

Structural transformation in CHINDIA: A comparison of the emerging giants

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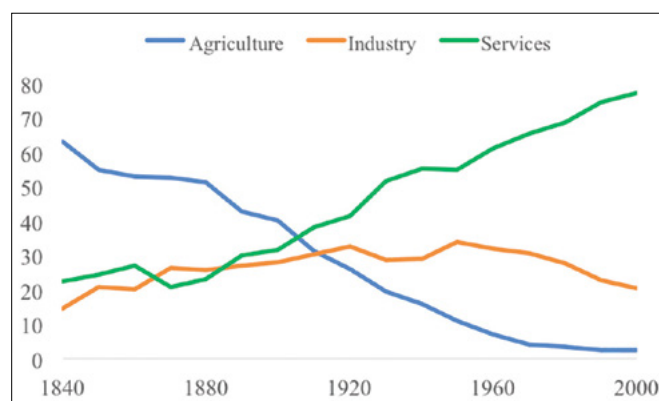
Source: iforexblog.com/news-item/future-global-economy-china-vs-india

Since the pioneering early contributions of Fisher (1935)¹, Clark (1940), Chenery (1960) and Kuznets (1966), economists have agreed that sustained economic growth and a permanently higher level of income per capita is strongly associated in the data with a structural transformation.

In this transformation, changes in the sectoral composition of production are observed. For example, the share of agriculture in a country's labour force and total output declines as income per capita increases. In other words, a substantial shift occurs in the composition of output and employment away from agriculture towards non-agricultural activities (e.g. manufacturing). This is one of the well-known stylised facts of economic development and can be visualised using the historical data from the United States (US).

Figure 1 displays the employment share of agriculture, industry (manufacturing, construction, and mining) and services for the US during 1840-2000.² This figure documents a long-run decline in the employment share of agriculture, increase in the employment share of services, and the inverted U-shaped pattern in the employment share of industry during the last two centuries.

Figure 1: Sectoral employment shares in the US (%), 1840-2000



Source: Herrendorf et al (2014).

Though there is a lot of data and many quantitative studies into the process of structural transformation in today's advanced economies, it's also important to know more about structural transformation in today's less developed (or developing) economies. To what extent are they following different paths from today's developed economies? And if so, what are the factors that give rise to these differences? China and India constitute perfect cases to study such questions, as they jointly account for more than one-third of the global population.

1. Allan George Barnard Fisher (1895-1976) was born in New Zealand. He completed a doctorate at the London School of Economics in 1924 and held a professorial post at the University of Otago from 1925 to 1935. Endres (1988) discusses Fisher's contribution to economic thought in New Zealand.
2. Data are available at: sites.google.com/site/valentiniyakos/Home/papers/handbook.

EMERGING GIANTS: A TOUR D'HORIZON

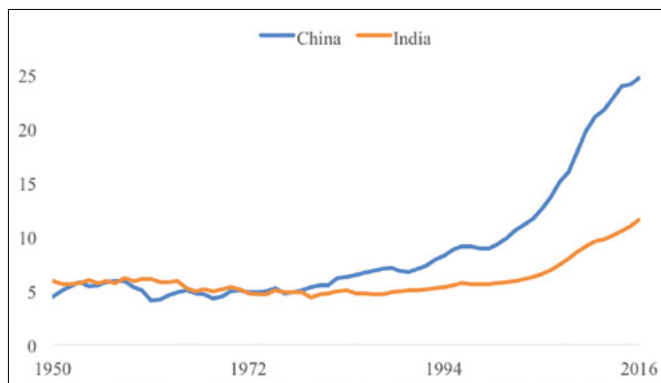
The US economy is the largest in the world. As of 2016, US gross domestic product (GDP) was \$18.6 trillion (measured in current US\$ prices), almost a quarter of the global economy. China, the world's most populous country, had a \$11.2 trillion GDP in 2016, making it the second largest economy in the world. India, the world's second most populous country, has a \$2.3 trillion economy in 2016, which makes India the world's seventh largest economy – behind the US, China, Japan, Germany, United Kingdom, and France.³

Figure 2, using PPP-adjusted⁴ per capita GDP as a proxy for economic development, illustrates the speed at which China and India are catching up with the US. China today refers to the People's Republic of China, the state that was established in 1949 after the victory of the Chinese Communist Party under the leadership of Chairman Mao Zedong.⁵ Beginning in the early 1950s, economic planning was introduced in China, which was modelled mimicking the system of the Soviet Union.

