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From rapid growth to slowdown: sectoral analysis of China's economic transformation

CAMBRIDGE INDUSTRIAL INNOVATION POLICY

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About this policy paper

This policy paper is part of a series examining the contribution of sectors to national economic performance across different contexts. Focusing on the Chinese economy, this report offers an overview of its structural evolution over the past two decades, providing insights into how different sectors have contributed to both economic growth and slowdown trends. Furthermore, we analyse key reforms and industrial policies that have influenced China's economic performance during this period.

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About us

Cambridge Industrial Innovation Policy (CIIP) is a global, not-for-profit policy group based at the Institute for Manufacturing (IfM), University of Cambridge. CIIP works with governments and global organisations to promote industrial competitiveness and technological innovation. We offer new evidence, insights and tools based on the latest academic thinking and international best practices. CIIP operates in consultancy, professional education, and thought leadership projects through IfM Engage, the knowledge-transfer arm of the Institute for Manufacturing, University of Cambridge.

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Executive summary

This report contributes to the ongoing debate about China's economic slowdown since 2011 and its future growth trajectory. We analyse how sectors have changed their participation in the Chinese economy over the last three decades, and how this transformation has contributed to both economic growth and slowdown trends.

China has experienced a prolonged economic slowdown since 2011

Since Deng Xiaoping initiated China's Reform and Opening Up in 1978, the Chinese economy has undergone a profound transformation. With growth rates averaging 10% over the period from 1980 to 2010,[1] China transitioned from an agrarian economy to the "factory of the world" and, in the past decade, a rising knowledge powerhouse.

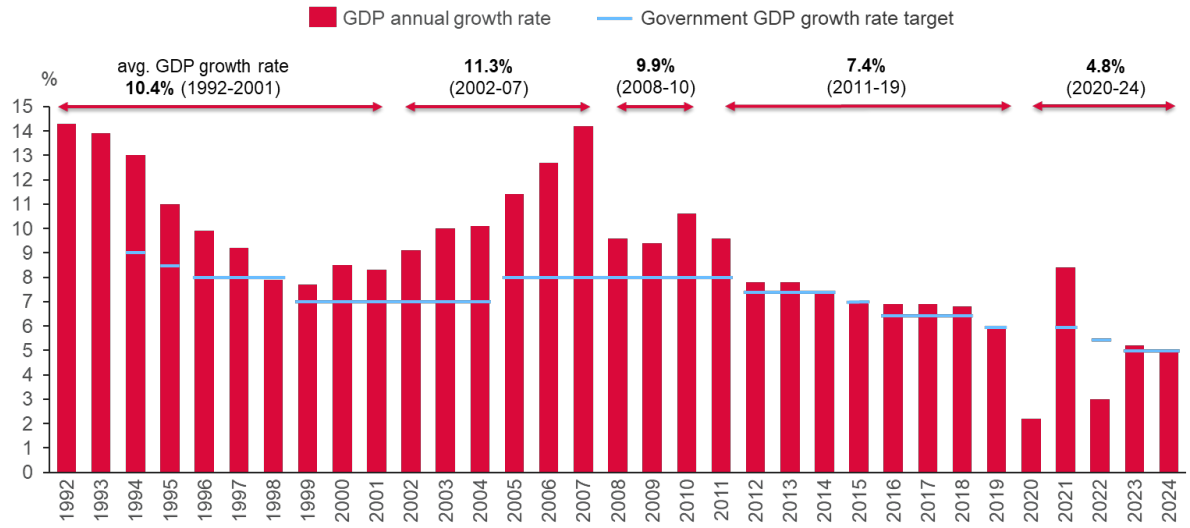
Today, China is the world's second-largest economy, with a gross domestic product (GDP) of CN¥126 trillion (~US$18 trillion) in 2023. This figure is equivalent to 0.7 times the size of the US economy, 4.2 times that of Japan and 5.8 times the size of the UK economy.[2]

However, China's economic growth has decelerated since 2011, averaging around 4.8% annually between 2020 and 2024. In response to the new economic and geopolitical environment, the Chinese government has lowered the growth rate target to *around* 5% since 2023, the lowest in 30 years.[3]

This slowdown has sparked questions about the factors driving it and the future of China's economy. Some analysts have suggested that the economic slowdown may indicate a decreasing efficiency of 'communist capitalism',[4] while others contend that China's leadership is deliberately prioritising long-term strategic goals over immediate economic growth.[5]

[1] International Monetary Fund, IMF (2024). China, People's Republic of Dataset (accessed in August 2024).
[2] The Word Bank (2024). World Development Indicators. (accessed in June 2024).
[3] The State Council (2024). 5%左右, 2024 年 GDP 目标设定传递什么信号？
[4] Financial Times (2024). The future of 'communist capitalism' in China
[5] Foreign Policy (2024). Why Is Xi Not Fixing China's Economy? Explanations from insiders range from ignorance to ideology.

FIGURE ES1. CHINA'S GDP ACTUAL GROWTH AND GOVERNMENT TARGET, 1992–2024



Source: International Monetary Fund, IMF (2025). People's Republic of China (accessed 11 July 2025); State Council of the People's Republic of China (1994-2024). Report on the Work of the Government.

Key messages: what does sectoral analysis reveal about China's economic slowdown?

1. From 1992 to 2007, China's economic growth was driven by productivity gains across all sectors and the shift of workers to higher-productivity sectors.

