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Changing patterns of China's growth

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This paper analyzes the sectoral shifts occurred in China in the period 1980-2015. This is done by using a number of tools aimed at the main features in the patterns of growth and productivity of the Chinese economy. The narrative that can be drawn from the official statistics points to the fact that China's transition from the stage of deep industrialization towards a growth model led by the services sector is under way. However, the analysis suggests that there is still a long way before the shift to a service-led pattern of growth will be completed. The transition might be shorter than expected in view of the broad scope for expansion in financial services, and of China's track record as a fast reformer.

Keywords: China; growth; productivity; sectoral analysis.

Introduction

The reform process started in 1978 by China's leader Deng Xiaoping paved the way to a broad structural transformation in the Chinese economy. Rural liberalization initially encouraged the establishment of local entrepreneurship activities and the beginning of migration towards the new "special economic zones", and state enterprises. Growing flows of mostly young workers from the countryside later started to migrate from rural areas to the cities starting from early nineties. The transformation of China into a market economy, and its progressive integration within the world economy demanded larger and larger proportions of workers engaged in industrial activity. That unprecedented mass migration of workers from less to more productive activities contributed to the rise of aggregate growth and productivity[1].

As a result of labor reallocation China's economic transition was a striking success. In 1978 China represented 2.2 percent of the world's GDP. That figure recorded an eightfold increase to more that 16 percent in 2016, a performance never recorded by a rising economic power in previous historical experience.

* The opinions expressed are those of the author and do not necessarily reflect the views of the Bank of Italy or of the Eurosystem. All errors are my own.

[1] The positive net contribution to China's growth coming from the reallocation of workers from agriculture to non-agriculture has been estimated to be around 1.4 percent per year. (Ercolani and Wei, 2011)

The transition of Chinese economy from an emerging to a developed economy is still in progress. This paper aims at assessing the situation in the light of the most recent trends, and in view of the task, reiterated by authorities in recent years, to make the service sector the main driver, led by consumption, of the Chinese economy. This is performed by analyzing the sectoral shifts occurred in China in the period 1980-2015, by using a number of tools aimed at highlighting the main features in the patterns of growth and productivity of the Chinese economy. The narrative that can be drawn from the official statistics points to the fact that China is already transitioning from the stage of heavy industrialization and manufacturing activity towards a growth model led by the services sectors. The data suggest that there is still a long way to shift to a service-led pattern of growth; but if one looks at the broad scope for expansion in financial services, and to the active policies undertaken in China to enlarge the opening of the economy, broaden the financial and currency markets, foster global communication, finance world infrastructures, then the transition might take shorter than expected.

GDP decomposition in supply side components

We start the analysis by decomposing GDP according to the following identity:

$$Y = \frac{Y}{L} \times \frac{L}{F} \times \frac{F}{P} \times P$$

Where Y is GDP; L is the number of workers (employment); F is the labor force; and P is population.

If we apply logarithms on both hands of the above expression, and differentiate we get:

$$\Delta Y / Y \approx \Delta \frac{Y}{L} / \frac{Y}{L} + \Delta \frac{L}{F} / \frac{L}{F} + \Delta \frac{F}{P} / \frac{F}{P} + \Delta P / P$$

The expression above represents the percentage change of GDP as the sum of the percentage changes of: productivity; the employment rate; labor participation; population.

Table 1a shows that that labor productivity has been the main driver of GDP growth in 1980-2015. The employment rate (1 - unemployment rate), can be disregarded, as it is a cyclical component. Participation rates, which grew at very high rates during the eighties, have stabilized in the 2000s. The rate of growth of population has reduced from yearly rates close to 1.5 per cent, to 0.5 per cent, as an effect of the one-child-policy introduced in 1980 and scrapped in 2015.

Decomposition of aggregate labor productivity

The category of productivity considered here is labor productivity, i.e. output per worker. To the ends of this paper, output per worker represents a simpler and more visible indicator than total factor productivity (TFP) to measure the consequences of inter-sectoral shifts.

Indeed, TFP calculation heavily depends on how capital stock is measured and assessed. The range of TFP estimates for China is so wide that the necessity has arisen to categorize them under the two broad groups of “optimistic” and “pessimistic” views. The choice between the two views clearly relies more on individual judgement than on objective evaluation[2]. Furthermore, recent research persuasively argues that the results from TFP calculations for East Asia are affected by methodological choices that reduce the relevance of such exercises, and therefore their use for analytical or policy purposes[3].

The approach utilized in this paper is amply widespread in literature. It takes different names and formulations, but it is fundamentally based on the economic interpretation that can be given to the expression obtained from applying the difference operator to the product of two variables in mathematics (see annex). This kind of decomposition, commonly named shift-share analysis (such as in Molnar and Chalaux, 2015), proves helpful to the task of decomposing aggregate labor productivity in various effects[4]. In the literature of labor productivity decomposition it follows the observation that a simple weighted sum of sectoral productivities fails to provide a complete explanation for aggregate productivity in one national economy (Denison, 1962). In this light, shifts in labor allocation across sectors may contribute to a more thorough explanation of aggregate labor productivity change.

The working assumption in the following decomposition is that real sectoral components are additive, i.e. their sum amounts to the aggregate output of the economy[5]. Accordingly, country’s GDP can be decomposed as follows:

$$Y = \sum_{i=1}^{n} Y_i$$

where the aggregate output (GDP) is equal to the sum of the output of all *n* sectors.

Given the property of additivity, the difference of Y from time 0 to time t can be defined as:

$$Y_t - Y_0 = \Delta Y = \sum_{i=1}^{n} \Delta Y_i$$

Dividing the above by Y, we can define the percentage change of Y as a weighted sum of all sectors’ rates of percentage change:

$$\frac{\Delta Y}{Y} = \sum_{i=1}^{n} w_i \frac{\Delta Y_i}{Y_i}$$

[2] For an extensive survey of the debate see Xu (2014).

[3] See Felipe and McCombie (2017). Felipe (1999), had previously criticized the neoclassical framework as a tool for evaluating TFP in East Asia, suggesting that the theoretical problems underlying the notion of TFP are so significant that the whole concept should be seriously questioned.

[4] In the context of the analysis of international trade, it is called, constant market share analysis, and it is used to describe if the allocation of a country’s exports across its trading partners is optimal.

[5] This property descends from the fact that real output is calculated at constant prices using fixed base Laspeyres quantity and Paasche price indexes at both the aggregate and sectoral levels.

Where the weights $w_i = Y_i / Y$ represent the relative size of each sector *i* on aggregate GDP.

It now follows the decomposition of the growth rate of labor productivity.

According to the above, aggregate productivity, defined as aggregate real output per worker, can be defined as:

$$\frac{Y}{L} = \frac{\sum_{i=1}^{n} Y_i}{\sum_{i=1}^{n} L_i}$$

If we assume that $k_i = L_i / L$ (sectoral employment over total employment) and $y_i = Y_i / L_i$ (sectoral productivity) we obtain the following expression:

$$y_t = \sum_{i=1}^{n} k_{t,i} y_{t,i}$$

If we take the difference of y

$$y_t - y_{t-1} = \sum_{i=1}^{n} \left(k_{i,t} y_{i,t} - k_{i,t-1} y_{i,t-1} \right)$$

And using the following[6]:

$$k_{i,t} y_{i,t} - k_{i,t-1} y_{i,t-1} = y_{i,t-1} \left(k_{i,t} - k_{i,t-1} \right) + k_{t,i-1} \left(y_{i,t} - y_{i,t-1} \right) + \left(k_{i,t} - k_{i,t-1} \right) \left(y_{i,t} - y_{i,t-1} \right)$$

and dividing by y_{t-1}, we get:

$$\frac{y_t - y_{t-1}}{y_{t-1}} = \frac{1}{y_{t-1}} \sum_{i=1}^{n} \left(y_{i,t-1} \left(k_{i,t} - k_{i,t-1} \right) + k_{i,t-1} \left(y_{i,t} - y_{i,t-1} \right) + \left(k_{i,t} - k_{i,t-1} \right) \left(y_{i,t} - y_{i,t-1} \right) \right)$$

that is, rearranging for convenience:

$$\frac{y_t - y_{t-1}}{y_{t-1}} = \sum_{i=1}^{n} \left(\frac{k_{i,t-1}}{y_{t-1}} \left(y_{i,t} - y_{i,t-1} \right) + \frac{y_{i,t-1}}{y_{t-1}} \left(k_{i,t} - k_{i,t-1} \right) + \frac{1}{y_{t-1}} \left(k_{i,t} - k_{i,t-1} \right) \left(y_{i,t} - y_{i,t-1} \right) \right)$$

The expression above represents the decomposition of total productivity percentage change in three separated effects.

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[6] This property is expressed geometrically in the Annex.

Following Nordhaus (2001), performing the above decomposition highlights that aggregate labor output per worker can be split into three components: a pure, fixed-weight productivity term which uses fixed base-year expenditure or output weights ("pure productivity effect"); a term that reflects the difference between current weights and base-year weights, and a third term which reflects the interaction between changing weights and relative productivity levels in different sectors.

The definition of the three effects in this paper follows the mainstream naming convention in the literature of labor productivity decomposition[7].

Accordingly, Nordhaus' "pure productivity effect" will be defined as a "within-sector productivity growth effect", henceforth WSPGE. It represents the direct effect descending from changes in productivity in individual sectors.

The second term, Nordhaus' "Denison effect", consistently with Denison (1962), will be named "static structural reallocation effect" (SSRE). It shows that aggregate output per worker can increase even when sectoral labor productivities remain constant, provided that labor moves from sectors with lower towards sectors with higher output per worker.

The third term, the so-called "Baumol effect" in Nordhaus' classification, after Baumol (1967) will be here referred to as the "dynamic structural reallocation effect" (DSRE). This definition highlights the changes in productivity associated with the reallocation of employment across sectors with different productivity growth rates. The sign of this effect is positive (negative) when labor moves towards (away from) a sector with higher (lower) labor productivity growth.

To better understand the features of WSPGE, DSRE, and SSRE it is helpful to note that:

(1) When sectoral productivity is constant (i.e. $y_{i,t} = y_{i,t-1}$) WSPGE and DSRE collapse to zero, and aggregate productivity is entirely explained by $SSRE = \sum_{i=1}^{n} \frac{y_{i,t-1}}{y_{t-1}} \left(k_{i,t} - k_{i,t-1}\right)$ that is the change in sectoral employment share. The implication is that the net sign and size of SSRE will be determined by the way labor force moves toward the sector (s) with higher-that-average productivity.

When sectoral labor shares are constant (i.e. $k_{i,t} = k_{i,t-1}$), SSRE and DSRE collapse to zero (there is no sectoral shift). The aggregate productivity is only explained by :

$$WSPGE = \sum_{i=1}^{n} \frac{k_{i,t-1}}{y_{t-1}} \left(y_{i,t} - y_{i,t-1}\right)$$

that is to a sum of sectoral productivity changes, weighted by quotas of sectoral output, over total output.

[7] Such as, among others, Felipe et al. (2007), Usui (2011), De Avillez (2012), Dumagan (2013).

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The data

Since China's fast economic expansion triggered a growing interest by analysts and academic scholars in the last two decades, its official GDP figures have been subjected to close scrutiny and heavy criticism[8]. These ranged from the suspicion that official statistics might be inconsistent with the evidence emerging from alternative indicators of economic activity to the concern that the figures might be hardly comparable with the equivalent statistics of other countries that follow uniform international standards[9].