CHINA

In 1950, per capita GDP in China was less than 5% of the US level. This ratio stayed the same until 1978. China's economic reform towards a market-oriented economy began in 1978 and has been recognised as essentially successful.⁶ Per capita income in China grew at an annual average rate of 2.6% during 1950-1977, but then at 6.2% during 1978-2016, which is 4.3 percentage points higher than that of the US economy. In 2016, GDP per capita in China reached 25% of the US level.

Figure 2: GDP per capita in China and India, relative to the US (%)



Source: The Conference Board Total Economy Database, November 2017.

INDIA

On June 15, 1947, the British House of Commons passed the Indian Independence Act, which divided India into two dominions, India and Pakistan. On August 15, 1947, Jawaharlal Nehru addressed the nation with a new Declaration of Independence of India.⁷ In 1950, per capita GDP in India was around only 6% of the US level.

India embarked on an 'autarkic'⁸ path of development with import-substitution policies. Such policies did not bring prosperity to India and relative per capita income was only 5% in 1990. Even as late as 1990, India had one of the most closed economies in the world (Joshi, 2017, p. 247).

A programme of reform was launched in July 1991 to re-integrate India into the global economy and reap the economic benefits thereof. Per capita income in India grew at an annual average rate of 1.9% during 1950-1990, but then at a rate of 5.2% during 1991-2016, which is 3.4 percentage points higher than that of the US economy.⁹ In 2016, GDP per capita in India was 11.5% of the US level.

The World Bank presents a classification system where countries are annually ranked by their level of gross national income (GNI) per capita.¹⁰ According to this measure, China was classified as a low-income economy in 1990, a lower-middle income country in 2000 and became an upper-middle income country in 2010. India, on the other hand, was categorised as a low-income country until 2007. Starting in 2007, India has been considered a lower-middle income country.

STRUCTURAL TRANSFORMATION

Let's now turn to measuring structural transformation. The two most common measures of economic activity at the sector level are employment shares and value-added shares. Employment shares are calculated by using workers by sector, and value-added shares are typically expressed in current prices.

The Groningen Growth and Development Centre (GGDC) 10-Sector Database¹¹ provides long-run internationally comparable data on sectoral productivity performance in Africa, Asia and Latin America. The database includes annual time-series of value-added and persons employed for ten broad sectors of the economy (Timmer et al, 2015).¹² The research reported here is based on constructing separate accounts for these three major economic sectors: (i) agriculture, (ii) industry (mining, manufacturing, utilities, and construction), and (iii) services (wholesale, transport, finance, personal, and government services).

Figure 3 depicts the evolution of sectoral employment and value-added shares in China and India during 1980-2010. Panel (a) shows that from 1980 to 2010 the employment share in China's agriculture fell from about 69% to less than 37%, whereas the share of services increased from 13% to about 35%. Industrial employment share also increased from 18% to about 29%.¹³