Between 1992 and 2007, China experienced some of its fastest growth, largely driven by productivity improvements across all sectors and the expansion of low/medium-tech and medium/high-tech manufacturing, alongside labour-intensive services.

The most significant productivity gains from the reallocation of workers from low- to high-productivity sectors occurred between 2002 and 2007. During this period, over 52 million agricultural workers shifted primarily into labour-intensive services and manufacturing industries. This sectoral shift contributed 2.4 percentage points to the overall productivity growth.

More than half of these gains were derived from the manufacturing sector. Between 2002 and 2007, employment in low/medium-tech manufacturing increased by 19.9 million workers, while medium/high-tech manufacturing saw a rise of 12.8 million workers. Key manufacturing industries that increased their employment include: apparel and textiles, electronic and telecommunication equipment, food products, electric equipment and machinery and equipment. The increasing size of medium/high-tech manufacturing and its higher productivity meant that for the first time its contribution to GDP growth, at 13.1%, surpassed that of agriculture, which stood at 7.7% during this period.

2. The contraction and slowdown of low/medium-tech manufacturing accounts for nearly a third of China's economy slowdown over the last decade.

As international trade slowed down after the global financial crisis of 2008/09, and China developed its medium/high-tech manufacturing and knowledge intensive services, the role of low/medium-tech manufacturing in the Chinese economy has diminished.

Low/medium-tech manufacturing reduced its employment shares from 12.8% in 2011 to 11.2% in 2017, resulting in a negative contribution to productivity growth through its labour shift effect. Similar to other sectors across China's economy, low/medium-tech manufacturing also experienced a slowdown in productivity growth after 2010.

Although sectors such as construction and mining faced more pronounced slowdowns, the relatively larger size of low/medium-tech manufacturing both in terms of employment and value added (11.2% and 17.2% in 2017), meant that its contraction and deceleration had a more significant impact on the overall economy. This sector group experienced the largest decline in its contribution to productivity growth during the 2011–2017 period, compared to the 1992–2001 period. This decline accounted for nearly a third of the overall slowdown of the Chinese economy (Table ES 1).

The textiles and apparel industries were key contributors to this deceleration, accounting for 28% of the reduction in the contribution of low/medium-tech manufacturing to overall productivity growth during the 2011–17 period, compared to the 1992–2001 period. This is explained by both slower productivity growth and reductions in employment.

TABLE ES1. CONTRIBUTION TO PRODUCTIVITY GROWTH BY SECTOR GROUP, 1992-2017

Sector group	Contribution to overall productivity growth (percentage points)					(6)
	(1)	(2)	(3)	(4)	(5)	
	Private sector development (1992–2001)	Integration into global value chains (2002–2007)	Global financial crisis (2008–2010)	Transition to a knowledge economy (2011–2017)	(4)-(1)	Relative productivity, 2017[1/]
Labour-intensive services	4.78	3.98	4.31	3.73	**-1.05**	0.94
Knowledge-intensive services	2.00	2.15	2.54	2.32	**0.33**	2.58
Low/medium-tech manufacturing	3.72	2.91	2.76	1.58	**-2.14**	1.47
Medium/high-tech manufacturing	2.21	1.86	1.96	1.20	**-1.01**	1.79
Construction	1.11	0.84	1.24	0.74	**-0.37**	0.80
Agriculture	2.34	1.07	1.26	0.69	**-1.65**	0.29
Utilities	0.54	0.56	-0.04	0.21	**-0.33**	4.26
Mining	0.81	0.79	0.87	0.05	**-0.77**	2.69
Total productivity growth	17.50	14.17	14.89	10.51	-6.99	1.00

Note: Contribution computed based on the method used by Tang and Wang (2004), based on value added per employee. See appendix B. [1/] Relative productivity based on value added per employee, computed as the ratio of each sector's productivity over the average productivity of the total economy.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed 11 June 2024).

3. The expansion of labour- and knowledge-intensive services has not been able to offset the decline of low/medium-tech manufacturing.

After 2010, knowledge- and labour-intensive services became the primary sectors attracting workers from other industries. As employment shares in mining, low/medium-tech manufacturing and agriculture declined, labour-intensive services expanded more rapidly than in previous periods, increasing their employment shares by 5.8 percentage points from 2011 to 2017.

During this period, the employment share of knowledge-intensive services also saw a substantial increase, rising from 5.1% in 2011 to 8.3% in 2017. This growth, combined with productivity levels above the national average, led to knowledge-intensive services surpassing low/medium-tech manufacturing in their contribution to GDP growth for the first time, with contributions of 21.9% and 15.1%, respectively. Key contributors to this growth within knowledge-intensive services include: financial intermediation (7.2%), leasing, technical, science, and business services (7%), and postal and telecommunications services (3.9%).

This shift has important implications for the future growth of China's economy. Although knowledge-intensive services have productivity levels more than twice the national average, their relatively small size has limited their ability to offset the slowdown in other sectors. Meanwhile, labour-intensive services, which employ more than a third of the workforce, have productivity levels below the national average (relative productivity lower than "1") and lower than those of manufacturing industries (Table ES1).

