 1990s, most of the products have been sold at market prices. The price system reform has not only generated strong incentives for SOEs to increase productivity, but also enable the non-state enterprises to get access to goods and capital from markets.

Before second round of SOE reform started in 1997, the government usually asked state-owned banks to bail out loss-making SOEs to avoid laying off workers or shutting down factories, in order to maintain social and political stability. After 1997, the loss-making SOEs were allowed to exit by going bankruptcy or privatization through management buyouts (Zhu, 2012). The previous restrictions preventing the entry of non-state owned firms have been gradually eliminated. The entry of non-state firms has brought competition and therefore improved productivity.

Since non-state enterprises continue to outperform the state-owned sector, the reallocation of labor and capital from the state to the non-state sector has contributed large proportion to the growth of TFP, especially before the state-owned firms reform started in 1993. According to the estimation of Brandt and Zhu (2010), from 1988 to 1998, the average annual growth rate of

total factor productivity in the state sector was only 0.27 percent, while the comparable growth rate of the non-state sector was 2.17 percent. A more efficient allocation of capital and labor, mainly from state-owned to non-state firms has contributed about 2 percentage points per year to the aggregate TFP from 1998 to 2005 (Jefferson, Rawski, and Zhang, 2008; Hsieh and Klenow, 2009).

Since the beginning of the millennium when the government launched new reforms through merging, privatizing and restructuring China's remaining SOEs, SOEs' productivity has significantly improved. According to the estimation of Zhu (2012), the TFP growth of SOEs has increased from -1.0 percent during 1978 to 1997 to 3.5 percent from 1998 to 2007.

Despite of the fact that TFP growth in the state sector has improved after the SOE reforms, Du, etc. (2014) find that there still exist systematic resource misallocation within the state sector and between the state and private sectors. This suggests that non-market forces allow resources to be driven away from their competitive market allocation and towards the inefficient state sector. In the first half of 2014, one third of central SOEs and half of local SOEs experienced declining profits or losses. In the wake of the crack down on excessive land financing and local government debts, local governments have to find new sources of revenue and to rid themselves of liabilities. A new round SOE reforms is being launched in order to eliminating the distortion and misallocation of capital and labor which still extensively exist.

C. Institutional reforms of trade, investment and migration

China's entry into the World Trade Organization in 2001 led the government to cut tariffs, broadened trade rights, and liberalized its regime for foreign direct investment (Branstetter and Lardy, 2008). Between 1998 and 2007, the share of total urban employment in domestic private enterprises and foreign-invested enterprises increased from 8 to 24 percent. Since foreign-invested enterprises in general have higher productivity than the average level (Hsieh and Klenow, 2007; Song, Storesletten and Zilibotti, 2011), the policy of opening-up and trade liberalization have played an important role in the growth of productivity.

Domestic trade reform has reduced the internal trade and migration costs, which resulted in the reduction in misallocation of labor and promotion of TFP growth. Local protectionism has been one of the factors for the high domestic trade cost. The local government had strong incentives to protect their tax base and local SOEs by preventing the interregional competition (Bai, Du, Tao, Tong, 2005). There was no promulgation to prohibit it in the early years of economic reform. In 2001, the central government issued a directive to prohibit local government from engaging in local market protections. Some industries in the domestic trade sectors, such as transportation, logistic, etc., were dominated by the SOEs, and there existed barriers for non-state sectors especially the foreign investors to enter. After China's entry into the WTO, The barriers have been gradually removed, non-state enterprises began to enter the domestic trade sectors, which has significantly reduced costs and improved productivity.

According to the estimation of Tombe and Zhu (2015), reductions in trade and migration costs have been one of the main driving forces behind China's aggregate labor productivity growth from 2000 to 2005. Since the trade cost in China is still high, for example 40 percent higher than that in Canada, there is still a large room for further reducing trade and migration costs, and for promoting productivity progress.

D. Resources reallocation through the process of entry and exit

Reallocation of labor and capital through the entry of high-efficient firms and exit of low-efficient ones contributed significantly to productivity growth. Using data of China Annual Survey of Industries, Brandt, Van Biesebroeck, and Zhang (2012) estimate that, for the manufacturing sector, the growth rate of TFP is as high as 13.4 percent per year during 1997 to 2007. Reallocation through the process of entry and exit accounts for 72 percent of the aggregate growth of TFP. The SOE reform during this period has played an important role in the entry and exit because state-owned enterprises were allowed the loss-making SOEs to go bankrupt and exit after the reform. Hsieh and Klenow (2007) estimate that reallocation across manufacturing firms with different productivity accounts for an annual 1.4 percentage points increase in aggregate TFP during 1998-2005.