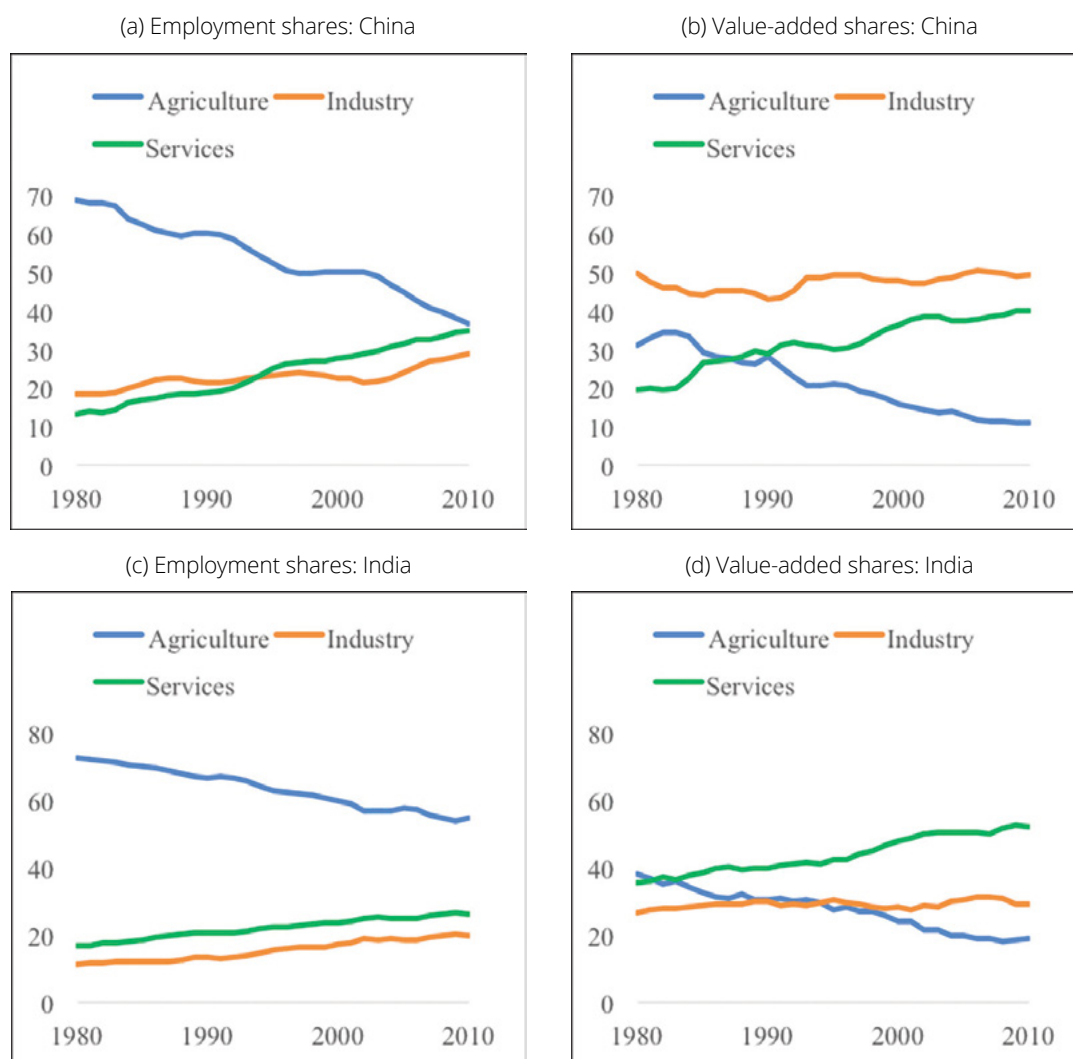
Panel (b) plots the value-added shares of China between 1980 and 2010. In 1980, agriculture captured 31% of the Chinese value-added, whereas in 2010 it had the lowest contribution to Chinese total value-added, with 10.7%. The value-added share of the service sector increased from about 20% in 1980 to about 40% in 2010. Industry has been accounting for roughly half of the total value-added of China during the sample period.

3. Data are from the World Development Indicators (World Bank, 2017).
4. PPP (purchasing power parity) is the most widely used adjustment in measuring living standards, because it takes into account the actual cost of living. I use the variable "GDP per capita in 2016 US\$ (converted to 2016 price level with updated 2011 PPPs)", which reflects the rapid declines in the prices of information and communication technology goods, from the November 2017 version of the Conference Board Total Economy Database.
5. Mitter (2008) provides a brief, yet comprehensive, introduction to modern China.
6. See Üngör (2016) for a brief review of China's economic development since 1978.
7. theguardian.com/theguardian/2007/may/01/greatspeeches
8. Autarky means to be self-sufficient.
9. From 2003 to 2011, the rate was nearly 7% a year.
10. siteresources.worldbank.org/DATASTATISTICS/Resources/OGHIST.xls
11. rug.nl/ggdc/productivity/10-sector
12. (1) agriculture, hunting, forestry and fishing, (2) mining and quarrying, (3) manufacturing, (4) utilities (electricity, gas and water supply), (5) construction, (6) wholesale and retail trade, hotels and restaurants, (7) transport, storage and communication, (8) finance, insurance, real estate and business services, (9) community, social and personal services, and (10) government services.
13. Dekle and Vandenbroucke (2012) develop a model to quantitatively assess the driving forces of China's structural transformation since 1978.

Panel (c) in Figure 3 shows that agriculture remains the dominant activity in terms of employment in India. In 2010, more than half of India's labour force was still in agriculture, though this proportion was down from 72% in 1980. From 1980 to 2010, the share of services increased from around 17% to almost 26%. Industrial employment share also increased from 11% to about 19.5%.