Looking ahead: perspectives for future growth

In the years following 2017, China's economic growth decelerated further, averaging 5.3% annually between 2018 and 2022. Despite this slowdown, China's growth rate remained significantly higher than that of advanced economies, which averaged 1.7%, and emerging and developing economies, which averaged 3.5% during the same period.[6]

Our analysis provides evidence of a declining structural bonus (productivity gains from workers moving from lower- to higher-productivity sectors) as a key factor in China's economic slowdown since 2011. As more sophisticated industries expand their participation in the economy, rural migrant workers are increasingly moving to lower-productivity service sectors rather than low/medium-tech manufacturing roles, which have higher productivity levels. This is particularly relevant because agriculture workers still accounted for 22% of the total workforce in 2021, representing approximately 165 million people.[7]

Our study also underscores the ongoing influence of industrial policy in shaping China's economic performance. Developing productive forces and engaging in global trade and investment remain widely emphasised across China's policies. In September 2023 Xi Jinping proposed the concept of "New Quality Productive Forces", highlighting the importance of innovation, technology and the manufacturing sector in China's future economic development.[8]

China's outward investment in manufacturing has soared. Between 2016 and 2021 Chinese investments in overseas manufacturing activities totalled over US$150 billion, almost twice the amount recorded between 2011 and 2015.[9] Key industries receiving these investments include: automotive, computers, communication and other electronic equipment, raw chemical materials and chemical products, and medicines. Additionally, investments have diversified towards ASEAN countries and, and since 2020, have notably expanded into Latin America.

China has also enhanced its innovation capabilities. In 2022, China ranked fourth globally in domestic patent applications per million inhabitants[10] and ninth in intellectual property exports.[11]

What can be expected for China's future economic performance? Our sectoral analysis indicates that, as the manufacturing sector slows its expansion and rural migrant workers increasingly move into labour-intensive services, it is unlikely that ongoing structural change will sustain double-digit growth rates in the future. However, recent economic performance and policy developments also suggest that China's growing leadership in innovation and technology may enable the country to maintain growth rates above those of most emerging and advanced economies.

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[6] IMF (2024). World Economic Outlook. Real GDP growth.
[7] Asian Productivity Organization, APO (2024). *APO Productivity Database 2023 Ver. 1.*
[8] Fan, Z. (2024). China's emerging industrial vision: the significance and impact of "New Quality Productive Forces". Cambridge Industrial Innovation Policy.
[9] National Bureau of Statistics. National data (accessed in June 2024).
[10] WIPO. IP Statistics Data Centre (accessed in June 2024).
[11] WIPO (2024). Cross-border Payments for the Use of Intellectual Property (IP) surpass 1 trillion US Dollars in 2022, a record high.

Introduction

Since Deng Xiaoping initiated China's Reform and Opening Up in 1978, the Chinese economy has undergone a profound transformation. With growth rates averaging 10% over the period from 1980 to 2010,[12] China transitioned from an agrarian economy to the "factory of the world" and, in the past decade, a rising knowledge powerhouse.

Today, China is the world's second largest economy, with a gross domestic product (GDP) of CN¥126 trillion (~US$18 trillion) in 2023. This figure is equivalent to 0.7 times the size of the US economy, 4.2 times that of Japan and 5.8 times the size of the UK economy.[13]

However, China's economic growth has decelerated since 2011, with a further slowdown observed since 2020. Between 2020 and 2024, China's economy grew at an average annual rate of around 4.8%.[14] In response to the new economic and geopolitical environment, since 2023 the Chinese government has also lowered the growth-rate target to *around* 5%.[15]

Following this slowdown, questions have arisen about the factors driving it and the future of China's economy. Some economists have suggested that the economic slowdown may indicate a decreasing efficiency of 'communist capitalism'.[16] While others contend that China's leadership is deliberately prioritising long-term strategic goals over immediate economic growth.[17] This shift, they argue, may reflect a broader focus on stability and external security, particularly through the advancement of high-tech industries.[18]

In this report we analyse how sectors have changed their participation in the Chinese economy over the last 30 years, and how these changes explain economic growth and slowdown trends. We discuss the role of China's industrial innovation policy in its economic performance, and how it is expected to remain a key driver as China navigates a changing global landscape. The report is structured as follows:

- **Section 1** provides an overview of growth trends and the transformation of China's economy since 1992.
- **Section 2** examines the structural changes observed in China's economy between 1992 and 2017, the different policy developments and events that drove these transformations, and their implications for China's economic growth. We examine four distinct sub-periods: (i) the increasing movement of rural migrant workers and the development of the private sector (1992–2001); (ii) China's accession to the World Trade Organization (WTO) and the growth of its manufacturing industry (2002–2007); (iii) the global financial crisis (2008–2010); and (iv) China's transition to a knowledge economy (2011–2017).
- **Section 3** discusses China's economic performance and policy developments after 2017. It explores China's increasing leadership in high-tech sectors globally and how this is reflected in the country's economic growth.
- **Section 4** concludes with reflections on the future trajectory of China's economy in light of emerging challenges.

[12] IMF (2024). China, People's Republic of Dataset (accessed in August 2024).
[13] The Word Bank (2024). World Development Indicators (accessed in June 2024).
[14] IMF (2024). China, People's Republic of Dataset (accessed in August 2024).
[15] The State Council (2024). 5%左右, 2024 年 GDP 目标设定传递什么信号？.
[16] Financial Times (2024). The future of 'communist capitalism' in China
[17] Foreign Policy (2024). Why Is Xi Not Fixing China's Economy? Explanations from insiders range from ignorance to ideology.
[18] Fairbank Center for Chinese Study, Harvard University (2023). China's Economic Growth Is Slowing Down—as Arthur Kroeber Tells It, That Was Always Part of Xi's Plan

