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Original Research

Structural Transformation and Labour Productivity Growth in India and China: A Comparative Analysis, 1978–2004

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Abstract

India and China have experienced sustained economic growth since the introduction of economic reforms, although their patterns of structural transformation have differed considerably. This paper examines the contribution of structural transformation to labour productivity growth in India and China, focusing on changes in sectoral employment, value added, and the reallocation of labour between sectors. Using secondary data and estimates from existing studies, the paper adopts a comparative quantitative approach to examine the extent of structural change and its contribution to labour productivity growth. The analysis uses the Norm of Absolute Values (NAV) to measure changes in sectoral composition and a decomposition of labour productivity growth to distinguish improvements within sectors from those associated with the reallocation of labour. The findings show that China experienced a greater change in its employment structure during 1978–2004, while India recorded a slightly larger change in the composition of value added. During 1993–2004, resource reallocation contributed 1.2 percentage points to annual labour productivity growth in both countries, although its relative contribution was greater in India. China's faster productivity growth was associated mainly with stronger productivity improvements within sectors, particularly industry, whereas services contributed more to India's productivity growth than industry. The findings suggest that structural transformation contributed to productivity growth in both economies, but that its relative importance and the sources of productivity growth accompanying it differed. The paper therefore distinguishes the extent of structural change from its measured contribution to aggregate labour productivity growth.

Keywords: Structural Transformation; Labour Productivity Growth; Sectoral Reallocation; Norm of Absolute Values (NAV); India; China

1. Introduction

India and China have achieved remarkable rates of economic growth since the reforms. In China, the reforms of 1978—Reform and Opening-up (Gaige Kaifang)—transitioned the country towards a socialist market economy, while in India, economic growth accelerated following the New Economic Policy: Liberalization, Privatization, and Globalization reforms. Figure 1 compares GDP per capita in India and China from 1978 to 2004, measured in current US dollars. These figures provide a comparison

of nominal income levels but do not account for inflation or differences in purchasing power. Despite achieving sustained economic growth, the economies of the two countries have transformed along different paths. China's growth acceleration was closely associated with industrial expansion, whereas services accounted for a larger share of India's growth. The comparison is therefore not only about differences in growth rates, but also about how changes in sectoral output, employment, and productivity shaped growth in each country.

This paper examines how structural transformation contributed to labour productivity growth in India and China. It considers changes in the shares of agriculture, industry, and services in output and employment, and distinguishes productivity gains within sectors from those associated with the reallocation of labour. The paper adopts a comparative quantitative approach using secondary data, drawing primarily on the sectoral data and growth-accounting estimates reported by Ray and Chattopadhyay (2021) and Bosworth and Collins (2008), alongside calculations based on their published estimates.

The findings suggest that structural transformation contributed to labour productivity growth in both countries, although its relative importance differed. China experienced greater changes in sectoral employment and stronger productivity improvements within industry, while India recorded a larger change in the composition of value added. Resource reallocation accounted for a greater share of India's labour productivity growth during 1993–2004, whereas China's faster growth was associated more strongly with within-sector productivity improvements. The paper contributes to this comparison by distinguishing the extent of structural change from its measured contribution to labour productivity growth.

The remainder of the paper is organised as follows. The next section provides the historical background to economic reforms in India and China, followed by a review of the literature on other factors contributing to economic growth in both countries. The methodology section explains how sectoral change and labour productivity growth are measured. The results section then examines changes in sectoral composition and the contribution of resource reallocation to productivity growth. Finally, the conclusion discusses the main findings and limitations of the analysis.

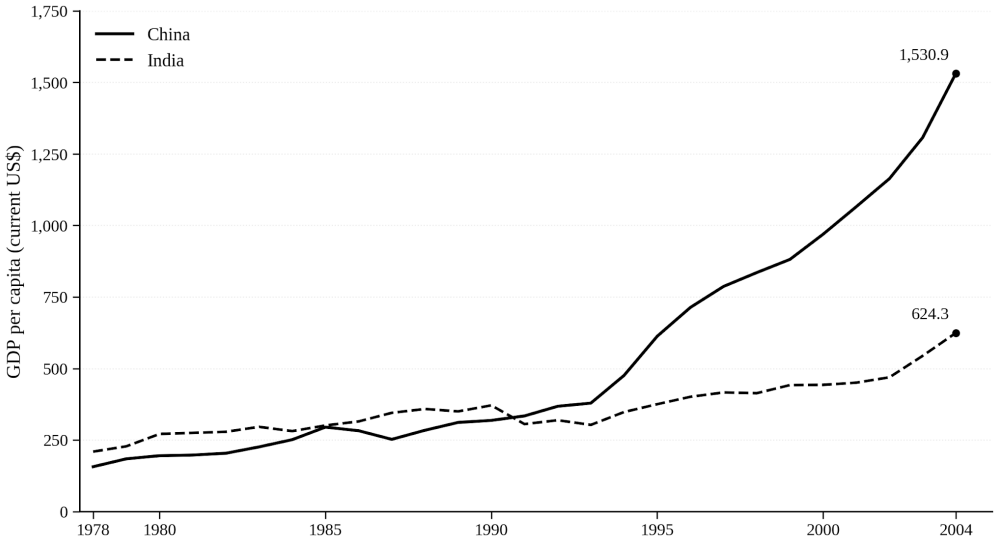

Figure 1. GDP per Capita in China and India, 1978–2004.

Source: World Bank, World Development Indicators, "GDP per capita (current US$)," indicator NY.GDP.PCAP.CD, China and India, 1978–2004.

2. Background

Although India and China undertook economic reforms, the timing and nature of these reforms differed considerably. China's reform process began in 1978 and took place in three broad phases. The first phase focused primarily on agriculture, while the second phase, during the 1980s and 1990s, introduced changes affecting industry, services and property rights. The third phase, beginning in the late 1990s and

continuing through the 2000s, placed greater emphasis on banking, finance and international economic relations (Valli and Saccone 2009).