Panel (d) plots the value-added shares of India between 1980 and 2010. The value-added share of the service sector increased from about 36% in 1980 to 41% in 1991. Following the economic liberalisation in India, the service sector has gained prominence in the economy as it accounts for the largest share of value-added. The share of this sector in value-added has been growing very rapidly.¹⁴ The service sector has been accounting for more than half of the total value-added of Indian economy since 2002. In comparison, the industry share has remained stagnant, growing only from 26% in 1980 to 29% in 2010.

Figure 3: Sectoral composition of employment and value-added, 1980-2010 (%)



Source: The GGDC 10-Sector Database.

SECTORAL PRODUCTIVITY DIFFERENCES

Figure 4 presents the time paths of labour productivity (measured as value-added per worker) (1980=1) in China and India respectively during 1980-2010.¹⁵ Panel (a) shows that all three sectors experienced rapid labour productivity growth rates in China and the corresponding figures are 4.9%, 7.7% and 5.9% for agriculture, industry and services respectively. The relative performance of India has been weaker compared to that of China. The annualised growth rates in labour productivity between 1980 and 2010 are 2.1%, 2.6% and 4.0% for agriculture, industry and services respectively in India.

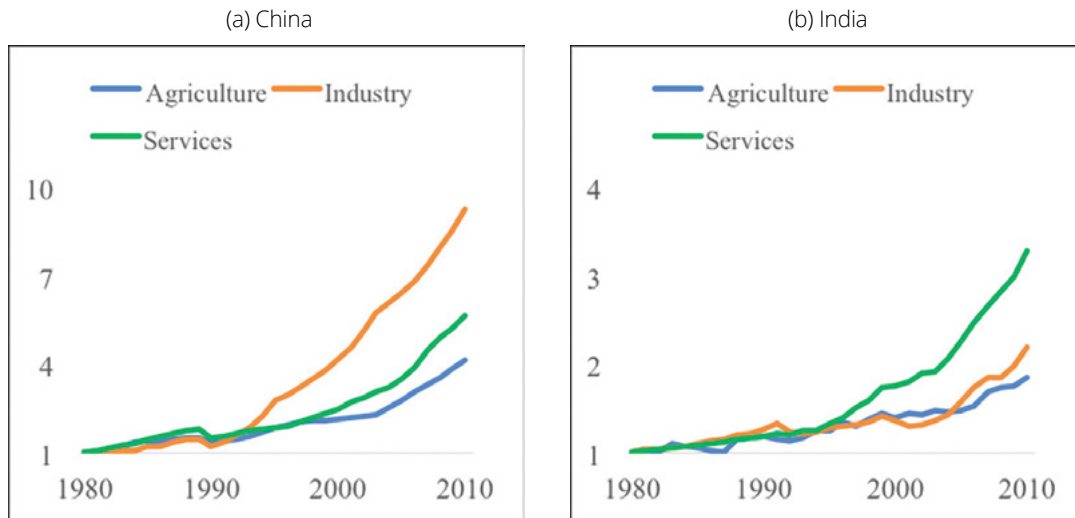
It is important to note there might be several reasons behind the differences in sectoral productivity growth rates within and across countries. Increases in labour productivity may arise from the application of changes in production technology, from higher levels of investment in the production process, changes in the organisation of production, or from higher levels of skill embodied in the labour force¹⁶, to name a few possibilities.

14. Verma (2012) provides a quantitative exploration of the factors responsible for generating the services-led growth witnessed in India during 1980-2005.

15. Constant prices in local currency were used when deriving the growth rates of labour productivity in each country. The levels are not directly comparable across countries because they do not reflect the PPP adjustments.

16. It is very important to note that that employment may not reflect changes in true labour input since there are systematic differences in hours worked or in human capital per worker across sectors (Herrendorf et al 2014). There is an active research agenda in these areas. For example, Herrendorf and Schoellman (forthcoming) document that agriculture has less educated workers for 13 countries ranging from relatively rich countries (such as Canada and the US) to relatively poor countries (such as India and Indonesia).

Figure 4: Labour productivity by sector, China vs. India (1980=1)



Source: The GGDC 10-Sector Database.

Agriculture in India had the lowest labour productivity growth rate during 1980-2010. This is important because agriculture dominates the structure of the Indian economy in terms of employment (see Panel (c) in Figure 3).