In spite of the above, recent research suggests that recently reported Chinese GDP figures are no less reliable than it is commonly observed elsewhere (Fernald et alii, 2013). Official GDP data are found to display only few and acceptable statistical anomalies, supporting the view that the National Bureau of Statistics of China is fully reliable (Holz, 2014). In sum, China's official GDP data can be viewed as similar, in quality, to those of other countries[10].

With these considerations in mind, the data in this paper have been collected from the 2016 issue of the National Bureau of Statistics of China's Statistical Yearbook. Albeit not exempt from some problems, which will be considered in the following sections, such data are trusted in this paper as providing a true and realistic representation of the Chinese economy.

When computing sectoral output in real terms for China, one is faced with a serious difficulty. In the National Bureau of Statistics of China's Statistical Yearbook for 2016, there are six base years in the National Accounts Series, namely 1970, 1980, 1990, 2000, 2005, and 2010. For the period relevant to the present analysis, 1980-2015, constant price data are based on five different benchmark years, as linking of GDP has not been undertaken so far. If one follows the procedure to link the time series of GDP at constant prices, in every rebasing year[11], the results are inconsistent, because they lose the additivity property. Moreover there are breaks in sectoral quotas when moving across different base periods. For this reason, the following procedure has been followed in this paper. Sectoral quotas from current prices series have been computed and applied to the aggregate real GDP series at 2010 constant prices to derive the equivalent real output for the three sectors. This procedure implicitly assumes that relative prices in the three sectors stay constant over time, which it might be clearly a disadvantage. On the positive side, it makes the series smooth and consistent, and keeps the additive properties.

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[8] A detailed review of the debate on the reliability of Chinese GDP figures started by the "wind of falsification and embellishment" found in 1998 is found in Holz, 2014.

[9] The interest in thoroughly analyzing the Chinese economic structure, and an evident dissatisfaction or mistrust in what concerns official statistics, has induced some authors to recalculate specific subsets of Chinese macroeconomic data, so as to be compliant with a priori assumptions or models (see, inter alia, Maddison and Wu, 2008; Wu, 2014; Cheremukhin et alii, 2015; Chang et alii, 2015).

[10] This might not be necessarily reassuring if one considers the warnings of pioneers like Kuznets and Morgenstern against the reliability of national accounts statistics for quantitative analysis purposes.

[11] This procedure is consistent with the suggestion of the National Bureau of Statistics of China to "link the time series of GDP at constant prices, in every time of rebasing, not only by the new base year constant prices, but also by the previous base year constant prices". See United Nations Statistics Division, p. 9.

Another problem with the data used for productivity calculations involves the labor force series. This is a well-known anomaly in the aggregate employment series (Maddison and Wu, 2008; Wu, 2015), consisting in a 17.3 percentage increase in the number of employed between 1989 and 1990 (from 55,707 to 65,323), whose causes as of today are still unclear[12]. In this paper no attempt is made at smoothing the above discontinuity. Since the analysis is based on annual rates of change the jump in employment series is restricted to a single year in year-by-year analysis and less visible in cumulative analysis.

Labor productivity decomposition

Calculations have been performed by using Speakeasy, a numerical computing interactive environment also featuring a powerful interpreted programming language[13], in cumulative terms. This means applying the formula to the initial and final observation on the period under exam, so as to have that $t_0 = initial$ and $t_n = final$ [14].

To start with the object of the decomposition, in the period 1980-2015 aggregate labor productivity has increased from 5224 to 77883 yuan per worker, at constant 2010 prices (roughly from 765 to 11450 USD at the average exchange rate of that year), with an average yearly rate of growth of 7.58 percent (Figure 1, table 1c). This makes China an exceptional performer vis-à-vis most economies in the rest of the world[15]. Industrial output per worker has been consistently higher than in services sector, with agriculture lagging behind throughout the whole period.

As a result, the sectoral share of industry has been the largest until 2012 (Figure 2). After then industry has gained a consistent advantage, with a share nearing 50 per cent, as against 42 per cent in services and 8 in agriculture.

Sectoral shares of labor show that at the start of the period agriculture absorbed almost 70 per cent of total employment (Figure 3). It progressively fell to move below 30 per cent in 2015. Likewise for output shares, industrial labor shares have remained roughly stable from 1980 to early 2000s. Since then industry labor share has increased by 10 percentage points nearing 30 per cent. The share of labor absorbed by services sector has steadily increased across the whole period, from around 13 per cent to around 42 per cent.

Table 2 shows the decomposition of aggregate China's output per worker into sectors and effects, calculated on the basis of the framework illustrated in the previous section. The increase in aggregate output per worker between 1980 and 2015 amounts to 13.91, equivalent to almost 14 times, consistent with a yearly growth rate of 7.58. For the whole

[12] It has been suggested that this problem might be caused by a clash between population census-based estimates and annual estimates through a long-established data reporting system, but it is also claimed that the problem deserves further investigation. See Wu (2014); Maddison and Wu (2008).

[13] A long-lasting numerical package, Speakeasy was initially developed for internal use at the Physics Division of Argonne National Laboratory by the theoretical physicist Stanley Cohen.

[14] It can be easily checked that, given the peculiar features of the disaggregation formula, the single terms cannot be summed or averaged, because the additivity property would get lost, and the analysis would thus yield inconsistent results.

[15] For a comparison see United Nations Statistics – Millennium Development Goal Indicators; growth rate of GDP per person employed, indicator 1.4 on web: *https://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=757*

period 1980-2015 the largest contribution comes from services sector, followed by by industry. The contribution from agricultural sector appears only marginal.

If one looks at the decomposition of aggregate productivity increase throughout the whole period, the WSPGE, or pure productivity effect, prevails over the other effects, a result commonly found in literature. As already said before, it is the sectoral contribution to aggregate productivity "if" labor are constant.

Since this is not the case, the dynamic structural reallocation effect (DSRE) is sizeable. Looking at the DSRE by sectors, it comes out that it is particularly large for services, as one should expect by the combination of the dynamic pattern of productivity by the sector and by its fast growing share of labor. A similar pattern, but of a smaller scale, is found for industry, where productivity dynamics is slightly faster, but labor share dynamics is less pronounced. A declining labor share combined with slow productivity produces a negative DSRE, as expected.

On the contrary the contribution of SSRE is pretty small. This cannot be surprising, because the initial productivity level is relatively small, as compared with the final level. Hence, if the period of analysis is long, the dynamic effect will be prevalent as compared with the static effect.

A look at different decades adds dynamic dimension to the narrative above. Agriculture records negative static and dynamic structural and reallocations effects, due to a continuing process of reduction in the number of agricultural workers. As a consequence its contribution to aggregate productivity shrinks over time. At the opposite side, industry and services, record a continuing process of fast productivity growth, and both contribute to the fast aggregate productivity growth recorded by the Chinese economy during the sub-periods. However, since 2000 to 2010, a decade of fast productivity growth, the contribution of services sector tends to oversize that of industry. In 2010-2015, the contribution of services becomes much larger, in terms of pure productivity growth, as well as in terms of static and dynamic sectoral reallocation. This seems to confirm a growing role of services sector in the past few years in China.

The above is confirmed if one looks at figures 4-8 which represent, in cumulative terms the sectoral contribution to aggregate productivity growth (figure 4); the contribution of the three effects to aggregate productivity growth (figure 5); and the three effects decomposed by sector (figures 6-8). The most interesting features that can be noted are: a declining contribution to productivity by industry in recent years (figure 4); persistently high dynamic reallocation, particularly in the 2000s, as noted before; a strong divergence, starting from early 2000s in the dynamic allocation effects from industry and services. The latter display an impressive boost, mirrored by the reduction in agriculture, and some slackening in industry. This explanation of this pattern appears in line with the elsewhere observed dynamic trends in immigration flows from the rural to the urban areas. Since this has still some way to go, the potential for fast increases in GDP and productivity is viewed as very favorable for the coming years (OECD, 2015).

A final remark is that, looking at cumulative dynamic effects, industry sector appears the most sensitive to the cyclical profile of GDP (figure 9).

Sectoral shifts and economic stages

Previous discussion has highlighted an ongoing shift of Chinese economy towards services. This cannot be surprising, since the behavior of service sector share in an economy has been long debated by economists, starting from the seminal contributions of Fisher (1935), Clark (1940), Fourastier (1949), and Chenery (1960). This relevant thread of economic literature is focused on the structural transformation associated to the reallocation of economic activity across the three broad sectors (agriculture, industry and services). In this approach the relative size of sectoral quotas of employment and output across sectors follow a predetermined sequence that marks the state of development of an economy.

Following an initial stage where agriculture absorbs the largest share of labor force, with low productivity levels, workers gradually move towards industrial activity, characterized by higher productivity and higher salaries. A new shift will occur when labor force moves again towards tertiary sector and a gradual deindustrialization will occur, in favor of a broader service sector.

In order to analyze the features of the above trends for China, this section draws upon the pioneering econometric approach of Chenery (1960 and 1982), and Chenery and Syrquin (1975), which paved the way to a broad number of following contributions. Cheney and Syrquin did not provide an explanation of changes in identified variables based on an explicit general equilibrium model (Garrido, 2014). In their analysis they assume that sectoral quotas of economic activity basically depend on per-capita income, a variable that simultaneously embodies those supply and demand factors which represent the foundations of development process. This analysis has become the workhorse of modern studies on the patterns of structural shift in development literature.

The specification adopted in this paper is based on the authors' suggestion that development dynamics should be viewed as a "multidimensional transition from one structure to another with lower and upper bounds for the analyzed variables".

Since a logistic function seems to best match the above description[16], the following econometric specification has been here adopted for its convenient analytic properties:

$$Ln\left(\frac{\alpha_i}{100-\alpha_i}\right)=a+bY+c\ln Y$$

[16] As suggested also by Garrido (2014) .

where α_i is the share of output or employment of sector i and Y is aggregate per-capita income. The above logistic transformation forces calculated values of α_i to stay in a boundary of zero to 100 for any value of independent variables.

The equation above has been estimated for the period 1980-2015 both for output sectoral data and per-capita GDP. Tables 3.1 through 4.3 report the details of the estimation tests, and figures 10 and 11 report the calculated values for employment and output shares in the three sectors.

Employment and output share for agriculture dramatically decreases, as per capita income increases. The relative position of the corresponding curves for output and employment in agriculture confirms the low productivity in the sector, as already made apparent in figure 1 and in previous analysis. The opposite occurs for industry and service sectors. Services in particular display a marked tendency to increase its relative size vis-à-vis the other sectors across the period considered. Looking at the most recent years, or higher per capita income, it appears that a visible reallocation of labor has occurred from agriculture to services; in the same period it looks like the output share of services has increased at the expenses of industry sector.

The reason for these observed shifts, and the path that labor flows, in particular, have followed when moving across sectors deserve some further investigation.

Indeed, the pattern of services sector seems to confirm, once again, the idea that the service sector, which has already represented a central source of growth and productivity in China, for its still unexploited potential can be viewed as a major engine of growth and productivity in the future. This finding appears to be in line with previous research. Herrendorf et al. (2014) have regressed sectoral shares for a number of countries in different periods, and using different databases. *Mutatis mutandis*, the sectoral pattern followed in the countries considered in that study appear broadly similar to that found for China. Looking at the industrial countries in the period 1800-2000[17], at earlier stages, with lower per capita income, the agricultural sector absorbs the largest labor share, and produce the largest (albeit relatively smaller) output share; the two approximately range from 60 to 80 per cent and from 50 to 70, respectively, to move lower than 10 percent. At the center stage of development most countries approach 50 per cent on both employment and industry shares, to decline down to around 20 per cent in most cases. Services sector displays a steep upward trend starting in a range of 10-20 per cent to reach 80 percent or more for employment shares. For the output shares, the start is at a range of approximately 20-40 per cent to end at around 80 percent.