To summarize, the sources of the TFP growth can mostly be attributed to the institutional reforms which have allowed labor and capital to be reallocated from low- to high-efficient sectors, such as from agricultural and the state sectors to non-agriculture non-state sectors, etc.. Another important factor is the catch-up effects. Like other late-developing countries, China has benefited from the catch-up advantage, by means of importing advanced technology from industry countries, rather than having to pioneer new technologies. Liberation of domestic and external trade, resulting from economic reforms and the opening up strategy has reduced the trade and migration costs, and has also been a main source of the rapid TFP growth. Given the fact that the reallocation from agriculture and the state sector has slowed down or even dried up in recent years, and the technological gap between China and industrial countries in terms of advanced and cutting-edge technology has narrowed, additional driving forces for productivity growth must be identified and promoted.

IV. Institutional Reforms to Foster Productivity

On the one hand, some of the factors which have driven the growth of TFP during the last decades have reduced or diminished, and will make smaller contributions than before.

First, since the GDP shares of output and employment in agriculture and the state sector have reduced to smaller proportions, labor and capital reallocation from these sectors, which has been one of the main driving forces of TFP in the last three decades will become smaller. Second, as China approaches the technological frontiers, the catch-up advantage will be smaller and China's TFP and economic growth will have to rely more on ingenious innovations. Third, China's consumption pattern is transforming from consuming more physical products to more services, which means that the share of the service sector in GDP will increase continually. Since productivity in the service sector is usually lower than that in the industrial sector, transformation of the economic structure will bring downward pressure on the TFP growth in the future.

On the other hand, there is still large room to foster the growth of TFP by means of further institutional reform and opening up.

First, distortion and misallocation still extensively exist in capital and labor market which need to be reduced and eliminated by means of further institutional reform (Hsieh and Klenow, 2009; Song and Wu, 2011; Brandt, Tombe, and Zhu, 2012). While these potential efficiency gains are substantial, many obstacles need to be eliminated in order to let these gains be realized.

For example, the current household residential registration or the hukou system is one of the obstacles for labor mobility and reallocation, and needs to be reformed. Despite the fact that more than 50% population now live in cities, only about 30% of them have hukou status for cities where they live. Having no hukou status means the migrants cannot get access to some public services, such as children's education, health care, social security, etc., and usually at an unfavorable position in job finding and wage bargain. This has impeded labor mobility and increased the costs of labor reallocation. The further reform of the hukou system which aims to grant migrants more access to the public service is expected to promote labor reallocation and aggregate productivity.

The weak performance of state firms is still a significant obstacle to Chinese economic growth. Despite many years of SOE reforms starting from 1998, some industries such as energy, transportation, telecommunication, banking sectors are still monopolized by state firms. In addition, SOEs remain active in a wide range of non-strategic sectors, from textiles and papermaking to catering (Du, Liu and Zhou, 2014). Over the past 10 years SOE reforms have stagnated and the SOEs are increasingly inefficient and unprofitable. Due to weak corporate governance, the SOEs generally have lower productivity than non-state firms; further reform of the SOEs will improve productivity.

Second, China's service sector, especially financial sector is still protected by barriers to prevent the entry of private or foreign firms. The banking sector is largely state-controlled, and bank loans disproportionately favor state-owned enterprises (SOEs) at the expense of more productive private firms (Liu, 2015). Song, Storesletten and Zilibotti (2011) find evidence that financial imperfection is a big obstacle retarded the SOE reform and growth of TFP. Because banks are state-dominated and tend to be supportive of the SOEs, private small and medium sized enterprises, which are often have higher productivity than SOES, are more difficult to get access to the banking credit. SOEs with low productivity can survive by means of preferential access to cheap credit. Such distortion in the credit allocation stifles competition and innovation from the private sector (both domestic and foreign) and encourages inefficient allocation of resources, over-investment, and overcapacity in industrial production (Chen, Jefferson and Zhang, 2009; Song, Storesletten and Zilibotti, 2011).