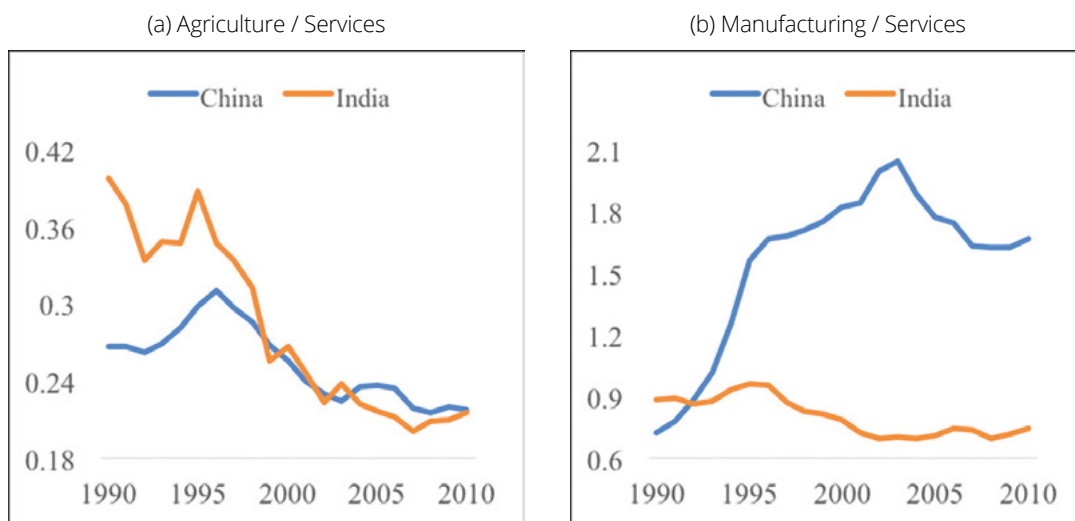
Another observation for India is that the service sector had the highest labour productivity growth rate during 1980-2010. This is in contrast to China, whose industrial sector has shown the highest growth rates. This requires an elaboration and Figure 5 provides a perspective for this observation, plotting the time paths of labour productivity levels in agriculture and in manufacturing relative to services in each country.

Panel (a) in Figure 5 reveals that both countries have shown similar patterns of levels of agricultural productivity relative to the levels of their labour productivity in services.

Panel (b), however, tells us a different story. In terms of levels, India's service sector has been more productive than its manufacturing sector. On the contrary, China's service sector has been less productive, in terms of levels, than its manufacturing sector since 1993. For example, China's manufacturing sector was two times more productive than its service sector in 2002.

This finding is in line with the fact that China has become a global manufacturing warehouse. China is the largest manufacturing economy in the world, with a 25.5% share of global manufacturing value-added in 2016. India is in sixth place with a 2.8% share – behind China, US, Japan, Germany, South Korea and France. Manufacturing value-added in China totalled \$3.08 trillion in 2016 compared with \$2.18 trillion for the US and \$0.34 trillion for India.¹⁷

Figure 5: Labour productivity levels, relative to services.



Source: The GGDC 10-Sector Database.

17. Data are from the United Nations' Main Aggregates Database. The variable "Value Added by Economic Activity, at current prices – US Dollars" was used (unstats.un.org/unsd/snaama/selbasicFast.asp).

WHAT DOES THE FUTURE HOLD FOR CHINDIA?

The rising importance of emerging market economies in global economic affairs has been one of the central topics of the research in international macroeconomics of the past three decades. This is mainly due to the emergence of China and India as major forces in the global economy. Accordingly, there is an ever-growing literature that studies the sources of economic development in these two countries, comparing and contrasting their experiences over the past 30-40 years.¹⁸

China and India have differences in their structural transformation experiences. Growth in China has been described as manufacturing-centred, whereas in India it is more service sector-led. Goel and Restrepo-Echavarría (2015) pose these questions for future research: (i) Why is India's structural transformation following such an unusual path? (ii) Is the cause a stagnant manufacturing sector or an exceptionally productive services sector? Such questions will keep researchers in the field of international economics busy in the coming years.

QUESTIONS TO THINK ABOUT

1. Can differences in sectoral productivity growth rates account for the differences in sectoral reallocation of labour in China and India?
2. What would have happened to GDP per capita in India (Figure 2) if India had exhibited the Chinese sectoral labour productivity growth rates?
3. What are the aggregate consequences of structural transformation for economic development?
4. Can India leap ahead to overtake both China and the US in the near future?

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18. See, among many others, Bosworth and Collins (2008), Hsieh and Klenow (2009) and Bardhan (2010) and the references therein.