The above describes a story shared by many countries in East and South-East Asia, in line with the classical view of reallocation across sectors in the path to higher stages of development[18]. If China were to match the described trends, the services sector would still have a broad scope for growth from the current share of 40-50 percent. The way to go

[17] These are: Belgium, Spain, Finland, France, Japan, Korea, the Netherlands, Sweden, United Kingdom, and the Unites States.
[18] See Park and Shin (2012), Estrada et al. (2013).

might be shorter than expected if one considers that discontinuities sometimes occur in the path of services sector takeoff, due to an observable decline in the threshold per capita income for a takeoff of services, a behavior that presumably reflects the diffusion and increased applicability of information technology (Noland, Park, and Estrada, 2012).

Conclusions

The example coming from advanced economies suggests that deep industrialization is only transitional, as it is invariably followed by a fast rise of the services sector share at the expenses of industry. In the most advanced stages of development process services eventually become the most relevant economic activity. In this light, the question arises of when this will happen for China.

Previous studies (Noland, Park, and Estrada, 2012) have suggested that the industrial sector has already come to maturity in many Asian countries, with the implication that industry is now displaying a reduced ability to keep a fast pace of productivity and to absorb labor. Service sector, for its being labor intensive and highly dynamic, is the answer to the question of how to increase employment and living standards in the Asian region in the coming years.

The objectives stated in 2011 and again in 2016 China's five-year Plan points to service sector and to consumption demand as the main drivers of the Chinese economy in the future. Evidence on the changing attitudes of Chinese consumers suggests that people in China are now spending larger amounts of their earnings for health care and education, as well as for travels and for entertainment. Yet, shifting demand components from investment and net exports to private consumption is a complex task, requiring careful policy planning. Keeping the pace of structural reform will prove crucial to ensure a smooth and painless transition to the "new normal"[19].

Compared with other Asian economies, China's service sector's share of output and employment appears still small but seems to be fast heading in the right direction. This paper tries to analyze past trends of structural shifts on China, and derive insight for the future.

In this light, the first *caveat* that comes to one's mind is that conventional wisdom, policy blueprints, and the historical experience of other countries seems to be of little or no use to analyze China.

For its ability to successfully pursue hard-to-reach goals and to challenge commonplaces, China has often surprised analysts and practitioners. For example, the process of renminbi internationalization which has brought the yuan into the SDR basket of currencies has challenged the opinions of those who thought that a "dual track reform" was doomed to failure.

China has also displayed an extraordinary vitality and activism in creating visionary projects, such as the One Belt One Road initiative, or the AIIB, which are poised to improve promote

[19] OECD, 2015.

growth and prosperity and improve lives in the regions affected. The growing use of RMB in trade and investment in Asia is fostering the activity of joint ventures and activities located in Hong Kong, the largest offshore RMB Centre, meant to finance infrastructure projects in the Asian region. There is a clear mutually reinforcing interaction between the spread of RMB across the world markets and offshore issuances of RMB bonds aimed at financing infrastructural project.

In spite of a relatively high share of economic activity compared to lower income Asian economies (Estrada et al., 2013), financial services are in China still smaller than in the largest advanced economies, and therefore with a broad potential for expansion. This suggests that there the contribution of financial services to growth in China is likely to become very relevant in the years to come.

References

Baumol, William J. (1967), "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis," American Economic Review 57, 415-26.

Chang, C. et alii, 2015. "Trends and Cycles in China's Macroeconomy". NBER Working Paper Series 21244, June.

Clark, C. (1940), The Conditions of Economic Progress. London: MacMillan & Co. Ltd. (reprinted in 1951)

Chenery, H.B., 1960. "Patterns of Industrial Growth", American Economic Review, Vol. 50, n. 4.

Chenery, H.B., 1982. Industrialization and growth : the experience of large countries. Staff working paper; no. SWP 539. Washington, D.C. : The World Bank.

Chenery H. and M. Syrquin, 1975, "Patterns of Development 1950-1970", Published for The World Bank by Oxford University Press.

Cheremukhin, A. et alii. 2015. "The Economy of People's Republic of China from 1953", NBER Working Paper No. 21397, July.

De Avillez R., 2012. Sectoral Contributions to Labor Productivity Growth in Canada: Does the Choice of Decomposition Formula Matter? CSLS Research Report 2012-09, December.

Dumagan, J. C., 2013, A Generalized Exactly Additive Decomposition of Aggregate Labor Productivity Growth. Review of Income and Wealth, 59: 157–168.

Denison, E.F., 1962, "The Sources of Economic Growth in The United States and the Alternatives Before Us". Supplementary Paper No. 13. New York: Committee for Economic Development.

Ercolani, M.G., and Z. Wei, 2011. "An Empirical Analysis of China's Dualistic Economic Development: 1965–2009", Asian Economic Papers 10:3, The Earth Institute at Columbia University and the Massachusetts Institute of Technology.

Estrada, G. et al., 2013. "The Service Sector in Lower-Income Asian Economies", ADB Economics Working Paper Series No. 347, Asian Development Bank, Manila, April.

Felipe, J., 1999, "Total Factor Productivity Growth in East Asia: A Critical Survey", Journal of Development Studies 35 (4), pp.1-41.

Felipe, J. and J. McCombie, 2017. "The Debate about the Sources of Growth in East Asia after a Quarter of a Century: *much ado about nothing*", ADB Economics Working Paper Series, No. 512. Asian Development Bank, Manila, May.

Felipe, J. et al., “Sectoral Engines of Growth in Developing Asia: Stylized Facts and Implications”, ERD Working Paper Series no. 107, Asian Development Bank, Manila, November.

Fernald, J., Malkin, I., and M. Spiegel, 2013. “On the Reliability of Chinese Output Figures”, FRBSF Economic Letter 2013-08. March.

Fisher, A.G.B., 1935. “The Clash of Progress and Security”. London: MacMillan & Co. Ltd.

Fourastié, J., 1949. “Le Grand Espoir du XXe Siècle”, Paris: Presses Universitaires de France.

Garrido, L., 2014. “Patterns of Development. A Review of the Literature for an Empirical Update”. Paper presented at the 17th Annual Conference on Global Economic Analysis, Dakar, Senegal. https://www.gtap.agecon.purdue.edu/resources/download/ /7030.pdf

Herrendorf, B. et al., 2014, “Growth and Structural Transformation”, in: Handbook of Economic Growth, Edited by Philippe Aghion and Steven N. Durlauf, Elsevier. Downloadable at: http://www.sciencedirect.com/science/handbooks/15740684

Holz, C.A., 2014. “The quality of China's GDP statistics”, China Economic Review 30: 309–338.

Maddison A., and H.X. Wu, 2008. “Measuring China’s Economic Performance”. World Economics, Vol. 9, n. 2, April-June.

Molnar, M. and T. Chalaux, 2015. “Recent trends in productivity in China: shift-share analysis of labour productivity growth and the evolution of the productivity gap”, OECD Economics Department Working Papers, No. 1221, OECD Publishing, Paris. http://dx.doi.org/10.1787 /5js1j15rj5zt-en

Noland, M., D. Park, and G.B. Estrada, 2012. “Developing the Service Sector as Engine of Growth for Asia: An Overview”, ADB Economics Working Paper Series, No. 320, November.

Nordhaus, W.D., 2001. “Productivity Growth and the New Economy”. National Bureau of Economic Research Working Paper 8096. Cambridge, MA. January.

OECD, 2015. “Economic Survey on China”. OECD, Paris, March.

Park, D. and K. Shin, 2012. “The Service Sector in Asia: Is It an Engine of Growth?”, ADB Economics Working Paper Series, No. 322, December.

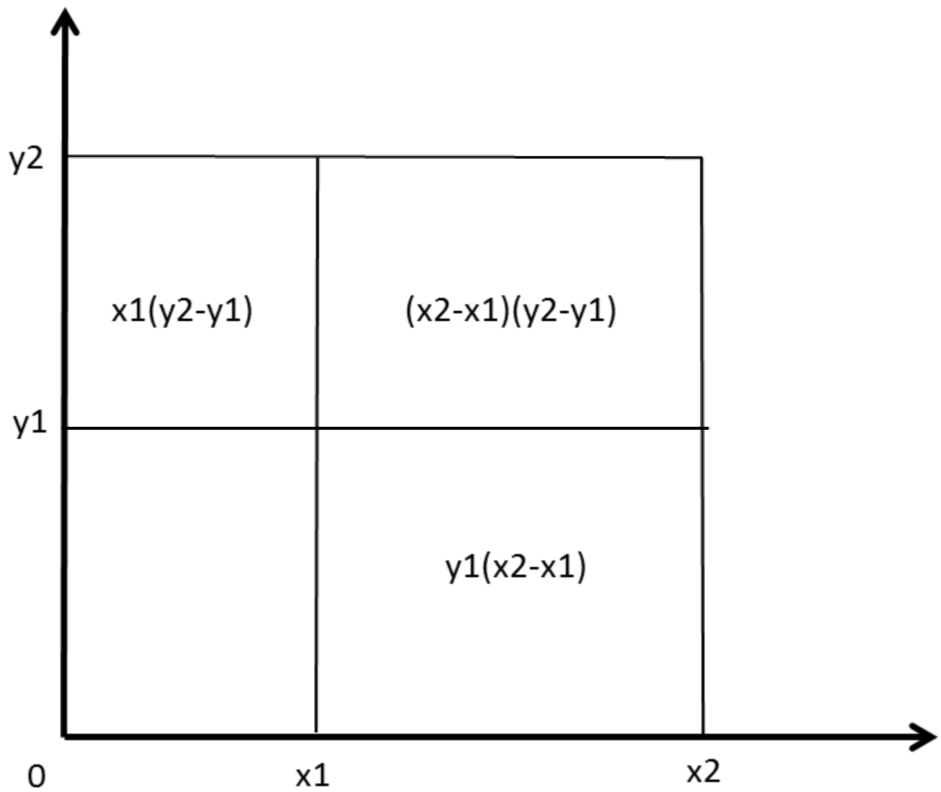
Usui, N., 2011. “Transforming the Philippine economy: ‘walking on two legs’.”, ADB Economics Working Paper Series - No. 252, March

United Nations Statistics Division, “Review of Country Practices on Rebasing and Linking National Account Series”. Available via the internet: https://unstats.un.org/unsd/DA-

SEA-Asia/Documents%20-%20Lao%20WS/Lao%20WS-Country%20practices%20on%20 rebasing%20and% 20linking%20NA.pdf

Wu, H.X., 2014. "China's Growth and Productivity Performance Debate Revisited - Accounting for China's Sources of Growth with a New Data Set", The Conference Board Economics Program Working Paper Series, EPWP n.14-01