In addition, over-regulation and barrier to entry are the main obstacles impeding TFP growth in the service sector. If the restriction and discrimination are lifted, there will be a large chance to foster productivity in the service sector.

VI. Strategy to foster the TFP growth

A. Strategy to foster the productivity

The Chinese government has set the target of economic growth for the next five years as that by 2020 the per capita GDP will be doubled than that in 2010. To reach this target, the average growth rate per year should be no less than 6.7 percent for the next five years during 2016 to 2020. Given the fact that China's economic growth is under the downward pressure currently, to keep economic growth at a relatively high speed is a challenge faced by the government. Therefore, measures need to be taken to foster productivity and economic growth.

Since capital returns are decreasing due to the aging demographic structure and the diminishing demographic dividends (Cai, 2013), economic growth will rely more on the growth of productivity, especially on indigenous innovations. According to the official blueprint for China's 13th five-year plan (2016-2020), issued in November 2015, the government has pledged to take measures to promote better allocation of resources including labor, capital, land, technology, and to transform the development pattern from extensive investment to one that is more innovation-driven. Further reform of SOE, hukou system, fiscal and financial system, as well as the open-up of service sector, boosting innovations, research and internet, are at the center of the agenda.

To facilitate labor mobility and reallocation, the Chinese government determines to increase the urbanization ratio calculated based on the number of registered residents, by means of the hukou system reform, aiming to grant migrants greater access to public services in the cities where they work.

The strategy called "Internet Plus" will be implemented, which intends to encourage traditional industries better integrated with internet and upgrading to a higher level. The government has claimed to enhance investments in internet infrastructure national wide.

The government has taken measures to encourage people to start their own business and to make innovations. Some outdated regulations and restrictions which prevent people from starting business have been abolished. In addition, people who start their own business will be supported by a series of favorable policies, such as preferential taxation, simplified approval procedures, easier access to financial supports, etc.. To do pioneering work and make innovations are becoming popular ideas adopted by the whole society.

Measures have been taken to further open up and attract FDI. To achieve this objective, the government decided to adopt a nationwide "negative list" that clearly indicates sectors and businesses that are denied access by foreign investment. This will help ensure the protection of foreign investors' rights and better allocation of their funding. Meanwhile, China keeps promoting the Belt and Road Initiative by enhancing cooperation with countries and regions along the route. In addition, some service industries, such as health care, education, telecommunication, which has denied entry of FDI for many years, will be opened up in an orderly way.

Financial system reform is the focal point of the next five years. The direction of the reforms is to establish a transparent and sound functioning capital market, and to develop a multi-tiered capital market. Encouragement will be given to direct finance, to establish a multi-level and diverse banking system, allowing more private participation in established banks. The government is pushing forward market oriented exchange rate and interest rate formation mechanism, along with the internationalization of the RMB. Also planned includes building an inclusive financial system, to let ordinary citizens to have access to financial services.

B. Challenges for the reform

To carry out planned reforms on the agenda, and to achieve the objective of economic growth, China is faced with big challenges.

First, the government needs to balance the trade-offs between growth and structural transformation in the short-run. Reform and structure transformation may cause slow-down of

economic growth in the short run, and hence could be in conflict with the growth objective of the next five years. For example, to conduct SOE reforms, exits of inefficient firms are necessary, but this might reduce output and impose downward pressure on economic growth in the short run. Given the current declining trend of the economic growth, it might be a tough task for the government to hit the growth target of doubling per capita income by 2020, while in the same time to promote structural transformation and institutional reforms.

Second, the route map for this round of SOE reform is still under discussion and seems not very clear. "Mixed ownership" and "capital supervision" are the two key words for this round of SOE reform, which means to encourage private investors to take a controlling interest, and allowing employees to hold shares. The government intends to improve the SOEs' governance structure and supervise the state assets by mixed-ownership reform on SOEs.

There exist many challenges in this process. For example, The central government and local authorities might have different attitudes towards SOE reforms. Under the current circumstance that local fiscal condition becomes deteriorated, the local authorities are particularly enthusiastic about SOE reforms, in order to rid themselves of liabilities of local SOEs which have experienced declining profits or losses. But the central government pays more attention to preventing the loss of state assets and SOEs' social responsibility. The central government's target for SOE reforms is to make state assets more vital and more influential so as to play a better role in economic reconstructing and upgrading, and in fulfilling firms' social responsibility. The inconsistent attitudes of local and central government might lead to uncertainty and sluggishness on the SOE reform.