In 1978, China was predominantly an agrarian economy. However, its subsequent development was characterised by rapid industrialisation and tertiarisation. Initially, the services sector accounted for a relatively small share of employment and value added compared with market economies at similar levels of development. Valli and Saccone (2009) associate this partly with the traditional socialist distinction between "productive" sectors, such as agriculture and industry, and "unproductive" sectors, which included many services. This gradually changed as market-oriented reforms and private ownership expanded.

In India, economic reforms were introduced more gradually. Although the New Economic Policy followed the 1991 economic crisis, several reforms associated with faster growth had already begun during the mid-1980s. The subsequent liberalisation measures were followed by a period of stronger economic growth, particularly during the 1990s and 2000s. However, India's economic development differed from China's in its greater reliance on the expansion of services and a comparatively slower decline in agriculture's share of employment (Valli and Saccone 2009).

These differences in the timing and nature of reforms provide historical context for understanding the distinct patterns of economic development in India and China.

3. Literature Review

While structural transformation played an important role in the economic growth of India and China, existing literature identifies several other factors that contributed to their growth experiences. Bosworth and Collins (2008) find that capital deepening and total factor productivity (TFP) contributed substantially to labour productivity growth in both countries, with larger contributions in China. Herd and Dougherty (2007) similarly highlight differences in capital intensity, while also examining the role of education, employment and demographic change. Wu et al. (2017), however, provide different estimates of TFP growth, suggesting that the measured contribution of productivity depends partly on the period and methodology used. Marelli and Signorelli (2011) identify positive relationships between trade openness, foreign investment and economic growth, while Wignaraja (2011) highlights the role of international production networks and foreign investment in China's manufacturing expansion. The following review examines these factors in greater detail to provide a broader understanding of the differences in economic growth between India and China.

3.1 Capital Accumulation

Bosworth and Collins (2008) identify capital deepening as an important contributor to growth in both India and China, with a larger contribution in China. During 1978–2004, output per worker grew by 7.3% annually in China, with increased physical capital per worker contributing 3.2 percentage points. In India, the corresponding figures were 3.3% and 1.3 percentage points. Herd and Dougherty (2007) similarly attribute 60.9% of the average gap in labour-productivity growth between the countries to differences in capital intensity.

Bosworth and Collins report that gross private investment in India increased strongly after 1993. However, total net investment averaged about 17% of GDP during 1999–2004, which they considered too low to support annual output growth much above 7%. Public-sector investment also declined as a share of GDP, raising concerns about weak infrastructure. Although private savings increased, a substantial part was consumed in financing the public-sector deficit. By contrast, China had a national saving rate above 40% and private capital inflows equal to 10% of GDP; India's private capital inflows, relative to GDP, were about half those of China. The authors therefore viewed India's financing position as more constrained, suggesting that lower government deficits or greater foreign capital inflows could support faster growth. However, they cautioned that differences in public borrowing could be overstated because some Chinese state-enterprise losses were financed through bank loans rather than direct government borrowing.

However, an increase in capital per worker does not necessarily mean that resources are being used more efficiently. Improvements in this efficiency are reflected in total factor productivity (TFP) growth. Bosworth and Collins warned that China could face overinvestment in some sectors, but they did not find evidence that excessive investment was already causing a significant slowdown in TFP growth. Herd and Dougherty also argued that capital accumulation and productivity growth are linked, as productivity gains could increase incomes and encourage saving, providing resources for further investment. Their comparison nevertheless needs care because capital was measured differently for the two countries. These growth accounts assess how much capital deepening contributed to measured growth, but they do not show which policies caused that accumulation.

3.2 Productivity Growth

Labour productivity means output per worker and can increase through more capital per worker, better education, or TFP growth. Bosworth and Collins estimate TFP growth as the part left after accounting for the measured contributions of capital and education.

Bosworth and Collins (2008) find that productivity improvements contributed to growth in both countries, with China having a larger annual contribution. During 1978–2004, TFP contributed 3.6 percentage points to annual growth in output per worker in China, compared with 1.6 percentage points in India. Although China had the stronger TFP performance, India's contribution increased substantially during 1993–2004 compared with 1978–1993. The authors also found that roughly half of growth in output per worker over the full period came from TFP and roughly half from physical capital and education together.

However, Wu et al. (2017) present a different comparison for 1981–2011. They estimate that TFP grew by 0.83% annually in China and 1.13% in India, even though China's output grew faster.

Wu et al. (2017) report annual value-added growth of 9.41% for China and 6.07% for India during 1981–2011 (Table 2). These are the denominators used to calculate the share of value-added growth attributed to TFP:

$$\text{TFP share of value-added growth (\%)} = \frac{\text{TFP growth}}{\text{value-added growth}} \times 100 \tag{1}$$

For China, using 0.83% TFP growth and 9.41% value-added growth:

$$\frac{0.83}{9.41} \times 100 \approx 8.8\% \tag{2}$$

For India, using 1.13% TFP growth and 6.07% value-added growth:

$$\frac{1.13}{6.07} \times 100 \approx 18.6\% \tag{3}$$

Within Wu et al.'s (2017) framework, the estimates suggest that China relied more heavily on additional inputs, especially capital, while TFP accounted for a larger share of India's value-added growth. Wu et al. also find that China's TFP growth was more volatile and became negative during 2007–2011, whereas India maintained positive TFP growth following the global financial crisis.