Annex



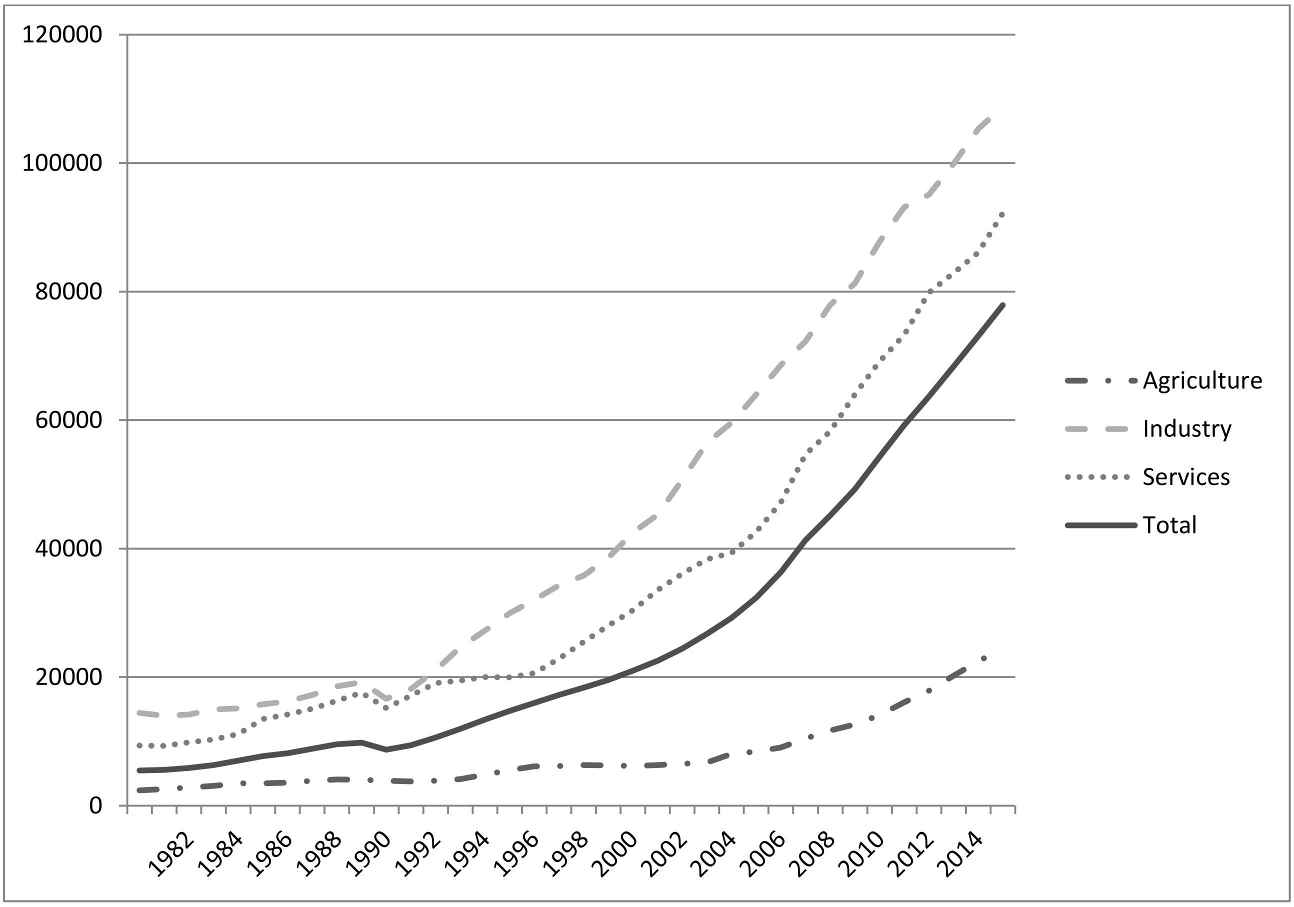
z1=x1y1 ; z2=x2y2

z2-z1=x1(y2-y1)+y1(x2-x1)+(x2-x1)(y2-y1)

Charts and tables

Figure 1

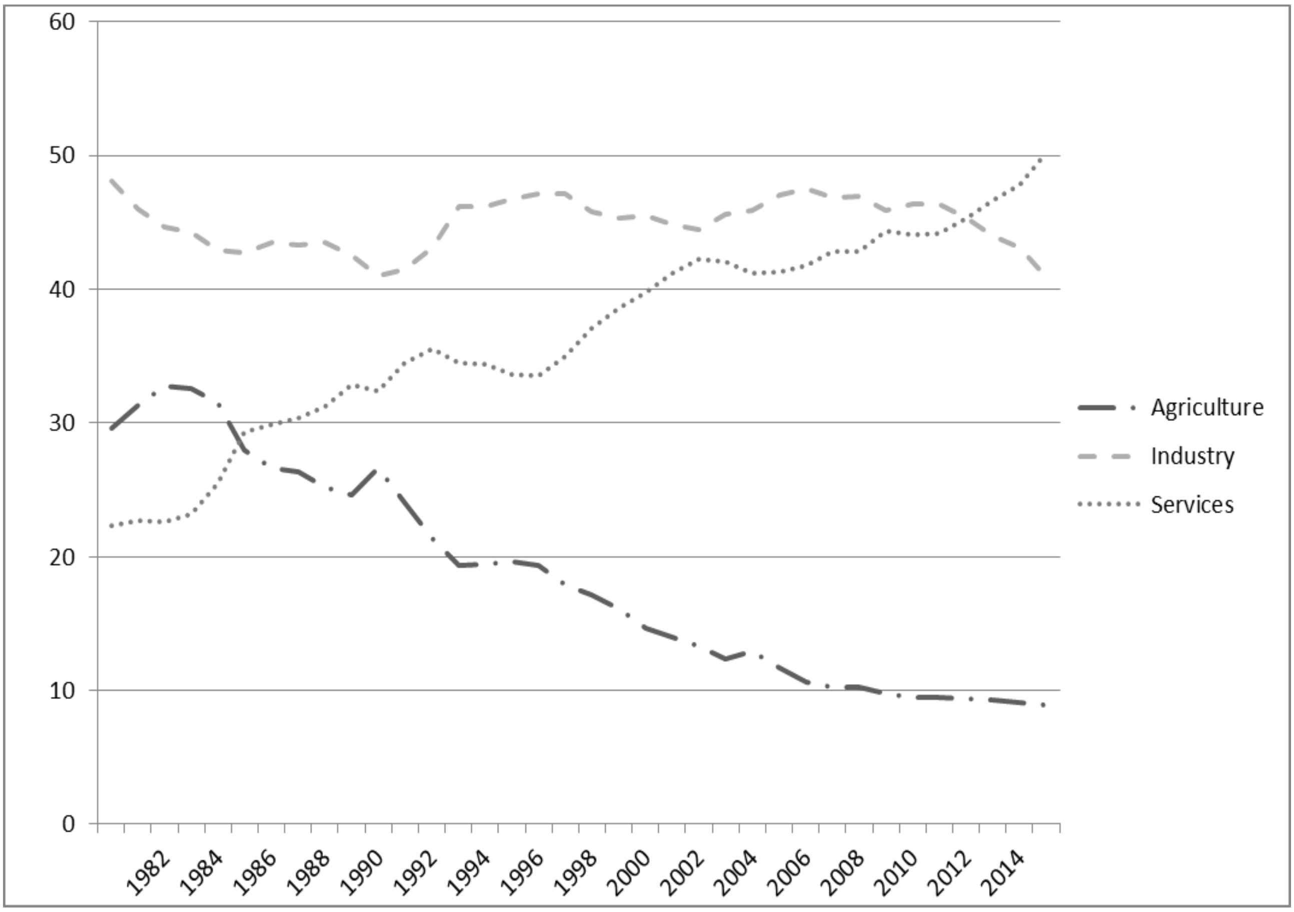
Labor productivity (real output per worker) in China (yuan at 2010 prices)



Source: National Bureau of Statistics of China and Author's calculations.

Figure 2

Sectoral quotas of GDP in China 1980-2015 (percentage values)



Source: China's National Bureau of Statistics and Author's calculations.

Figure 2 alt

Sectoral quotas of real GDP constant 2010 prices) in China 1980-2015 (percentage values)

Source: China's National Bureau of Statistics and Author's calculations.

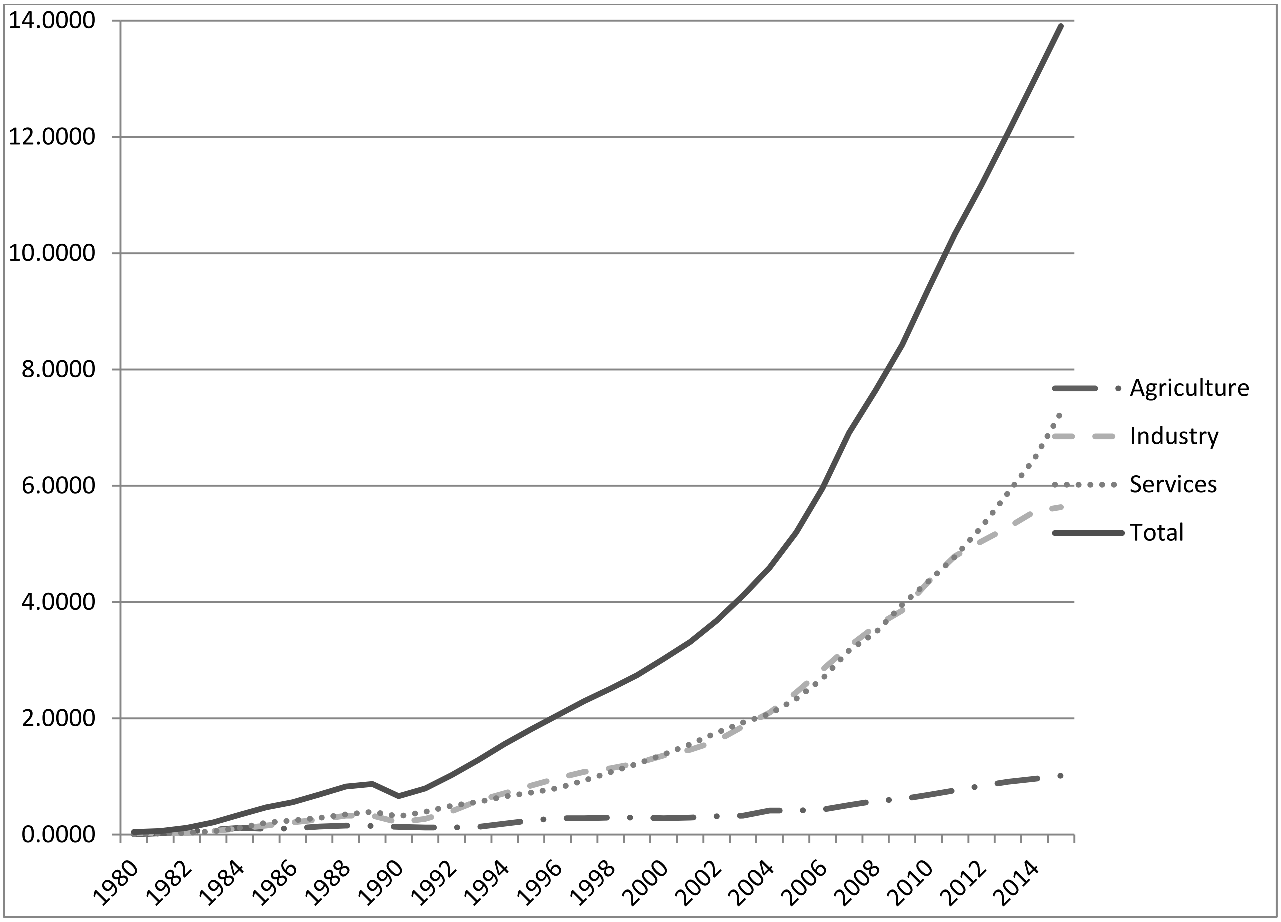
Figure 3

Sectoral quotas of employment in China 1980-2015 (percentage values)

Source: National Bureau of Statistics of China and Author's calculations.