1. The Dragon's roar: China's economic transformation in the last three decades

Key messages

- *Between 1992 and 2001, China experienced its fastest economic growth since 1978, with an average annual growth rate of 10.4%. Deng Xiaoping's Southern Tour in 1992, which signalled the direction of China's economic reforms, and the country's accession to the World Trade Organization (WTO) are key events marking this period.*
- *However, from 2011, China's economic growth began a prolonged slowdown. In early 2012, the central government lowered China's GDP annual growth target from 8.0% to 7.5%, and in 2014, Xi Jinping announced that China's economy had entered a "new normal."*
- *The country's economy grew at an average annual rate of 7.4% between 2011 and 2019, and 4.8% between 2020 and 2024.*
- *Economic transformation, including the shift of agricultural workers to other sectors, has been a key factor in China's rapid economic growth. Agriculture's share of employment shrank from 59% in 1992 to 27% in 2017.*
- *In contrast, labour- and knowledge-intensive services have significantly increased their share of employment over the past three decades.*

In this section we examine the trajectory of China's economic growth since 1992. We discuss fluctuations in growth over various periods and the factors influencing these fluctuations. Additionally, we explore the role of structural transformation in China's economic performance and highlight the significant contribution of rural migrant workers as the backbone of this transformation.

1.1 Economic growth

In 1978 the Reform and Opening Up policy initiated the rapid development of China's economy. Between 1980 and 2023 China's GDP per capita increased from US$307 to US$23,332, representing 76-fold growth.[19] Since 2010 China has been the second-largest economy in the world, accounting for 17% of global GDP in 2023.[20] The country has also become the top world trade partner. China's share in global exports surged dramatically, from less than 2% in the 1980s to 12% in 2022.[21]

Although this has, overall, been a period of strong economic performance, variations in the pace of growth are observed over different sub-periods (Figure 1). Between 1992 and 2001, China's economy grew at an annual rate of 10.4%. Deng Xiaoping's Southern Tour in 1992, signalling the direction of China's economic reform, and China joining the WTO in December 2001 are key events

[19] IMF (2024). China, People's Republic of Datasets (accessed in August 2024). Purchasing power parity, international dollars.
[20] The Word Bank (2024). World Development Indicators (accessed in August 2024).
[21] Ibid.

in this remarkable growth. These two events defined the beginning and end of the second phase of the Reform and Opening Up.[22]

Following China's accession to the WTO, its economy entered its strongest growth period since 1978. The GDP annual growth rate peaked at 14.2% in 2007, just before the 2008 global financial crisis. During the financial crisis (2008–2010), China's average GDP growth was 9.9%, lower than the pre-crisis average of 11.3% (2002–2007).

The average GDP growth between 2011 and 2019 was 7.4%. From 2011 China's economic growth began a prolonged slowdown. In early 2012 the central government lowered China's GDP annual growth target from 8.0% to 7.5%. Before this adjustment, the central government had maintained the 8.0% target for 7 consecutive years, from 2005 to 2011.

The 8% growth target was considered the minimum rate necessary for social stability and confidence in investment and consumption.[23,24] Since 1992 only the GDP annual growth rates for 1998 and 1999 have been lower than 8% because of the impact of the 1997 Asian financial crisis.[25]

Between 2011 and 2019, the central government lowered GDP growth targets four times, with the target for 2019 set at 6%–6.5%. This frequent adjustment of GDP growth targets reflected the challenges faced by China's economy during this period. Since its growth rate recorded 7.8% in 2012, China's economy has not exceeded 8%, except in 2021 when the economy rebounded from the disruptions caused by COVID-19. When Xi Jinping announced that China's economy had entered a "new normal" in 2014,[26] many interpreted this as the central government officially accepting that the 8% era for China's GDP growth had passed.[27]

The outbreak of COVID-19 led the Chinese government to omit setting an annual GDP growth target for the first time since it began doing so in 1994. Between 2020 and 2024, the average GDP growth rate declined to 4.8%. The latest GDP growth target set for 2025 is *around* 5%, with growth in the first half of 2025 recorded at 5.2%.

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[22] AMRO (ASEAN+3 Macroeconomic Research Office) (2019). *China's Reform and Opening-Up: Experiences, Prospects, and Implications for ASEAN.*

[23] Hunan Provincial Bureau of Statistics (2009). "保八"的意义在于树立信心.

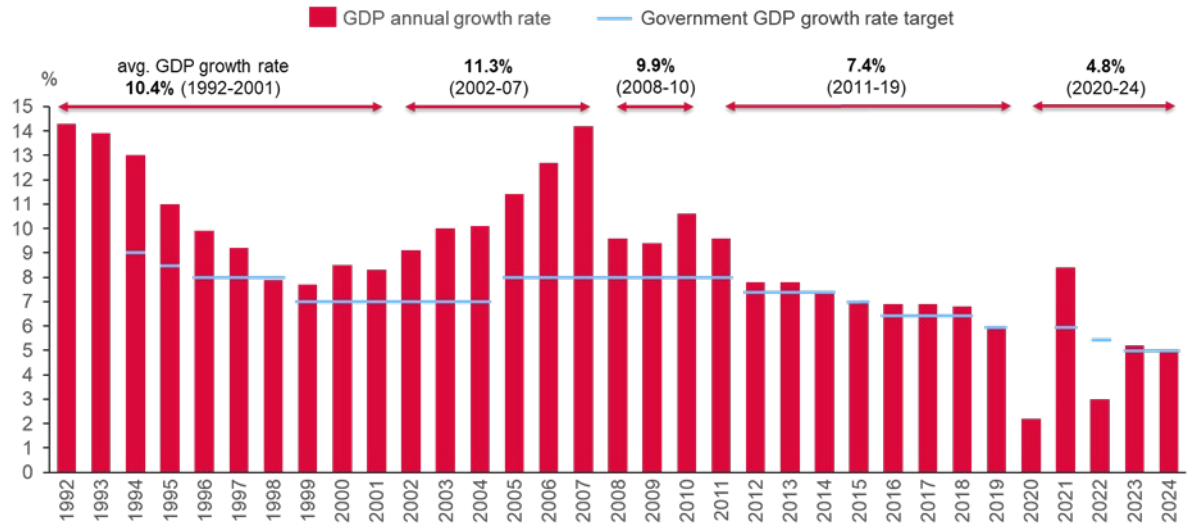
[24] The State Council (2011). 政府工作报告解读：2011 年我国 GDP 增长目标为 8%.