These percentages should not be compared directly with Bosworth and Collins (2008). Wu et al. estimate TFP as a share of aggregate value-added growth over 1981–2011 using an aggregate production possibility frontier (APPF) growth-accounting framework applied to economy-wide industry productivity accounts constructed in the spirit of KLEMS, whereas Bosworth and Collins decompose growth in output per worker over 1978–2004 using a different growth-accounting approach. Wu et al. also identify measurement limitations: Chinese labour input was measured in hours worked, while comparable hours-based measures were unavailable for India; price-base differences could introduce further bias.

3.3 Human Capital and Labour

Bosworth and Collins (2008) measure human capital through education, using years of schooling as an indicator of workers' skills. To construct their human-capital index, they assume a 7% return to each

additional year of schooling. This is a modelling assumption, not a directly observed increase in national GDP. During 1978–2004, education contributed 0.4 percentage points to annual growth in output per worker in India, compared with 0.3 percentage points in China. This measured contribution was smaller than those of physical capital and TFP in both countries.

India's slightly larger education contribution did not mean that it had caught up with China's educational attainment. In 2000, average schooling was 6.0 years in China, compared with 4.5 years in India, while the share with no schooling was 16% and 43%, respectively.

Improvements in human capital per worker should also be distinguished from employment growth. Bosworth and Collins report that employment grew by an annual average of 2.0% in both countries during 1978–2004. More people working does not necessarily mean an increase in their average education or skills.

Herd and Dougherty (2007) extend this discussion by distinguishing growth in output per worker from changes in employment rates and population age structure. They argue that China benefited from a growing proportion of people in age groups with high employment rates. They also identify a demographic contribution to India's income-per-person growth, as the working-age population grew faster than the total population. However, a larger potential workforce does not automatically raise income per person; the outcome also depends on employment and output per worker. The authors further caution that demographic benefits can weaken as the population ages.

The estimates also depend on how education is measured. Herd and Dougherty note that, for India, converting educational categories into years of schooling involves error because pupils do not always complete the courses they begin. Bosworth and Collins also could not distinguish education levels across Chinese sectors and therefore used a common education index. Overall, education contributed to growth in both countries, while employment and population age structure affected income per person through separate channels.

3.4 Trade and FDI

Trade and foreign direct investment (FDI) may have influenced the sectoral paths of growth, although their effects are not estimated separately in this paper. Wignaraja (2011) links China's manufacturing expansion to foreign investment and international production networks, while noting India's strengths in IT and business services. Marelli and Signorelli (2011) find positive relationships between openness, FDI and growth, but these associations do not establish causation. Trade and FDI therefore provide context for the contrasting development paths rather than inputs to the quantitative decomposition.

Capital deepening, TFP and education matter directly to this comparison because Bosworth and Collins (2008) estimate how much each contributed to output-per-worker growth. Evidence on labour and international integration provides broader context, while the subsequent NAV and reallocation analyses focus specifically on changes in sectoral composition and their measured contribution to productivity growth.

4. Methodology

Understanding economic growth in India and China requires looking not only at increases in GDP or per capita income, but also at changes in the composition of production and employment. These changes are commonly discussed through the 'stylized facts' of structural change. In their discussion of Herrendorf et al. (2014), Ray and Chattopadhyay (2021) explain that historical increases in GDP per capita are associated with decreases in agriculture's employment and value-added shares and increases in the corresponding shares of services. Manufacturing follows a different, hump-shaped pattern: its shares initially increase and later decline at higher levels of development. At low levels of per capita income, agriculture's value-added share is often much lower than its employment share. Services nevertheless already account for considerable output and employment. These patterns provide a framework for comparing India and China, rather than assuming that both countries must follow an identical development path.

Table I. Data Sources and Measures

Source and period	Data and classification	Use in this paper
Ray and Chattopadhyay (2021); 1950s–2010	Sectoral value-added and employment shares; construction in services	Published long-run trends; contextual evidence
Bosworth and Collins (2008); 1978–2004	Sectoral shares (%); construction in industry	Author-calculated NAV (percentage points)
Bosworth and Collins (2008); 1978–2004	Annual output-per-worker growth and factor contributions (pp/year)	Published estimates; author-calculated China–India differences
Bosworth and Collins (2008); 1978–1993 and 1993–2004	Resource-reallocation contributions (pp/year)	Published contributions; author-calculated shares (%)
Wu et al. (2017); 1981–2011	TFP growth estimates (%/year); separate accounting framework	Supplementary comparison

Source: Author's compilation based on the studies cited. Note: NAV = Norm of Absolute Values; TFP = total factor productivity; pp = percentage points. The evidence sets differ in period, sector classification and methodology and are not directly interchangeable.

4.1 Measuring Sectoral Change

Ray and Chattopadhyay (2021) use a broad three-sector classification: agriculture (ag), industry (ind) and services (s). Aggregate value added (VA) and employment (E) are therefore given by:

$$\mathrm{VA} = \mathrm{VA}_{ag} + \mathrm{VA}_{ind} + \mathrm{VA}_{s} \tag{4}$$

$$E = E_{ag} + E_{ind} + E_{s} \tag{5}$$

"Agriculture" includes agriculture and allied activities. "Industry" comprises: (i) mining; (ii) manufacturing; and (iii) utilities. "Services" includes almost everything else, viz., (i) construction; (ii) trade, restaurants and hotels; (iii) transport, storage and communication; (iv) finance, insurance, real estate and business services; (v) government services, and Community, social and personal services.