Figure 4

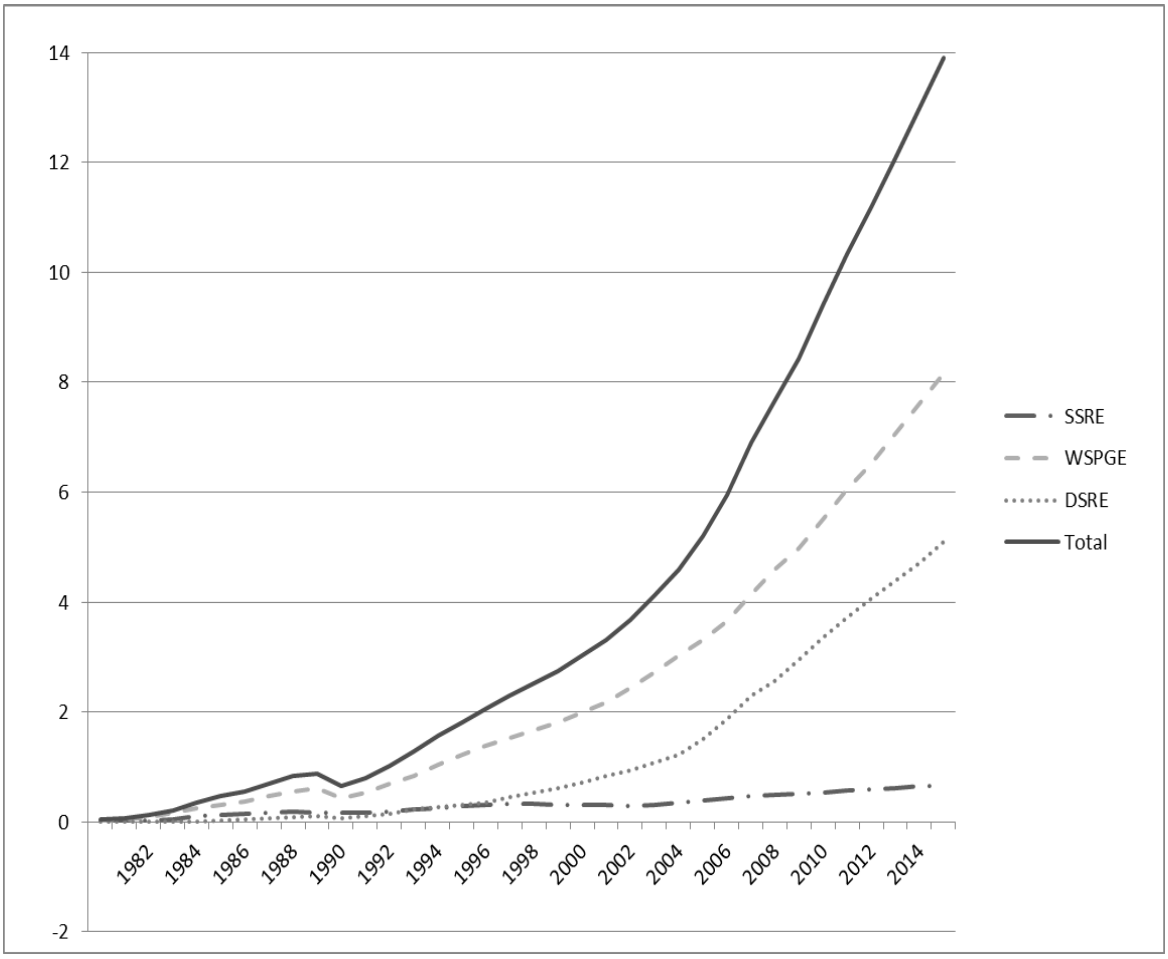
Cumulative sectoral contribution to productivity growth (output per worker) in China 1980-2015



Source: National Bureau of Statistics of China and Author's calculations.

Figure 5

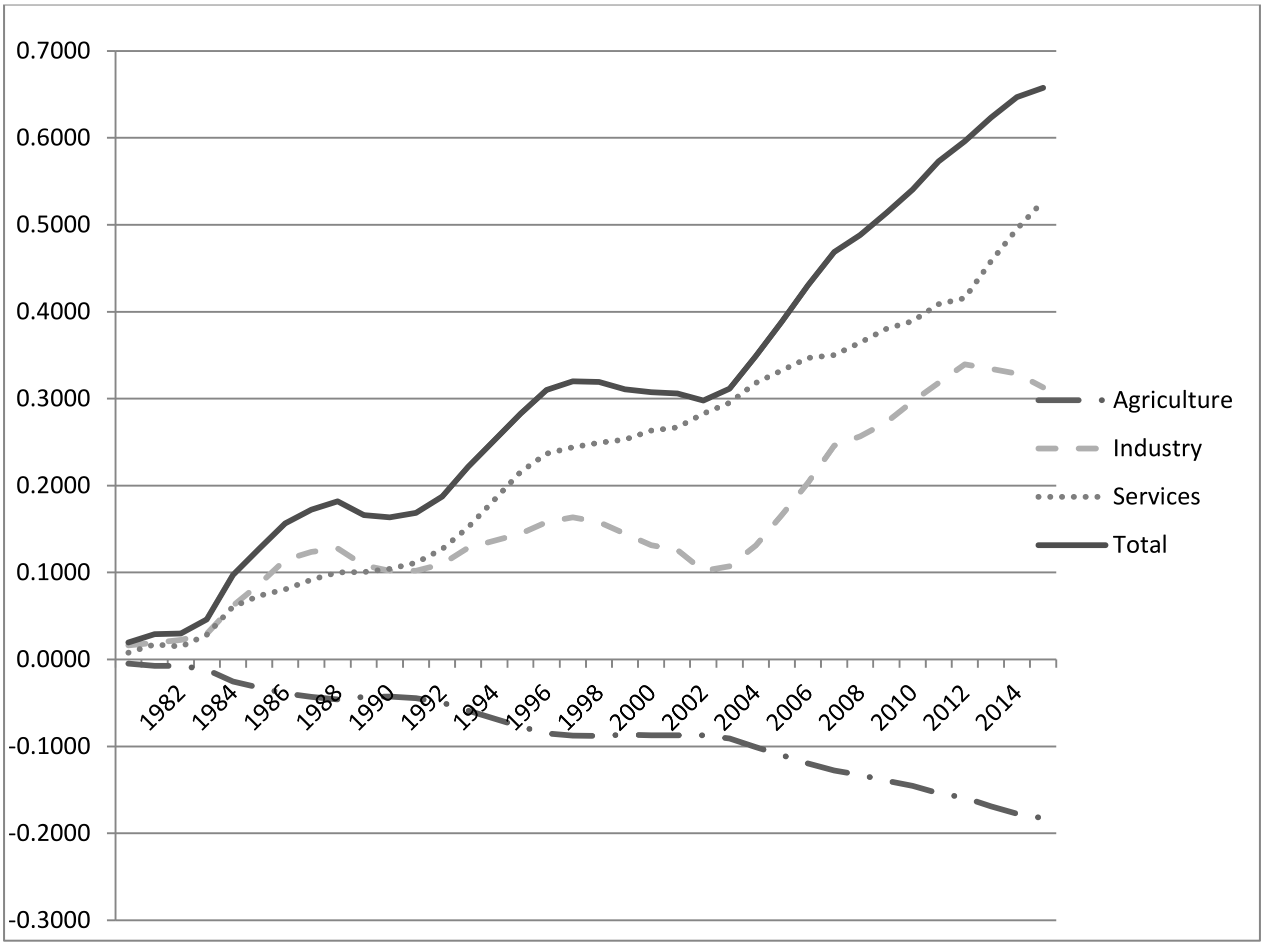
Decomposition of cumulative productivity growth
(output per worker) in China 1980-2015



Source: National Bureau of Statistics of China and Author's calculations.

Figure 6

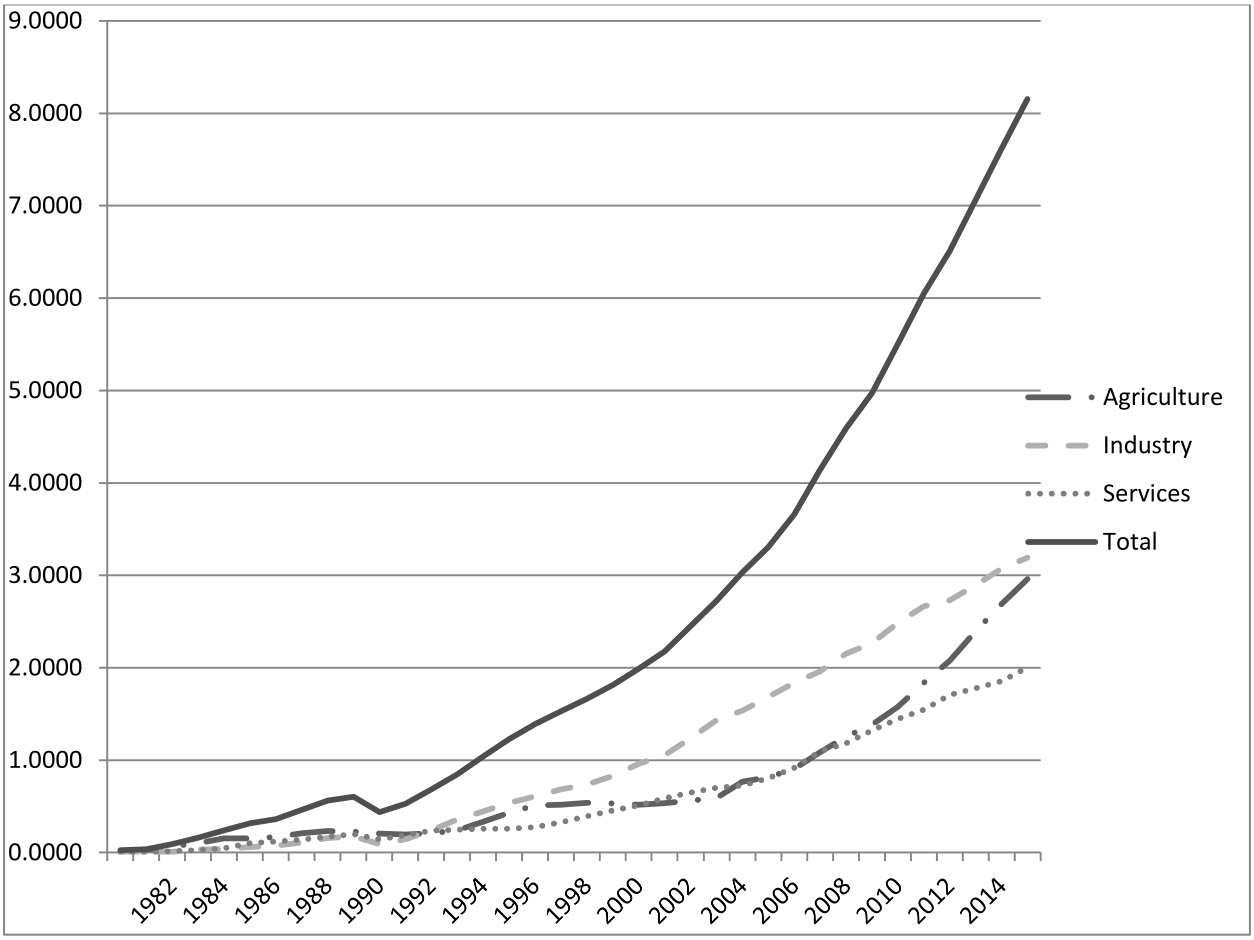
Cumulative dynamic structural reallocation effect (SSRE)
on productivity growth (output per worker) by sector in China 1980-2015



Source: National Bureau of Statistics of China and Author's calculations.