[25] RIETI (2009). 中国应对金融危机的政策措施及当前经济形势.

[26] Xinhua News (2014) 习近平首次系统阐述"新常态".

[27] BBC (2014). 视点：新常态 -- 告别经济高速增长.

FIGURE 1. CHINA'S GDP ACTUAL GROWTH AND GOVERNMENT TARGET, 1992–2024



Source: International Monetary Fund, IMF (2025). People's Republic of China (accessed 11 July 2025); State Council of the People's Republic of China (1994-2024). Report on the Work of the Government.

1.2 China's structural transformation

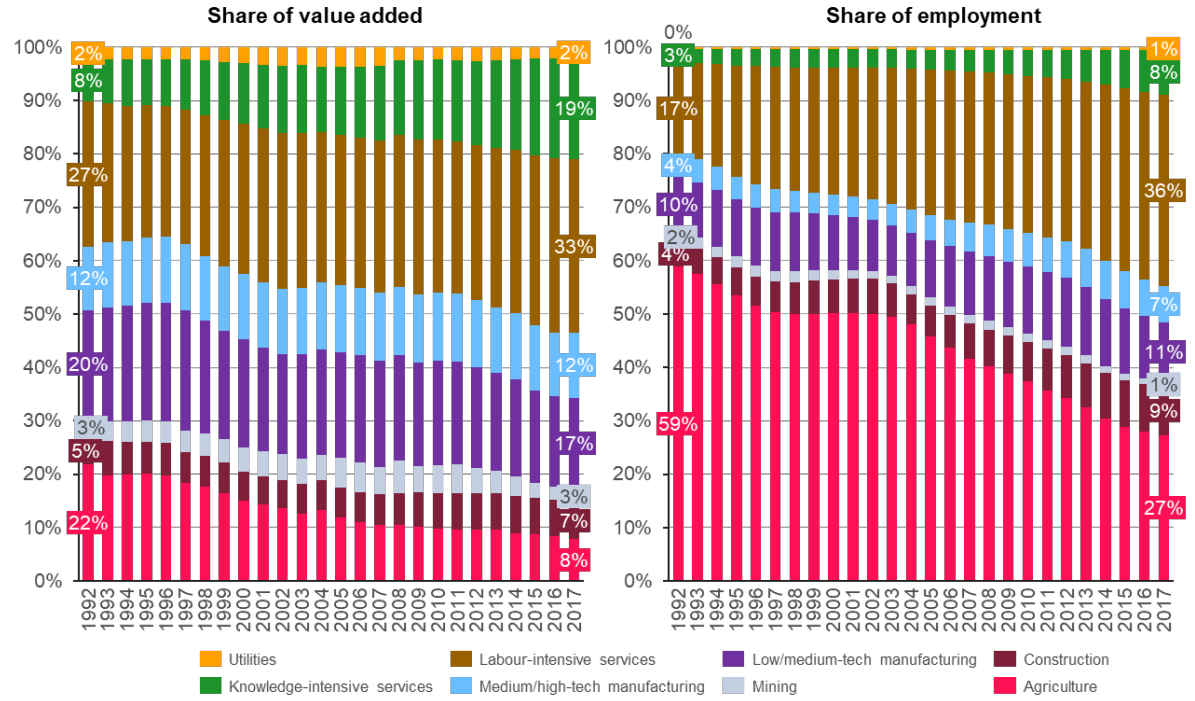
Structural transformation, understood as the shift of agricultural workers to higher-productivity sectors, helps to explain the fast growth of China’s economy, as well as fluctuations in growth pace and the slowdown observed in the last decade.

In 1992 agriculture constituted more than 20% of China’s economy and employed more than half of the workforce. By 2017 agriculture's share of the economy had shrunk to 8%, employing around a quarter of the workforce.[28]

Despite this transformation, agriculture is the second-largest employment sector after labour-intensive services (Figure 2). In terms of value added, labour-intensive services contribute 33% of China’s total value added, the largest share, followed by knowledge-intensive services at 19%, which includes business, professional, scientific, and technical services. The expansion of knowledge-intensive services has been supported by the increasing number of higher-education graduates. Between 2000 and 2022, the number of higher-education graduates in China increased from 0.5 million to 47.2 million.[29]

[28] Research Institute of Economy, Trade and Industry, RIETI (2023). *China Industrial Productivity Database 4.0* (accessed in June 2024).
[29] National Bureau of Statistics. National data (accessed in August 2024)

FIGURE 2. VALUE ADDED AND EMPLOYMENT BY SECTOR GROUP, 1992–2017



Note: Appendix A provides details on the economic activities included in each of these sector groups.