Third, reform of the hukou system will cause an increase in fiscal expenditure of the local authorities, because they have a responsibility to finance local public services, such as education, health care, etc. This might be a big challenge under the current circumstances. During the last decade, revenues from land sales have played an important role in local authorities' fiscal revenues. Because since recent years, the revenues from land related assets have decreased significantly as investment in the real estate has slowed down, the hukou system reform will be a big challenge for the local authorities, which calls for the reform of fiscal revenue reallocation between the central and local governments.

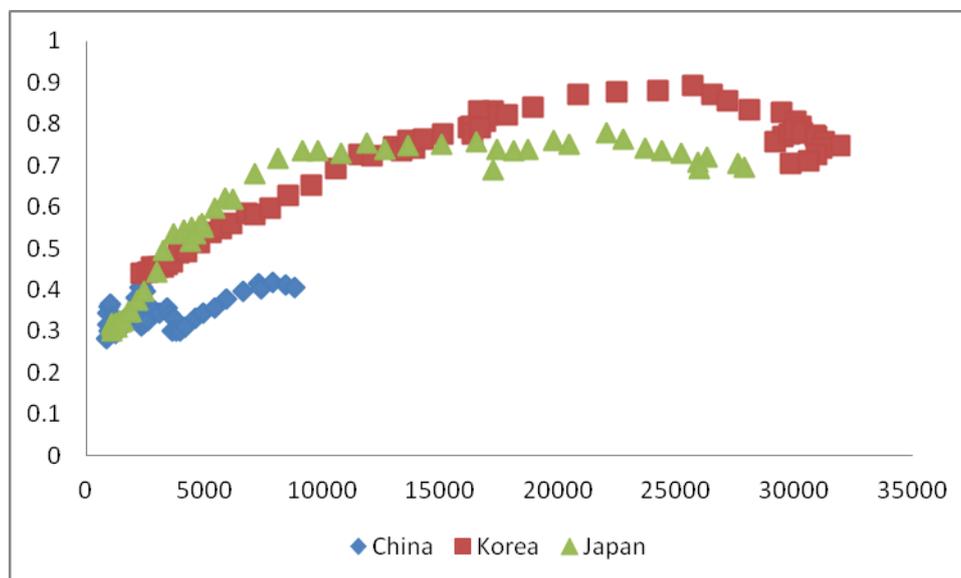
VII. Prospect of China's TFP and economic growth

Although the rapid TFP and economic growth during last three and half decades, due to the low level of the starting point, China's TFP and development level in general are still far behind the frontier and developed economies, which means there is large room for China to take advantage of catch-up effects.

Figure 8 shows the developments of relative productivity to U.S. and economic growth for China, Japan and South Korea. At the stage of catch-up, both Japan and Korea have experienced rapid TFP growth, which has narrowed their gaps with the U.S.. When Japan and Korea's relative TFP to U.S. reached 83 percent by 1975, 63 percent by 1990, respectively, these economies began to experience slowdown in the growth of relative TFP and economic growth. According to Penn World Tables 8.1, the ratio of China's per capita GDP and TFP relative to the U.S. have increased from 5.5 and 30 percent in 1978 to 20.7 and 40 percent in 2011, respectively. If China would follow the experience of Japan or Korea, China's TFP will be at least 60 percent of that of US before the growth rate slows down. Therefore China still has a

large room to improve TFP before productivity and economic growth slows down.

Figure 8. The correlation between per capita GDP and relative TFP level to US: China, Korea and Japan. Data source: Penn World Table 8.1



The Chinese government has formulated strategies and taken measures to foster the institutional reforms, including reform on SOEs, financial systems, hukou system, and service sector, opening up, etc.. As we have discussed, there still exist extensive imperfections in these areas. If the reform strategies can be steadily pushed forward and carried out successfully, meanwhile, the problems and risks caused by the reform can be appropriately tackled, the ongoing institutional reform may generate new engine to push the rapid growth TFP and aggregate economy in the next five years.

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