Figure 7

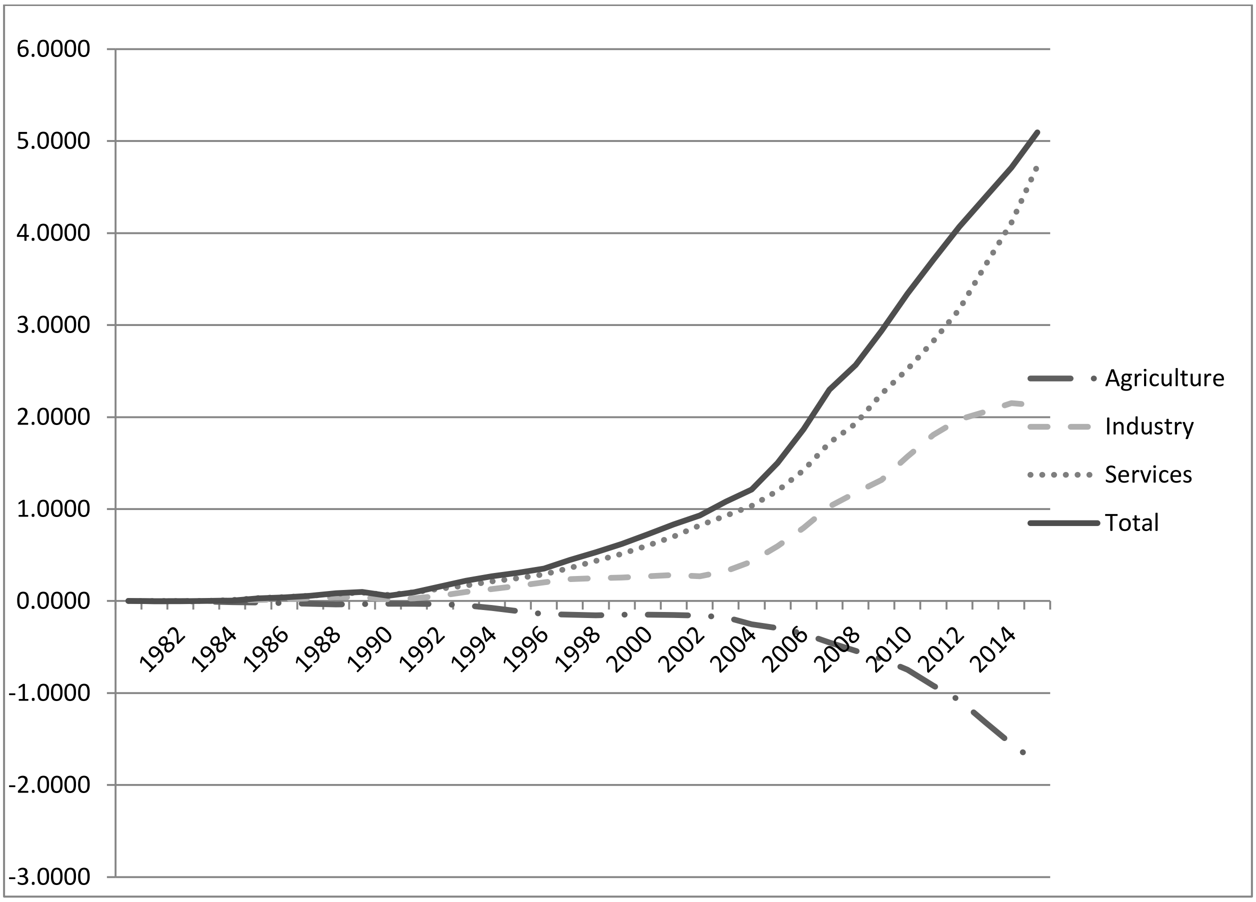
Cumulative within-sector productivity growth effect (WSPGE)
on productivity growth (output per worker) by sector in China 1980-2015



Source: National Bureau of Statistics of China and Author's calculations.

Figure 8

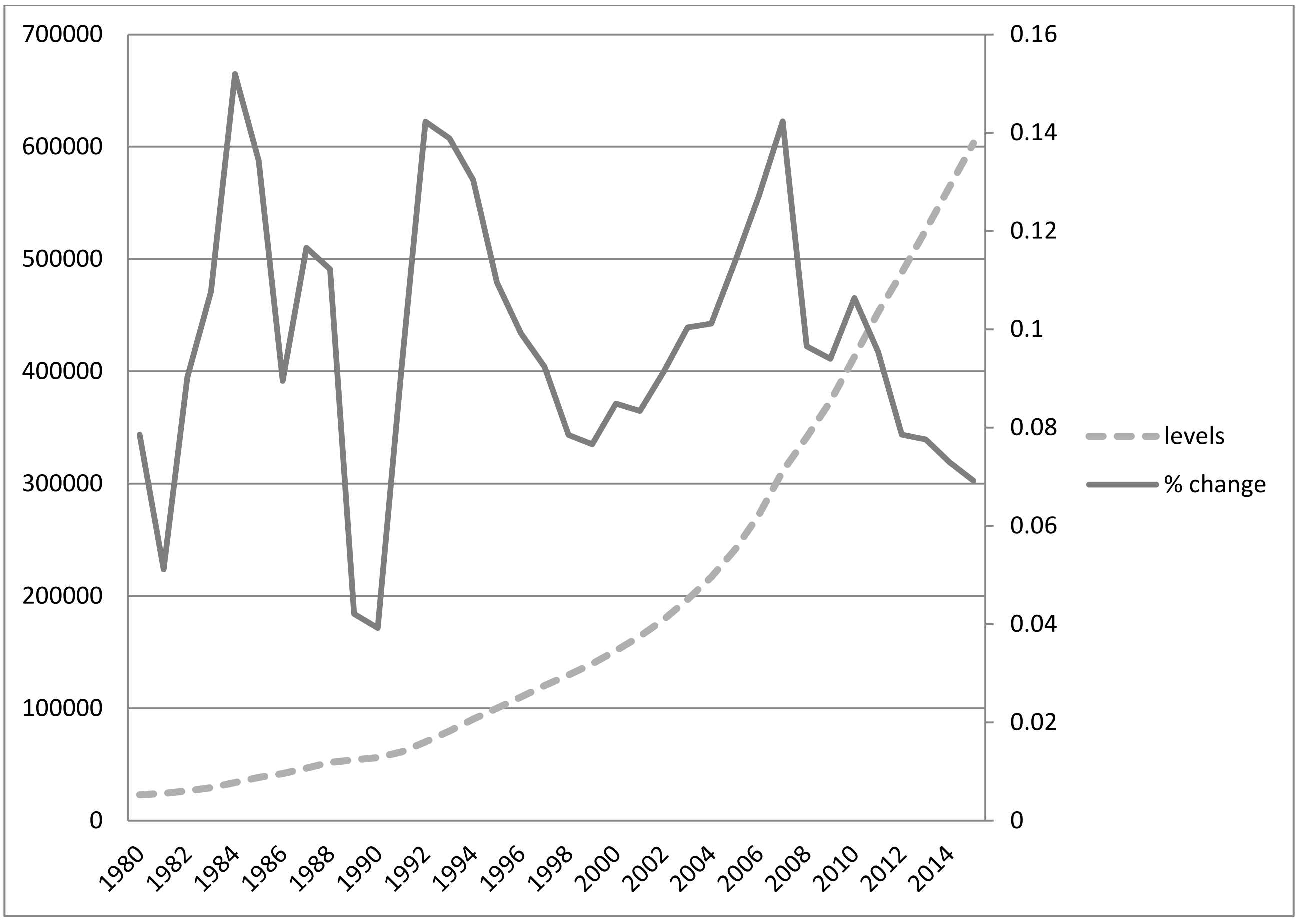
Cumulative static structural reallocation effect (DSRE)
on productivity growth (output per worker) by sector in China 1980-2015



Source: National Bureau of Statistics of China and Author's calculations.

Figure 9

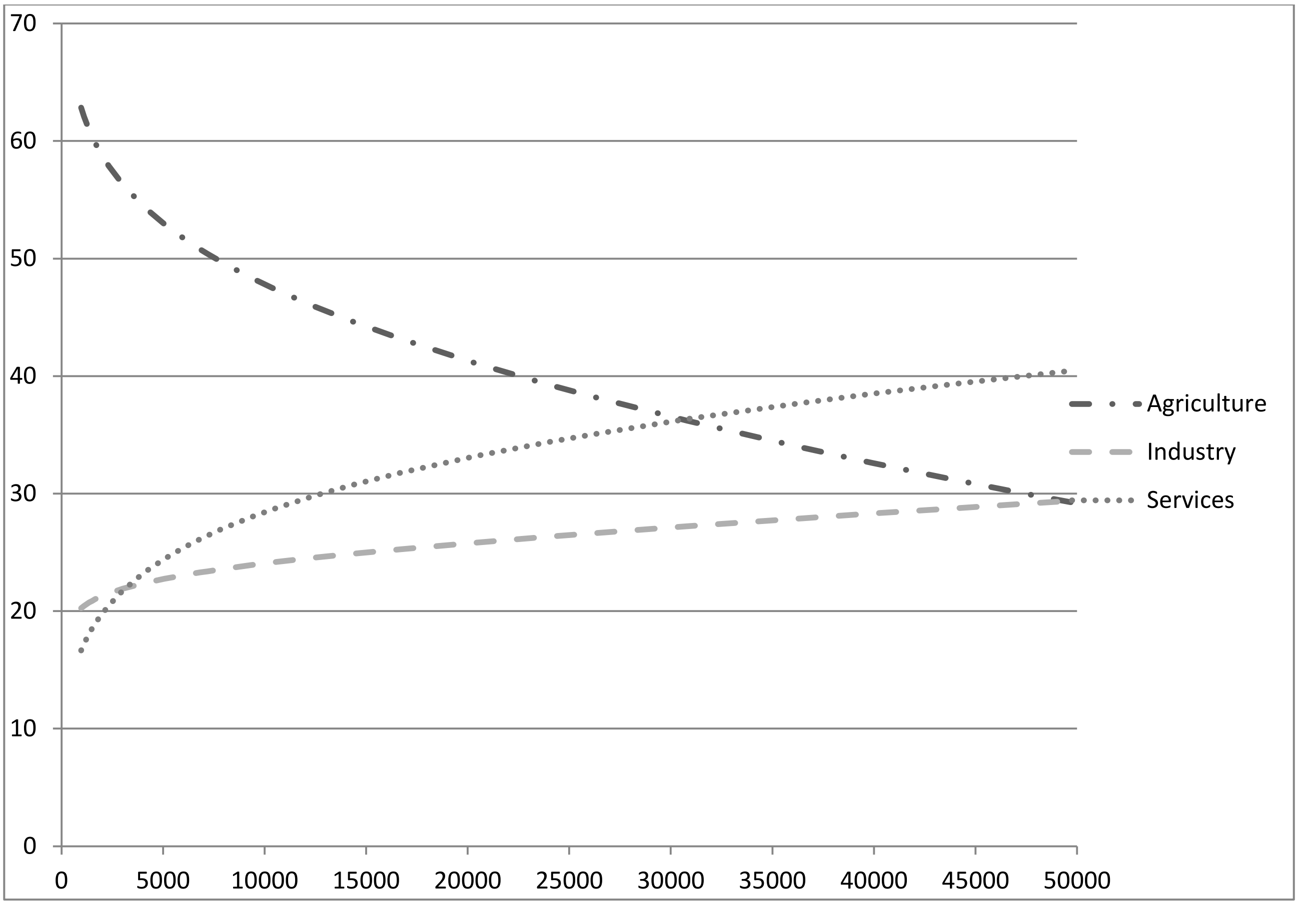
Real GDP levels (left scale) and yearly percentage changes (right scale) in China 1980-2015