Source: Research Institute of Economy, Trade and Industry, RIETI (2023). *China Industrial Productivity Database 4.0* (accessed in June 2024).

Agricultural workforce participation in non-agricultural activities was legalised by a series of policies following the Reform and Opening up. Prior to these reforms, farmers were restricted to their villages, where their households were registered, and they were limited to engaging in agricultural activities. [30] Since the mid-1980s the government has used the term "rural migrant workers" to refer to the workforce with rural household registrations working in non-agricultural activities. [31]

Rural migrant workers have been the backbone of China's economic development in past decades. In 2024 the number of rural migrant workers was nearly 300 million. With the agricultural workforce continuing to shift to other industries, rural migrant workers made up 68% of employment in manufacturing, 80% in construction, 80%–90% in mining, and 52% in services in 2010. [32] Manufacturing, construction and labour-intensive services such as wholesale and retail trade, and accommodation and catering services, are the main sectors where rural migrant workers are employed (Figure 3).

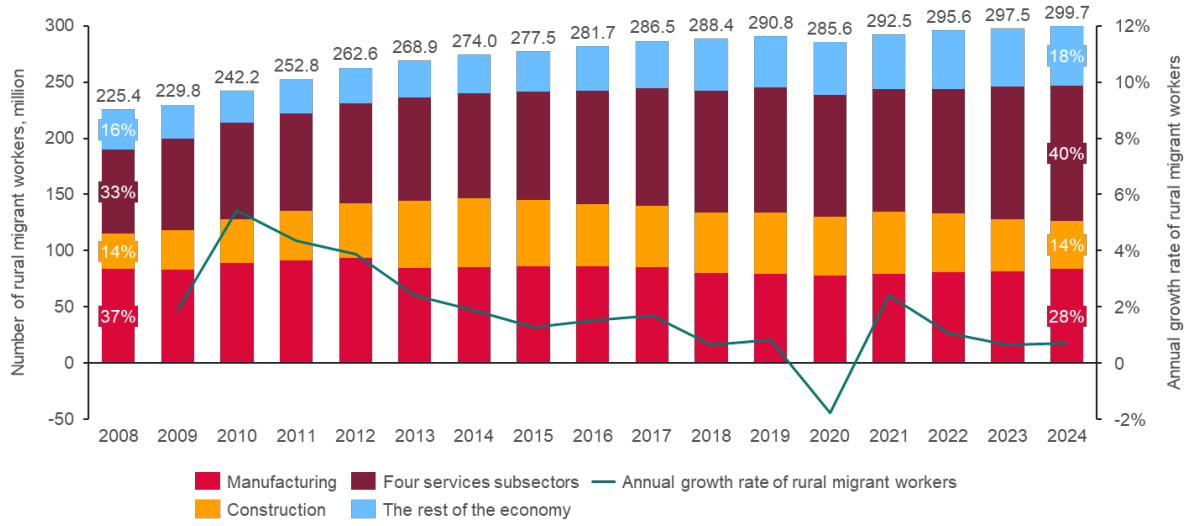
In the 2000s manufacturing became the main sector attracting rural migrant workers (see Section 2). Since then, an increasing number of rural migrant workers have moved to the service sector.

[30] Ministry of Agriculture and Rural Affairs of the People's Republic of China (2008). 改革开放 30 年我国农业与农村经济取得了辉煌成就.
[31] International Labour Office (2011). *Promoting Decent Employment for Rural Migrant Workers.*
[32] The National People's Congress of the People's Republic of China (2010). 不能愧对农民工.

Factors driving this shift include lower skill requirements, higher salaries and more flexibility.[33] Between 2008 and 2024 the share of rural migrant workers in manufacturing, as a proportion of total rural migrant workers, decreased by 9.3 percentage points, while the annual growth rate of the number of rural migrant workers decelerated from 5.4% in 2010 to 0.7% in 2024.

In section 2 we discuss how structural transformation has influenced economic growth and slowdown trends between 1992 and 2017.

FIGURE 3. NUMBER OF RURAL MIGRANT WORKERS BY SECTOR AND ANNUAL GROWTH RATE, 2008–2024



Note: Four services subsectors include 1) wholesale and retail trades, 2) transport, storage and post, 3) accommodation and catering services and 4) service to households and repair. The rest of the economy includes mining, public utilities and the rest of services sectors (i.e. finance, education, administrative services, and health).

Source: China's National Bureau of Statistics. National Survey Report on Rural Migrant Workers (Year 2012-2024).

[33] Xinhua News (2020). 制造业农民工亟待转型升“技”.

2. China's structural transformation and economic growth: 1992–2017

Key messages

- *Changes in China's economic structure help explain the periods of rapid growth and the recent slowdown. Following China's accession to the WTO, the country experienced some of its fastest growth, driven by the expansion of low/medium-tech manufacturing and medium/high-tech manufacturing.*
- *However, as international trade slowed after the global financial crisis of 2008/09, and as China's government prioritised high-tech industries, the role of low/medium-tech manufacturing in the Chinese economy has diminished.*
- *Among sector groups, low/medium-tech manufacturing saw the most significant decline in its contribution to productivity growth, accounting for nearly a third of the overall slowdown in the Chinese economy over the last decade. The textiles and apparel industries were key contributors to this deceleration.*
- *After 2010, knowledge- and labour-intensive services became the primary sectors attracting workers from other industries. However, this shift resulted in a contraction in the employment shares of low/medium-tech manufacturing.*
- *This shift has important implications for the future growth of China's economy. Although knowledge-intensive services have productivity levels more than twice the national average, their relatively small size has limited their ability to offset the slowdown in other sectors. Meanwhile, labour-intensive services, which employ more than a third of the workforce, have productivity levels below the national average and lower than those of manufacturing industries.*

In this section we examine the structural changes observed in China's economy between 1992 and 2017, the different policy developments and events that drove these transformations, and their implications for China's economic growth. We examine four distinct sub-periods: (i) the increasing movement of rural migrant workers and the development of the private sector (1992–2001); (ii) China's accession to the World Trade Organization (WTO) and the growth of its manufacturing industry (2002–2007); (iii) the global financial crisis (2008–2010); and (iv) China's transition to a knowledge economy (2011–2017).