The authors use the Groningen Growth and Development Centre (GGDC) 10-sector database (Groningen Growth and Development Centre, 2014; Timmer, de Vries and de Vries, 2015), measuring value added at constant 2005 national prices. To measure the extent of structural change, Ray and Chattopadhyay (2021) use a measure called the Norm of Absolute Values (NAV). In simple terms, NAV measures how much the distribution of employment or value added across sectors differs between two years. It calculates the absolute change in each sector's share and adds these changes together. The total is then divided by two to avoid double-counting, since a decline in one sector's share must be offset by an increase in another. A higher NAV indicates a greater change in sectoral composition relative to the base year, but does not necessarily imply higher productivity or economic growth.

$$\mathrm{NAV} = \frac{1}{2} \times \sum_{i} |X_{i,t} - X_{i,s}| \tag{6}$$

Here, i denotes the sector, t the chosen base year, and s a later comparison year. X_{it} and X_{is} represent the sector's share of total value added or employment in the respective years. Ray and Chattopadhyay (2021) interpret a rising NAV as indicating progress towards structural transformation, with higher values suggesting that the process is approaching completion. However, the formula itself measures the difference in sectoral composition relative to a base year. A higher NAV therefore indicates a greater change in sectoral shares, rather than necessarily implying that structural transformation is complete. Moreover, NAV need not increase continuously, since it can decline if sectoral shares move back towards their initial distribution.

For the NAV calculations, this paper uses the sectoral employment and value-added shares reported by Bosworth and Collins (2008), with 1978 as the base year and 2004 as the comparison year. Their

classification includes construction within industry, unlike the classification discussed by Ray and Chattopadhyay (2021), which places construction within services. The NAV results therefore follow Bosworth and Collins' sector definitions and are not directly comparable with estimates based on the alternative classification.

4.2 Measuring Labour Productivity

To compare the sources of labour productivity growth, the analysis uses the growth-accounting estimates reported by Bosworth and Collins (2008) for 1978–2004. Labour productivity is measured as output per worker, while its growth is separated into contributions from physical capital, education and total factor productivity (TFP). TFP represents the part of output growth that cannot be explained by measured changes in factor inputs, including adjustments for their quality.

The differences between China and India are calculated by subtracting India's reported contribution from China's for each component of labour productivity growth. These calculations use the estimates reported by Bosworth and Collins (2008) for 1978–2004. However, the decomposition is an accounting exercise rather than a causal analysis. In particular, TFP is measured as a residual and does not separately identify the contribution of structural transformation.

4.3 Measuring the Contribution of Resource Reallocation

To distinguish productivity improvements within sectors from those associated with changes in the distribution of employment, the analysis uses Bosworth and Collins' (2008) sectoral decomposition of labour productivity growth.

Bosworth and Collins (2008) calculate the contributions of agriculture, industry and services to aggregate labour productivity growth using each sector's initial share of value added. Resource reallocation is calculated as the difference between aggregate labour productivity growth and the sum of these sectoral contributions. It is therefore an accounting residual associated with changes in the distribution of resources across sectors, rather than a direct measure of the causal effect of labour movement. The initial value-added weights refer to the beginning of each subperiod (1978 or 1993), not necessarily to 1978 for both periods.

Using these estimates, the contribution of resource reallocation as a proportion of total output-per-worker growth is calculated as follows:

$$\text{Reallocation shares (\%)} = \frac{\text{Reallocation contribution}}{\text{annual output-per-worker growth}} \times 100 \tag{7}$$

The calculation is applied separately to 1978–1993 and 1993–2004 for both countries. It measures the relative importance of resource reallocation within total labour productivity growth, rather than estimating a separate causal effect.

The NAV comparison covers 1978–2004, whereas the reallocation analysis examines two subperiods. The two measures are therefore used to examine different aspects of structural transformation and are not treated as directly equivalent.

The analysis draws on evidence covering different periods and using different methodologies. Bosworth and Collins (2008) provide the principal quantitative estimates for 1978–2004, including separate decompositions for 1978–1993 and 1993–2004. The longer-term sectoral patterns discussed by Ray and Chattopadhyay (2021) provide historical context, while the TFP estimates from Wu et al. (2017) cover 1981–2011. These evidence sets are used for different analytical purposes and are not treated as a single harmonised dataset. Consequently, numerical comparisons are restricted to estimates with consistent definitions and periods.

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5. Results and Findings

5.1 Trends in Value Added

The three sectors' shares of total value added sum to one:

$$\frac{\text{VA}_{ag}}{\text{VA}} + \frac{\text{VA}_{ind}}{\text{VA}} + \frac{\text{VA}_{s}}{\text{VA}} = 1 \tag{8}$$

Ray and Chattopadhyay's (2021) long-run output comparison covers the early 1950s to 2010. China began with a larger agricultural share, but experienced a faster decline in this share than India. The industrial share in India levelled off at around 25 percent, whereas it continued to increase in China over the period examined. India's services share remained higher than its industrial share throughout the comparison and was also higher than China's.

5.2 Employment Structure

Employment shares can be examined in the same way:

$$\frac{E_{ag}}{E} + \frac{E_{ind}}{E} + \frac{E_{s}}{E} = 1 \tag{9}$$

Ray and Chattopadhyay (2021) find that India's employment structure changed little until the mid-1980s, with changes becoming more evident thereafter. Towards the end of the period studied, agriculture still employed around 55 percent of the workforce but accounted for only 15 percent of total value added. The industrial employment share remained low, while changes in the distribution of employment were mainly associated with the expansion of services. In contrast, China's agricultural employment share declined more rapidly. The authors therefore highlight a mismatch in India: the shift away from agriculture in output was not matched by an equally pronounced change in employment.