Source: National Bureau of Statistics of China and Author's calculations. Left scale=100 million yuan

Figure 10

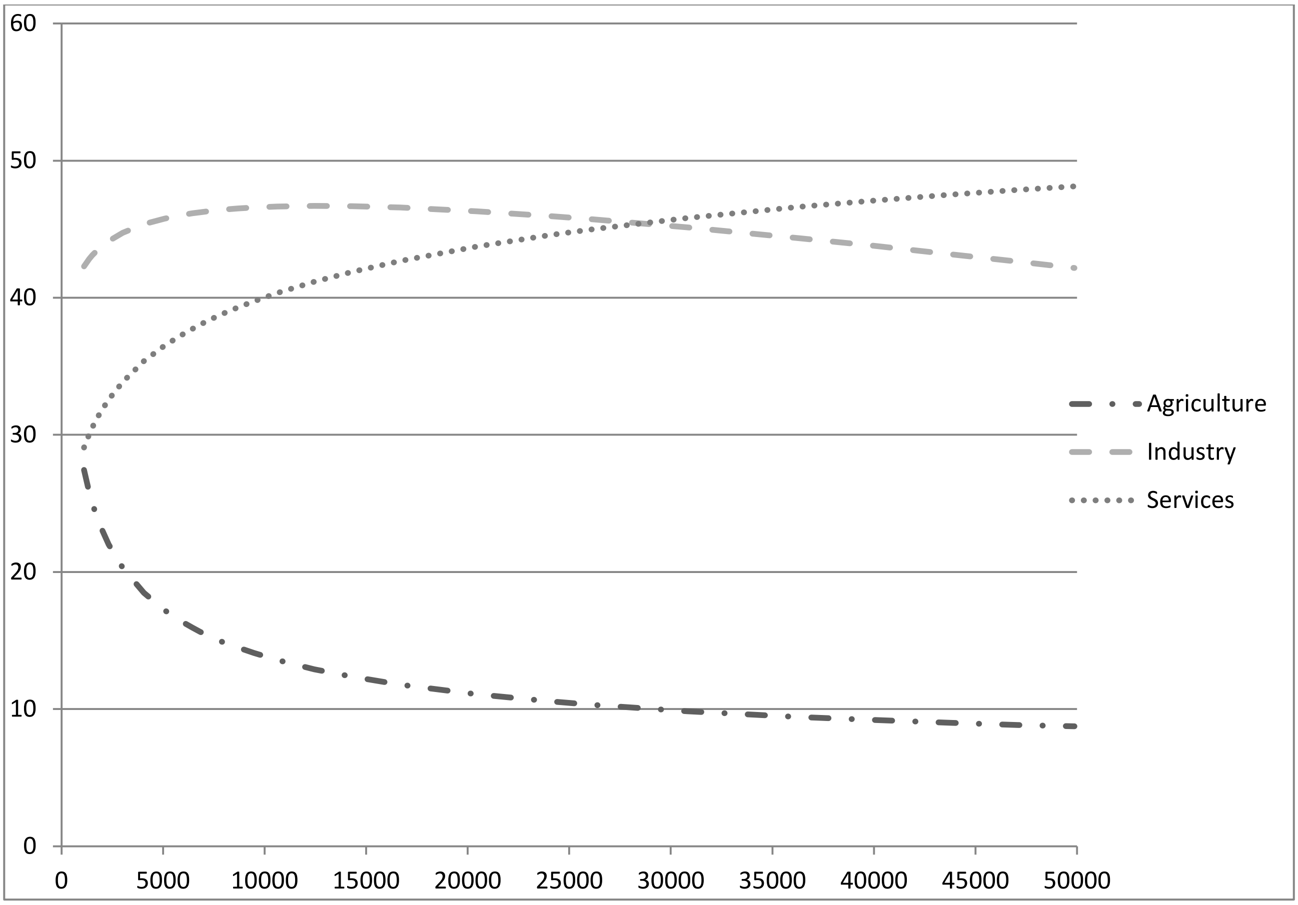
Per capita income (nominal yuan per head) and sectoral shares of employment in China



Source: National Bureau of Statistics of China and Author's calculations.

Figure 11

Per capita income (nominal yuan per head) and sectoral shares of aggregate output in China



Source: National Bureau of Statistics of China and Author’s calculations.

Table 1a

China's real GDP growth decomposition in supply side components

Year	Y	Y/L	L/F	F/P	P
1980	7,9	4,5	0,1	1,9	1,2
1981	5,1	1,8	0,3	1,5	1,4
1982	9,0	5,2	0,2	1,8	1,6
1983	10,8	8,0	0,3	0,9	1,3
1984	15,2	11,0	0,1	2,4	1,3
1985	13,4	9,6	0,0	2,0	1,4
1986	8,9	6,0	0,0	1,3	1,6
1987	11,7	8,5	0,0	1,2	1,7
1988	11,2	8,0	0,0	1,4	1,6
1989	4,2	2,3	-0,1	0,5	1,5
1990	3,9	-11,2	-0,2	5,6	1,4
1991	9,3	8,0	0,0	-0,1	1,3
1992	14,2	13,1	0,0	-0,1	1,2
1993	13,9	12,8	0,0	-0,1	1,1
1994	13,0	12,0	0,0	-0,1	1,1
1995	11,0	10,0	-0,2	0,0	1,1
1996	9,9	8,5	0,0	0,3	1,0
1997	9,2	7,9	-0,2	0,5	1,0
1998	7,8	6,6	-0,6	0,9	0,9
1999	7,7	6,5	0,1	0,2	0,8

(Cont'd) – China's real GDP growth decomposition in supply side components

Year	Y	Y/L	L/F	F/P	P
2000	8,5	7,5	-0,7	0,9	0,8
2001	8,3	7,3	1,1	-0,8	0,7
2002	9,1	8,4	-0,2	0,2	0,6
2003	10,0	9,4	0,1	0,0	0,6
2004	10,1	9,3	0,2	-0,1	0,6
2005	11,4	10,8	-0,6	0,5	0,6
2006	12,7	12,2	0,2	-0,3	0,5
2007	14,2	13,7	0,2	-0,2	0,5
2008	9,7	9,3	-0,3	0,2	0,5
2009	9,4	9,0	-0,3	0,1	0,5
2010	10,6	10,2	-0,8	0,6	0,5
2011	9,5	9,1	0,2	-0,2	0,5
2012	7,9	7,5	0,0	-0,1	0,5
2013	7,8	7,4	-0,2	0,0	0,5
2014	7,3	6,9	-0,1	0,0	0,5
2015	6,9	6,6	-0,2	0,0	0,5

Source: National Bureau of Statistics of China and Author's calculations.

Table 1b

China's real GDP growth (constant 2010 prices) and sectoral contributions

Year	Total	Agriculture	Industry	Services
1980	7,9	1,3	4,9	1,7
1981	5,1	3,3	0,3	1,6
1982	9,0	4,4	2,7	1,9
1983	10,8	3,3	4,4	3,1
1984	15,2	3,8	5,2	6,2
1985	13,4	0,1	5,5	7,8
1986	8,9	1,1	4,7	3,2
1987	11,7	2,8	4,9	4,1
1988	11,2	1,7	5,1	4,4
1989	4,2	0,4	0,8	3,0
1990	3,9	3,0	0,1	0,8
1991	9,3	-0,3	4,3	5,3
1992	14,2	0,3	7,8	6,1
1993	13,9	0,7	9,5	3,8
1994	13,0	2,7	6,0	4,3
1995	11,0	2,3	5,7	3,0
1996	9,9	1,6	5,0	3,2
1997	9,2	0,2	4,3	4,7
1998	7,8	0,6	2,3	4,9
1999	7,7	0,1	3,0	4,5

(Cont'd) – China's real GDP growth (constant 2010 prices) and sectoral contributions

2000	8,5	-0,1	4,0	4,6
2001	8,3	0,5	3,0	4,9
2002	9,1	0,5	3,7	4,9
2003	10,0	0,3	5,8	4,0
2004	10,1	1,9	4,9	3,3
2005	11,4	0,1	6,5	4,9
2006	12,7	0,3	6,6	5,8
2007	14,2	1,1	6,0	7,1
2008	9,7	1,0	4,6	4,1
2009	9,4	0,5	3,3	5,7
2010	10,6	0,8	5,4	4,4
2011	9,5	0,8	4,4	4,3
2012	7,9	0,7	2,4	4,7
2013	7,8	0,6	2,1	5,0
2014	7,3	0,4	2,2	4,6
2015	6,9	0,4	0,7	5,8

Source: National Bureau of Statistics of China and Author's calculations.

Table 1c

China's aggregate and sectoral output per worker (yuan at constant 2010 prices)

Year	Total	Agriculture	Industry	Services
1980	5457	2352	14414	9321
1981	5557	2555	13957	9282
1982	5848	2814	14162	9827
1983	6319	3068	14953	10306
1984	7013	3453	15131	11149
1985	7687	3440	15770	13462
1986	8145	3560	16205	14149
1987	8836	3877	17230	15071
1988	9547	4059	18580	16312
1989	9769	4004	19181	17553
1990	8676	3837	16635	15185
1991	9372	3773	18169	17096
1992	10598	3864	21057	19031
1993	11951	4091	24637	19457
1994	13379	4798	27209	19988
1995	14712	5523	29904	19963
1996	15964	6109	32000	20611
1997	17221	6176	34225	22834
1998	18357	6325	35776	25468
1999	19554	6270	38565	28041
2000	21011	6167	42524	30399

(cont'd) –China's aggregate and sectoral output per worker (yuan at constant 2010 prices)

Year	Total	Agriculture	Industry	Services
2001	22540	6304	45276	33543
2002	24437	6501	50759	36097
2003	26723	6721	56445	38330
2004	29217	8046	59605	39320
2005	32379	8414	63974	42624
2006	36337	9063	68578	47188
2007	41319	10414	72248	54653
2008	45161	11690	77924	58242
2009	49234	12646	81260	64004
2010	54271	14093	87735	69132
2011	59203	16050	93120	73241
2012	63618	17835	95058	79843
2013	68311	20222	99875	82854
2014	73032	22429	105279	86052
2015	77883	24437	108791	92198

Source: National Bureau of Statistics of China and Author's calculations.