Our statistical analysis is based on data from the China Industrial Productivity Database 4.0, published by the Research Institute of Economy, Trade and Industry (RIETI). However, since this database only covers up to 2017, in Section 3 we draw upon additional data sources to examine China's economic performance from 2018 onwards. We acknowledge the limitations of the RIETI database, such as its higher reported value-added growth rates than other databases. To address these issues, we cross-reference RIETI's data with alternative sources whenever necessary.

Throughout China's economic transformation, we observe changes in how different sectors have contributed to its economic growth and productivity. As discussed in Section 1, rural migrant workers have been the backbone of China's structural change.

As agricultural workers moved to other sectors, agriculture's relative contribution to growth declined between 1992 and 2017. Similarly, the contribution of low/medium-tech manufacturing diminished, particularly after 2007, when the sector appeared to reach its peak in absorbing rural migrant

workers and the central government prioritised developing medium/high-tech manufacturing and knowledge-intensive services. In contrast, labour- and knowledge-intensive services have seen an increase in their contributions to growth across the whole period examined (Table 1).

TABLE 1. CHINA: RELATIVE CONTRIBUTION TO GDP GROWTH BY SECTOR, 1992–2017

Sector group	(1) Private-sector development (1992–2001)	(2) Integration into global value chains (2002–2007)	(3) Global financial crisis (2008–2010)	(4) Transition to a knowledge economy (2011–2017)	(5) (4)–(1)
Labour-intensive services	27.2%	28.1%	28.9%	35.3%	**8.1**
Knowledge-intensive services	11.3%	15.1%	17.0%	21.9%	**10.6**
Low/medium-tech manufacturing	21.2%	20.5%	18.6%	15.1%	**-6.1**
Medium/high-tech manufacturing	12.6%	13.1%	13.1%	11.5%	**-1.1**
Construction	6.3%	5.9%	8.3%	7.0%	**0.7**
Agriculture, forestry, animal husbandry and fishery	13.7%	7.7%	8.5%	6.6%	**-7.1**
Utilities	3.0%	4.0%	-0.2%	2.0%	**-1.0**
Mining	4.6%	5.6%	5.8%	0.5%	**-4.1**
All economy	100%	100%	100%	100%	NA
All economy growth rate (RIETI)	18.7%	14.9%	15.3%	10.9%	**-7.8**
All economy growth rate (IMF)	10.4%	11.3%	9.9%	7.6%	**-3.7**

Note: Contribution computed based on the method used by Zhao and Tang (2018) (see appendix B). As the RIETI database provides higher growth rates than other databases, the table presents the growth rates published by the International Monetary Fund (IMF) for reference.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed June 2024); IMF (2024). China, People's Republic of Dataset (accessed in August 2024).

Differences in the size of sectors, their productivity and pace of growth determine aggregate productivity growth. For this reason, structural change, the shift of labour, and other production factors from low- to high-productivity sectors are a key source of aggregate productivity growth. For instance, a recent World Bank study found that the shift of labour from agriculture into manufacturing and services accounted for around two-fifths of overall labour productivity growth in emerging market and developing economies between 1995 and 2017.[34] Therefore, in the economics literature productivity gains from structural change are referred to as a structural bonus.[35]

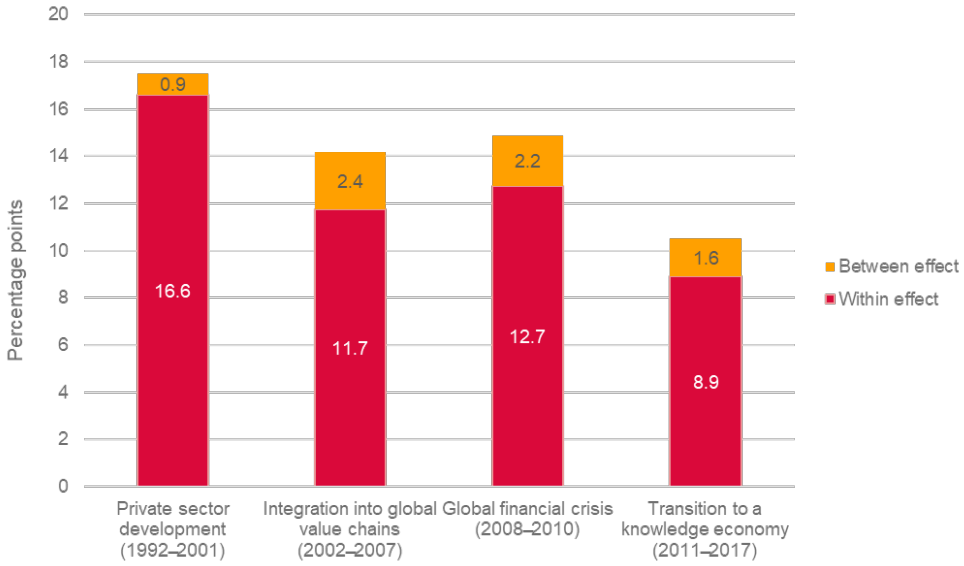
However, as countries industrialise and develop their service sectors, sectoral reallocation becomes a less important source of productivity growth, causing the structural bonus to decline.[36] Although China's rapid economic performance is primarily the result of increases in productivity