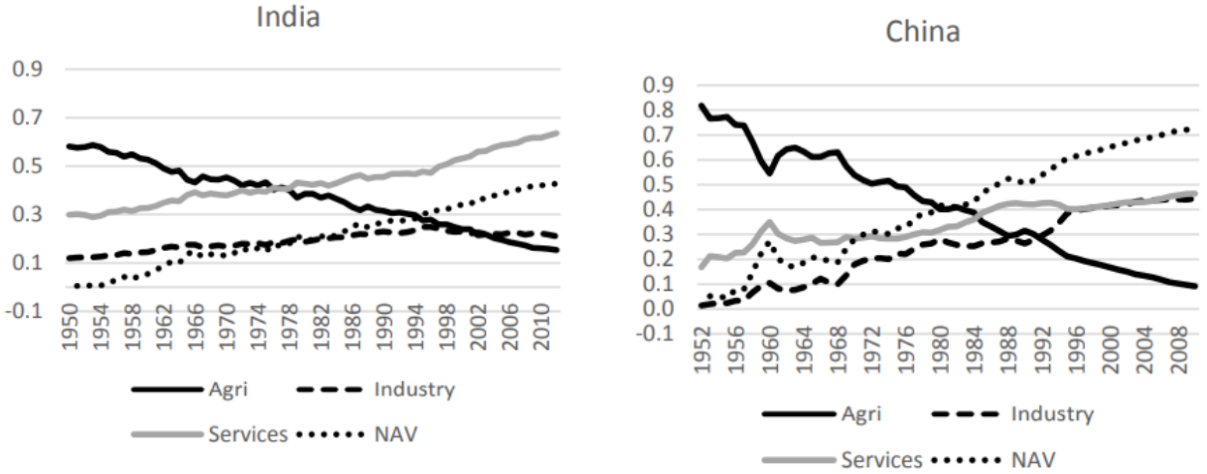

Figure 2. Trends in Value-Added Shares.

Source: Ray and Chattopadhyay (2021), p. 21; GGDC 10-sector database and authors' calculations.
Note: 1959–1961 corresponds to the Great Chinese Famine.

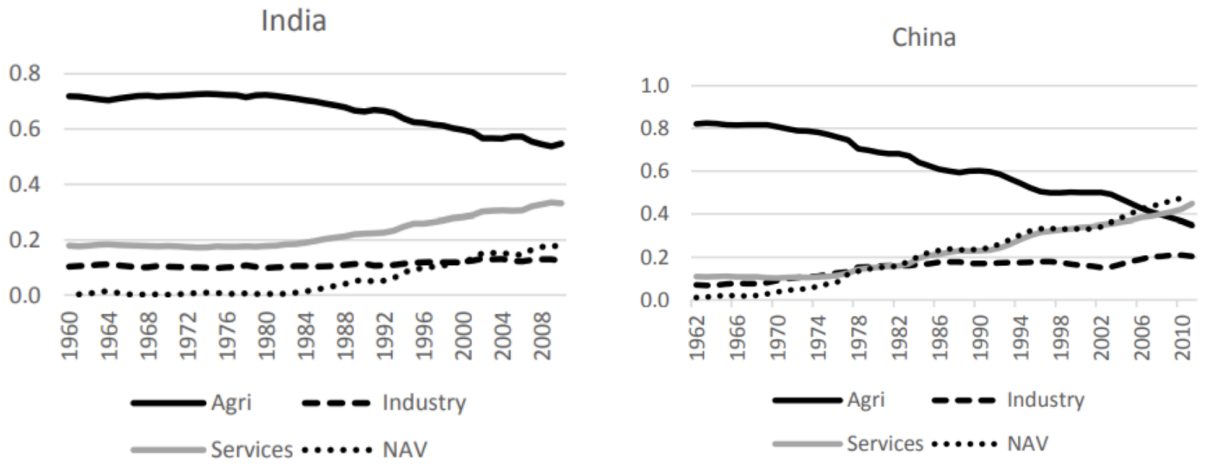

Figure 3. Trends in Employment Shares.

Source: Ray and Chattopadhyay (2021), p. 21; GGDC 10-sector database and authors' calculations.

5.3 Sectoral Growth and Productivity Patterns

Bosworth and Collins (2008) provide a complementary comparison of sectoral growth over 1978–2004. Their sectoral classification differs from that of Ray and Chattopadhyay: they include construction within industry, rather than services. The two studies' industry and services shares therefore refer to different groupings of activities.

In Bosworth and Collins' comparison, industry accounted for approximately half of China's GDP, whereas its share in India remained below 30 percent during the period examined. During 1978–93, industrial output and employment grew rapidly in both countries. Although increases in capital per worker were similar, China experienced much faster improvement in total factor productivity. After 1993, industrial output per worker also grew considerably faster in China than in India.

Services nevertheless played an important role in China's growth. Over Bosworth and Collins' study period, China's services sector grew as rapidly as its industrial sector and accounted for most of the increase in employment. After 1993, the contribution of increased capital per worker to labour-productivity growth in Chinese services was as large as that in industry. However, the services sector performed less well in terms of total factor productivity improvement. China's experience should therefore not be described as growth through industry alone.

Services was also the sector in which India came closest to matching China's performance. India's service-sector output growth accelerated after 1993, and output per worker increased by more than 5 percent annually during 1993–2004. These gains occurred with a relatively modest contribution from increased capital per worker and were largely associated with improvements in total factor productivity. However, Bosworth and Collins caution that some of India's measured service-sector total factor productivity gains may be overstated.

These findings show why output shares, employment shares and productivity must be examined together. In India, the change in output composition was not matched by an equally pronounced change in employment, while China combined strong industrial performance with substantial expansion of services. Understanding the contribution of structural change to growth therefore requires distinguishing productivity improvements within sectors from gains associated with the reallocation of workers towards more productive activities.

5.4 Sources of Aggregate Labour Productivity Growth

Bosworth and Collins (2008) examine the sources of economic growth in India and China by separating growth in output per worker into contributions from physical capital, education, and total factor productivity (TFP). During 1978–2004, China's output per worker grew by an annual average of 7.3%, compared with 3.3% in India, a difference of 4 percentage points. However, both countries experienced

an average annual employment growth rate of 2.0%, suggesting that differences in employment growth alone cannot explain the gap in their economic performance.