Table 2

Decomposition of China's productivity growth (output per worker) in selected periods

1980-2015

	SSRE	WSPGE	DSRE	**Total**
Agriculture	-0.1825	2.9577	-1.7584	1.0167
Industry	0.3128	3.1922	2.1268	5.6318
Services	0.5272	2.0036	4.7284	7.2592
Total	0.6575	8.1535	5.0967	13.9078

1980-1990

	SSRE	WSPGE	DSRE	**Total**
Agriculture	-0.0429	0.2279	-0.0318	0.1532
Industry	0.1084	0.1761	0.0407	0.3251
Services	0.1007	0.2006	0.0904	0.3917
Total	0.1662	0.6045	0.0992	0.8700

1990-2000

	SSRE	WSPGE	DSRE	**Total**
Agriculture	-0.0408	0.1393	-0.0231	0.0754
Industry	0.0266	0.4294	0.0269	0.4830
Services	0.1544	0.1965	0.0923	0.4432
Total	0.1402	0.7653	0.0961	1.0016

(cont'd) - Decomposition of China's productivity growth (output per worker) in selected periods

2000-2010

	SSRE	WSPGE	DSRE	**Total**
Agriculture	-0.0385	0.1633	-0.0391	0.0857
Industry	0.0947	0.5022	0.1048	0.7016
Services	0.1032	0.4947	0.1324	0.7304
Total	0.1594	1.1603	0.1981	1.5178

2010-2016

	SSRE	WSPGE	DSRE	**Total**
Agriculture	-0.0252	0.0912	-0.0235	0.0426
Industry	0.0248	0.1555	0.0084	0.1886
Services	0.1079	0.1953	0.0475	0.3507
Total	0.1075	0.4420	0.0324	0.5819

Source: National Bureau of Statistics of China and Author's calculations.

Table 3.1

OLS estimation of $Ln\left(\frac{\alpha_i}{100-\alpha_i}\right) = a + bY_i + c\ln Y_i$ where α_i is the share of workers in agriculture

```
Model CHENERY :
The number of behavioral equations to be estimated in block ONE is 1.
The total number of coefficients is 3.

 Behavioral Equation DIP1  ( Block ONE )
 Estimation Technique :
     Ordinary Least Squares
     Autoregression of Order 2 (Cochrane-Orcutt procedure)


    DIP1    =    .0244
                ( .6563 )

              -  .1119      * Y
                (-6.0904 )

              -  .2191      * LY
                (-10.9327 )

 Final Values of Autoregressive Parameters

    RHO    STD ERROR  T-STATISTIC
  1.2694   .1483        8.5589
 -.55154   .1366       -4.0362

     R-Squared                      :  .9978
     Adjusted R-Squared             :  .9975
     Durbin-Watson Statistic        :  2.0951
     Sum of squares of residuals    :  .0164
     Standard Error of Regression   :  .0234
     Log of the Likelihood Function :  84.5219
     F-statistic (  4 , 30 )        :  3454.6722
     F-probability                  :  .0000
     Mean of Dependent Variable     :  .0070
     Number of Observations         :  35
     Number of Degrees of Freedom   :  30
     Current Sample                 : 1981 1 2015 1
```

Table 3.2

OLS estimation of $Ln\left(\frac{\alpha_i}{100-\alpha_i}\right)=a+bY_i+c\ln Y_i$ where α_i is the share of workers in industry

```
Model CHENERY :
The number of behavioral equations to be estimated in block ONE is 1.

The total number of coefficients is 3.

 Behavioral Equation DIP2  ( Block ONE )
 Estimation Technique :
     Ordinary Least Squares
     Autoregression of Order 2 (Cochrane-Orcutt procedure)


    DIP2    = -  1.1860
                (-19.5701 )

              +  .0363      * Y
                ( 1.2354 )

              +  .0804      * LY
                ( 2.4377 )

 Final Values of Autoregressive Parameters

    RHO    STD ERROR  T-STATISTIC
  1.5057   .1350        11.1517
 -.67927   .1309       -5.18767

     R-Squared                      :  .9860
     Adjusted R-Squared             :  .9841
     Durbin-Watson Statistic        :  2.1608
     Sum of squares of residuals    :  .0167
     Standard Error of Regression   :  .0236
     Log of the Likelihood Function :  84.1737
     F-statistic (  4 , 30 )        :  527.5609
     F-probability                  :  .0000
     Mean of Dependent Variable     : -1.1782
     Number of Observations         :  35
     Number of Degrees of Freedom   :  30
     Current Sample                 : 1981 1 2015 1
```

Table 3.3

OLS estimation of $Ln\left(\frac{\alpha_i}{100-\alpha_i}\right) = a + bY_i + c\ln Y_i$ where α_i is the share of workers in services

```
Model CHENERY :
The number of behavioral equations to be estimated in block ONE is 1.
The total number of coefficients is 3.

 Behavioral Equation DIP3  ( Block ONE )
 Estimation Technique :
     Ordinary Least Squares
     Autoregression of Order 2 (Cochrane-Orcutt procedure)


    DIP3    = -  .9431
                (-24.2044 )

              +  .0194      * Y
                ( 1.0111 )

              +  .2864      * LY
                ( 13.5661 )

  Final Values of Autoregressive Parameters

    RHO    STD ERROR  T-STATISTIC
  1.1516   .1724        6.6805
 -.46806   .1649       -2.8389

     R-Squared                        :  .9965
     Adjusted R-Squared               :  .9960
     Durbin-Watson Statistic          :  2.0871
     Sum of squares of residuals      :  .0230
     Standard Error of Regression     :  .0277
     Log of the Likelihood Function :  78.5552
     F-statistic (  4 , 30 )          :  2132.3408
     F-probability                    :  .0000
     Mean of Dependent Variable       : -1.0864
     Number of Observations           :  35
     Number of Degrees of Freedom     :  30
     Current Sample                   : 1981 1 2015 1
```

Table 4.1

OLS estimation of $Ln\left(\frac{\alpha_i}{100-\alpha_i}\right) = a + bY_i + c\ln Y_i$ where α_i is the share of output in agriculture

```
Model CHENERY :

The number of behavioral equations to be estimated in block ONE is 1.
The total number of coefficients is 3.

 Behavioral Equation DIP1  ( Block ONE )
 Estimation Technique :
     Ordinary Least Squares
     Autoregression of Order 2 (Cochrane-Orcutt procedure)


    DIP1    = -  1.8613
                (-30.4289 )

             +  .0326      * Y
                ( 1.0812 )

             -  .4032      * LY
                (-12.0495 )

   Final Values of Autoregressive Parameters

    RHO    STD ERROR  T-STATISTIC
  .9082    .1665        5.4537
 -.2948    .1525       -1.9325

     R-Squared                        :  .9912
     Adjusted R-Squared               :  .9900
     Durbin-Watson Statistic          :  1.9364
     Sum of squares of residuals      :  .0874
     Standard Error of Regression     :  .0540
     Log of the Likelihood Function   :  55.2037
     F-statistic (  4 , 30 )          :  841.4319
     F-probability                    :  .0000
     Mean of Dependent Variable       : -1.5953
     Number of Observations           :  35
     Number of Degrees of Freedom     :  30
     Current Sample                   : 1981 1 2015 1
```

Table 4.2

OLS estimation of $Ln\left(\frac{\alpha_i}{100-\alpha_i}\right)=a+bY_i+c\ln Y_i$ where α_i is the share of output in industry

```
Model CHENERY :
The number of behavioral equations to be estimated in block ONE is 1.
The total number of coefficients is 3.

 Behavioral Equation DIP2  ( Block ONE )
 Estimation Technique :
     Ordinary Least Squares
     Autoregression of Order 2 (Cochrane-Orcutt procedure)


    DIP2    = -  .0424
                (-.8125 )

             -  .0927      * Y
                (-3.7134 )

             +  .1178      * LY
                ( 3.8879 )

  Final Values of Autoregressive Parameters

    RHO    STD ERROR  T-STATISTIC
  .9600    .1630       5.8890
 -.2306    .1434      -1.6089

     R-Squared                        :  .8172
     Adjusted R-Squared               :  .7928
     Durbin-Watson Statistic          :  1.8455
     Sum of squares of residuals      :  .0351
     Standard Error of Regression     :  .0342
     Log of the Likelihood Function   :  71.1896
     F-statistic (  4 , 30 )          :  33.5263
     F-probability                    :  .0000
     Mean of Dependent Variable       : -.2066
     Number of Observations           :  35
     Number of Degrees of Freedom     :  30
     Current Sample                   : 1981 1 2015 1
```

Table 4.3

OLS estimation of $Ln\left(\frac{\alpha_i}{100-\alpha_i}\right) = a + bY_i + c\ln Y_i$ where α_i is the share of output in services

```
Model CHENERY :
The number of behavioral equations to be estimated in block ONE is 1.
The total number of coefficients is 3.

 Behavioral Equation DIP3  ( Block ONE )
 Estimation Technique :
     Ordinary Least Squares
     Autoregression of Order 2 (Cochrane-Orcutt procedure)



    DIP3    = -  .3962
                (-5.2662 )

              -  .0083      * Y
                (-.2244 )

              +  .2256      * LY
                ( 5.5226 )


  Final Values of Autoregressive Parameters

    RHO    STD ERROR  T-STATISTIC
  1.2646   .1585        7.9808
 -.53326   .1538       -3.4669

     R-Squared                        :  .9831
     Adjusted R-Squared               :  .9808
     Durbin-Watson Statistic          :  2.1192
     Sum of squares of residuals      :  .0616
     Standard Error of Regression     :  .0453
     Log of the Likelihood Function   :  61.3217
     F-statistic (  4 , 30 )          :  435.4876
     F-probability                    :  .0000
     Mean of Dependent Variable       : -.5469
     Number of Observations           :  35
     Number of Degrees of Freedom     :  30
     Current Sample                   : 1981 1 2015 1
```

YEAR	DYR	DY	DEMPL	DPART	DPOP
1980.0	7.9	4.5	.1	1.9	1.2
1981.0	5.1	1.8	.3	1.5	1.4
1982.0	9.0	5.2	.2	1.8	1.6
1983.0	10.8	8.0	.3	.9	1.3
1984.0	15.2	11.0	.1	2.4	1.3
1985.0	13.4	9.6	.0	2.0	1.4
1986.0	8.9	6.0	.0	1.3	1.6
1987.0	11.7	8.5	.0	1.2	1.7
1988.0	11.2	8.0	.0	1.4	1.6
1989.0	4.2	2.3	-.1	.5	1.5
1990.0	3.9	-11.2	-.2	15.6	1.4
1991.0	9.3	8.0	.0	-.1	1.3
1992.0	14.2	13.1	.0	-.1	1.2
1993.0	13.9	12.8	.0	-.1	1.1
1994.0	13.0	12.0	.0	-.1	1.1
1995.0	11.0	10.0	-.2	.0	1.1
1996.0	9.9	8.5	.0	.3	1.0
1997.0	9.2	7.9	-.2	.5	1.0
1998.0	7.8	6.6	-.6	.9	.9
1999.0	7.7	6.5	.1	.2	.8
2000.0	8.5	7.5	-.7	.9	.8
2001.0	8.3	7.3	1.1	-.8	.7
2002.0	9.1	8.4	-.2	.2	.6
2003.0	10.0	9.4	.1	.0	.6
2004.0	10.1	9.3	.2	-.1	.6
2005.0	11.4	10.8	-.6	.5	.6
2006.0	12.7	12.2	.2	-.3	.5
2007.0	14.2	13.7	.2	-.2	.5
2008.0	9.7	9.3	-.3	.2	.5
2009.0	9.4	9.0	-.3	.1	.5
2010.0	10.6	10.2	-.8	.6	.5
2011.0	9.5	9.1	.2	-.2	.5
2012.0	7.9	7.5	.0	-.1	.5
2013.0	7.8	7.4	-.2	.0	.5
2014.0	7.3	6.9	-.1	.0	.5
2015.0	6.9	6.6	-.2	.0	.5