Using the estimates reported by Bosworth and Collins (2008), the differences in the contributions of physical capital, education, and TFP to labour productivity growth can be calculated as follows:

Table II. Contributions to Output-per-Worker Growth, 1978–2004

Growth component	China	India	Difference
Physical capital	3.2	1.3	1.9
Education	0.3	0.4	−0.1
Total factor productivity	3.6	1.6	2.0
Output per worker	7.3	3.3	4.0

Source: Author's calculations based on Bosworth and Collins (2008), Table 1. The original source warns that growth rates may not sum because of rounding. For China, the reported contributions (3.2 + 0.3 + 3.6 = 7.1 percentage points) differ from the published 7.3 total; the component differences total 3.8 rather than the reported 4.0-point gap. The published figures are retained as reported.

The calculations show that China's contribution from physical capital was 1.9 percentage points higher than India's, while the difference in TFP contributions was 2.0 percentage points. By contrast, India's contribution from education was marginally higher by 0.1 percentage points. These findings suggest that China's faster labour productivity growth was associated mainly with greater capital deepening and TFP improvements, rather than differences in education or employment growth.

However, TFP is a residual measure and does not separately identify the contribution of structural transformation. The estimates therefore explain the sources of aggregate labour productivity growth, but do not show how much of this growth was associated with the movement of workers between sectors. To examine this, the following analysis considers changes in sectoral employment and value-added shares in both countries.

5.5 Measuring Structural Change: Employment and Value-Added Shares

To examine the extent of structural transformation in India and China, the Norm of Absolute Values (NAV) is calculated using the sectoral employment and value-added shares reported by Bosworth and Collins (2008). These calculations follow the sectoral classification used by Bosworth and Collins (2008), ensuring consistency between the employment and value-added comparisons. Using 1978 as the base year and 2004 as the comparison year, the following results are obtained:

For example, China's employment NAV between 1978 and 2004 is calculated using the sectoral employment shares reported by Bosworth and Collins (2008):

$$\begin{aligned} \text{NAV} &= \frac{|47-71|+|23-17|+|31-12|}{2} \\ \text{NAV} &= \frac{24+6+19}{2} = 24.5 \end{aligned} \tag{10}$$

The result indicates a change of approximately 24.5 percentage points in China's sectoral employment distribution. Since the published employment shares are rounded to whole percentages, the calculated NAV is also approximate.

Table III. Employment and Value-Added NAV, 1978–2004

Measure	China	India
Employment NAV (pp)	24.5	14.0
Value-added NAV (pp)	19.0	22.0

Source: Author's calculations based on Bosworth and Collins (2008), Table 4. Values are approximate because published sector shares are rounded. In the source table, China's 2004 employment shares (47%, 23%, and 31%) total 101% because the published percentages are rounded independently.

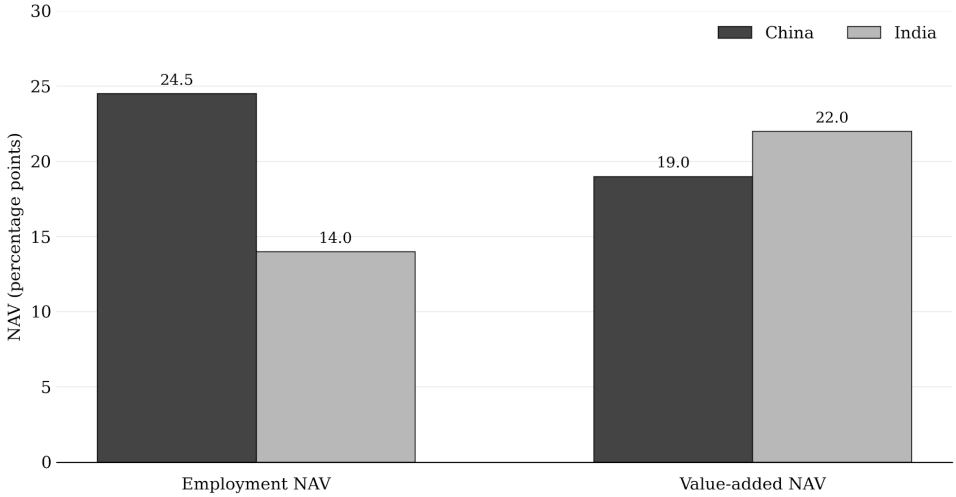

Figure 4. Employment and Value-Added NAV in China and India, 1978–2004.
Source: Bosworth and Collins (2008), Table 4; author's NAV calculations.

The calculations show that China's employment NAV was approximately 10.5 percentage points higher than India's, indicating a greater change in its sectoral employment distribution. Agriculture's share of employment declined from 71% to 47% in China, compared with a decline from 71% to 57% in India. The decline in agriculture's employment share was therefore more pronounced in China during 1978–2004.

However, the comparison differs when value-added shares are considered. India's value-added NAV was 22 percentage points, compared with 19 percentage points in China. In India, agriculture's share of value added declined from 44% to 22%, while the services share increased from 32% to 50%. In China, agriculture's share declined from 28% to 9%, while industry's share increased from 48% to 58%.

These findings suggest that changes in employment and production did not occur to the same extent in the two economies. China experienced greater employment redistribution, whereas India recorded a slightly larger change in the composition of value added. However, NAV measures the extent of sectoral change rather than its contribution to productivity growth. A larger change in sectoral shares does not necessarily imply a greater productivity benefit, since the effect also depends on differences in productivity across sectors.

To examine the contribution to productivity growth, the following section considers within-sector productivity improvements and resource reallocation.

5.6 Sectoral Productivity Growth and Resource Reallocation

While NAV measures the extent of structural change, it does not establish how much that change contributed to economic growth. Bosworth and Collins (2008) decompose aggregate labour productivity growth into contributions from productivity improvements within agriculture, industry and services, and from the reallocation of labour between sectors.

Using their estimates, the contribution of resource reallocation as a proportion of total output-per-worker growth is calculated for two periods:

Table IV. Resource Reallocation Contributions

Country	Period	OPW growth (%)	Reallocation (pp)	Share (%)
China	1978–1993	6.4	1.7	26.6
China	1993–2004	8.5	1.2	14.1
India	1978–1993	2.4	0.6	25.0
India	1993–2004	4.6	1.2	26.1

Source: Author's calculations based on Bosworth and Collins (2008), Table 5. Share = annual reallocation contribution divided by annual output-per-worker growth × 100.

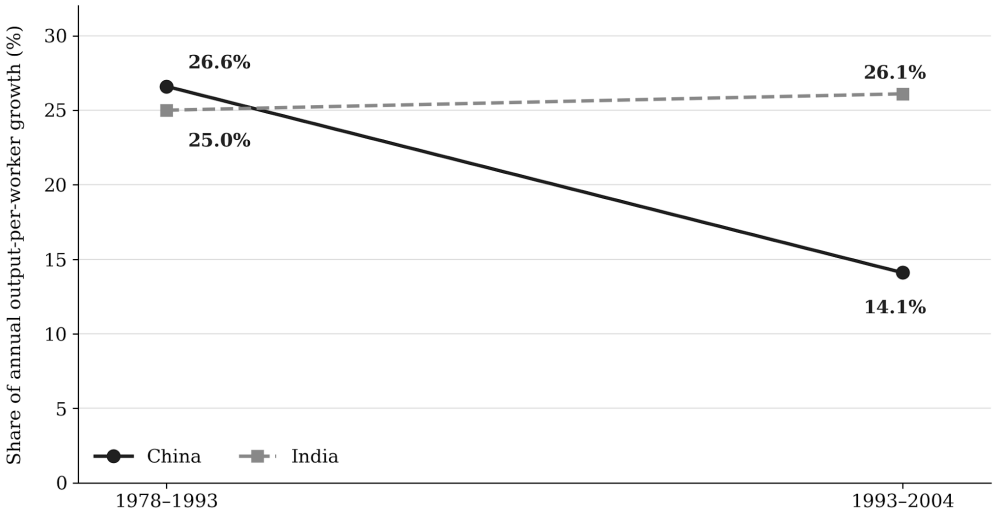

Figure 5. Resource Reallocation as a Share of Annual Output-per-Worker Growth.

Source: Author's calculations based on Bosworth and Collins (2008), Table 5. Connecting lines are visual guides between period averages, not annual observations.

During 1978–1993, resource reallocation contributed 1.7 percentage points to China's annual labour productivity growth, compared with 0.6 percentage points in India. However, its relative contribution was similar, accounting for approximately 26.6% of China's productivity growth and 25.0% of India's.

During 1993–2004, the annual contribution from resource reallocation declined to 1.2 percentage points in China, while increasing to 1.2 percentage points in India. Although the absolute contribution was identical, it accounted for 14.1% of China's productivity growth compared with 26.1% of India's. This indicates that resource reallocation remained relatively more important to India's overall productivity growth during the later period.

The difference becomes clearer when the contributions of individual sectors are examined. During 1993–2004, industry contributed 5.0 percentage points to China's annual labour productivity growth, compared with 0.9 percentage points in India. By contrast, services contributed 2.1 percentage points in India, slightly higher than China's 1.7 percentage points. Agriculture also contributed 0.7 percentage points in China and 0.5 percentage points in India, as shown in Figure 6. Together with reallocation (1.2 percentage points in each country), the displayed sectoral components sum to 8.6 for China and 4.7 for India, compared with the published totals of 8.5 and 4.6; these small differences reflect rounding in the source table. These estimates suggest that China's faster productivity growth was associated primarily with stronger within-industry productivity improvements, rather than a larger contribution from labour reallocation.

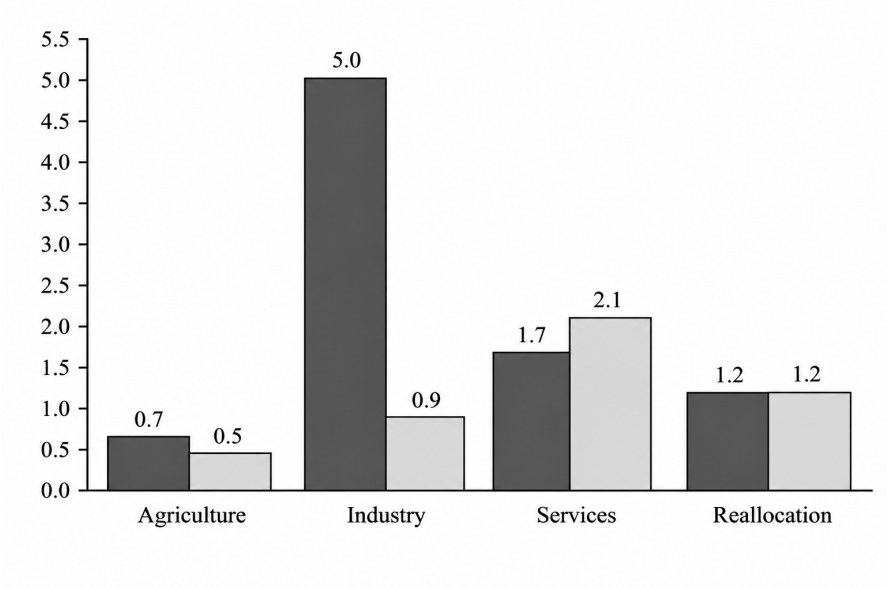

Figure 6. Sectoral and Reallocation Contributions to Annual Output-per-Worker Growth, 1993–2004.
Source: Bosworth and Collins (2008), Table 5. Values are percentage-point contributions. Dark bars represent China; light bars represent India. The figure includes agriculture.

Taken together, the results indicate that structural transformation contributed to labour productivity growth in both countries, but its relative importance differed. In China, resource reallocation became less important relative to within-sector productivity improvements, particularly in industry. In India, resource reallocation continued to account for approximately one-quarter of aggregate productivity growth, while services made a greater contribution than industry.

These results represent an accounting decomposition rather than a causal estimate of structural transformation's effect on growth. They identify the contributions associated with sectoral productivity improvements and labour reallocation, but do not independently establish the underlying causes of these changes. The NAV comparison covers 1978–2004, while the decomposition separates 1978–1993 and 1993–2004; the two sets of estimates should therefore be interpreted as complementary rather than directly equivalent.

6. Conclusion

This paper examined how structural transformation contributed to labour productivity growth in India and China. The findings suggest that structural transformation contributed to labour productivity growth in both countries, although the patterns of change differed considerably. China experienced a greater movement of labour away from agriculture, accompanied by rapid industrial expansion and stronger productivity growth. India, meanwhile, experienced a greater change in the composition of value added, particularly through the expansion of services, while the shift in employment away from agriculture remained relatively limited.

The NAV calculations show that China experienced a greater change in its employment structure, whereas India recorded a slightly larger change in the composition of value added. However, these changes do not necessarily indicate how much structural transformation contributed to productivity growth. The resource reallocation estimates provide a clearer comparison. During 1978–1993, labour reallocation contributed more to annual productivity growth in China than in India. During 1993–2004, however, its contribution was equal in both countries at 1.2 percentage points. Despite this, reallocation accounted for a larger share of India's productivity growth, while China's faster growth was associated mainly with stronger productivity improvements within sectors, particularly industry. In India, services made a greater contribution to productivity growth than industry. These findings suggest that the difference between the two countries was not simply the extent of structural change, but also the sources of

productivity growth accompanying it.

However, the analysis has certain limitations. It relies primarily on secondary data from Bosworth and Collins (2008) and Ray and Chattopadhyay (2021), which cover different periods and use different sectoral classifications. The NAV calculations are based on rounded published shares, while the broad division into agriculture, industry and services does not capture differences within individual sectors. Moreover, the growth-accounting and resource-reallocation estimates identify contributions to productivity growth, but do not establish the underlying causes of these changes. The findings should therefore be interpreted as an accounting comparison rather than a causal explanation of structural transformation's effect on growth.

Further research could extend the analysis to more recent periods and examine changes within individual sectors, particularly manufacturing and services. It could also consider how government policies, investment, trade and foreign direct investment influenced sectoral productivity and the movement of labour in both countries. This would provide a more detailed understanding of the factors behind the different patterns of structural transformation observed in India and China.

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Conflicts of Interest

The author declares no conflicts of interest related to this work.

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References

Bosworth, B., and Collins, S. M. 2008. "Accounting for Growth: Comparing China and India." *Journal of Economic Perspectives* 22 (1): 45–66. https://doi.org/10.1257/jep.22.1.45.

Groningen Growth and Development Centre. 2014. *GGDC 10-Sector Database, 2014 Release*. University of Groningen. https://www.rug.nl/ggdc/structuralchange/previous-sector-database/10-sector-2014.

Herd, R., and Dougherty, S. 2007. "Growth Prospects in China and India Compared." *The European Journal of Comparative Economics* 4 (1): 65–89. https://arl.liuc.it/esploro/outputs/journalArticle/Growth-Prospects-in-China-and-India/991000989145405126.

Herrendorf, B., Rogerson, R., and Valentinyi, Á. 2014. "Growth and Structural Transformation." In *Handbook of Economic Growth*, vol. 2, edited by P. Aghion and S. N. Durlauf, 855–941. Elsevier. https://doi.org/10.1016/B978-0-444-53540-5.00006-9.

Marelli, E., and Signorelli, M. 2011. "China and India: Openness, Trade and Effects on Economic Growth." *The European Journal of Comparative Economics* 8 (1): 129–154. https://ejce.liuc.it/18242979201101/182429792011080106.pdf.

Ray, P., and Chattopadhyay, S. 2021. *Sectoral Imbalance, Structural Change and Growth: How Different Are India and China?* NIBM Working Paper WP/02/2021. National Institute of Bank Management, Pune. https://www.nibmindia.org/static/working_paper/NIBM_WP02_PRSC.pdf.

Timmer, M. P., de Vries, G. J., and de Vries, K. 2015. "Patterns of Structural Change in Developing Countries." In *Routledge Handbook of Industry and Development*, edited by J. Weiss and M. Tribe, 65–83. Routledge. https://doi.org/10.4324/9780203387061-4.

Valli, V., and Saccone, D. 2009. "Structural Change and Economic Development in China and India." *The European Journal of Comparative Economics* 6 (1): 101–129. https://ejce.liuc.it/18242979200901/182429792009060106.pdf.

Wignaraja, G. 2011. *The People's Republic of China and India: Commercial Policies in the Giants*. Asian Development Bank Institute. https://ideas.repec.org/p/ris/adbrei/0083.html.

World Bank. n.d. "GDP per capita (current US$)." World Development Indicators. Accessed November 23, 2026. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD.

Wu, H. X., Krishna, K. L., Das, D. K., and Das, P. C. 2017. "How Does the Productivity and Economic Growth Performance of China and India Compare in the Post-Reform Era, 1981–2011?" *International Productivity Monitor* 33: 91–113. https://csls.ca/ipm-archive/ipm-issue-33/how-does-the-productivity-and-economic-growth-performance-of-china-and-india-compare-in-the-post-reform-era-1981-2011/.