[34] Dieppe, A. (2021). *Global Productivity: Trends, Drivers, and Policies*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1608-6.
[35] Timmer, M. P. and Szirmai, A. (2000). Productivity growth in Asian manufacturing: the structural bonus hypothesis examined. *Structural change and economic dynamics*, 11(4): 371–392.
[36] Asian Productivity Organization, APO (2022). *APO Productivity Outlook 2022. Manufacturing labor productivity: Trends and linkages*. Tokyo: Asian Productivity Organization.

across the board, the shift of workers from low- to high-productivity sectors has also made important contributions to China's overall productivity growth.

To understand the extent of these contributions, we decomposed the economy-wide labour productivity growth rates into sectoral contribution effects, as described in Tang and Wang (2004):[37] (i) a within effect that captures the productivity growth of each economic sector, given the relative importance in the economy; and (ii) a between effect that captures the effects of changes in the relative sector sizes (see Appendix B). Figure 4 shows (in yellow) the contribution of structural change (the between effect) to aggregate productivity growth.

FIGURE 4. CHINA: COMPONENTS OF AGGREGATE PRODUCTIVITY GROWTH (1992–2017)



Note: Labour productivity measured as value added per employee.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed 11 June 2024).

As shown in Table 2 and discussed in more detail in the following sub-sections, in the 1990s the structural bonus primarily arose from workers moving from agriculture to labour-intensive services, accounting for 0.93 percentage points of aggregate productivity growth in the 1992–2001 period. However, in the 2000s the expansion of manufacturing accounted for most of the structural bonus, 1.4 percentage points from both low/medium-tech manufacturing (0.65 percentage points) and medium/high-tech manufacturing (0.65 percentage points) (Table 2).

After 2010 knowledge- and labour-intensive services became the main sectors attracting workers from other industries and accounted for most of the structural bonus. Between 2011 and 2017 knowledge-intensive services contributed 1.34 percentage points to aggregate productivity growth because of its expansion, while labour-intensive services contributed 0.82 percentage points. However, these rapid expansions meant a contraction in the employment shares of low/medium-tech manufacturing, and thus a negative contribution from this sector.

[37] Tang, J. and Wang, W. (2004). Sources of aggregate labour productivity growth in Canada and the United States. *Canadian Journal of Economics*, 37(2).

This shift has important implications for the future growth of China's economy. Despite their productivity levels being more than twice the national average, knowledge-intensive services only employed 8% of the labour force in 2017, and it is unlikely that they will absorb most of the agricultural workers. In contrast, labour-intensive services, which employed 36% of the workforce in 2017, have productivity levels that are three times those of agriculture, but below the national average and below the productivity level of manufacturing industries, meaning their relative labour productivity is less than "1".

TABLE 2. CHINA: CONTRIBUTION OF LABOUR SHIFTS TO PRODUCTIVITY GROWTH, 1992–2017

Sector group	Contribution of labour shifts to productivity growth (between effect, percentage points) [1/]				Relative productivity, 2017 [2/]
	Private-sector development (1992–2001)	Integration into global value chains (2002–2007)	Global financial crisis (2008–2010)	Transition to a knowledge economy (2011–2017)	
Knowledge-intensive services	0.37	0.55	0.73	1.34	2.3
Labour-intensive services	0.93	0.80	0.56	0.82	0.9
Construction	0.26	0.00	0.26	0.27	0.7
Medium/high-tech manufacturing	-0.09	0.75	0.71	0.24	1.8
Utilities	0.04	0.04	0.03	0.02	4.2
Low/medium-tech manufacturing	-0.07	0.65	0.45	-0.20	1.5
Mining	-0.22	0.01	0.05	-0.33	2.7
Agriculture	-0.32	-0.38	-0.62	-0.55	0.3
Total	0.90	2.43	2.16	1.60	1.0

Note: [1/] Between effect computed using the generally exactly additive decomposition (GEAD) by Tang and Wang (2004) (see Appendix B). [2/] Relative productivity based on value added per employee, computed as the ratio of each sector's productivity over the average productivity of the total economy.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed 11 June 2024).

Among sector groups, low/medium-tech manufacturing experienced the most significant decline in its contribution to productivity growth, with a decrease of 2.14 percentage points between the subperiods 1992–2001 and 2011–2017. This decline accounts for nearly a third of the overall slowdown in the Chinese economy during this period. Textiles and apparel industries were key contributors to this deceleration, accounting for 28% of the reduction in the contribution of low/medium-tech manufacturing to overall productivity growth. This is explained by both slower productivity growth and reductions in employment.

In comparison, knowledge-intensive services was the only sector group expanding their contribution to China's economy. Despite their overall positive growth, their relatively small size has limited their ability to offset the slowdown in other sectors (Table 3).

In the following sub-sections we examine in greater detail the structural changes experienced in each sub-period, and the policy developments and events that drove these transformations.

TABLE 3. CONTRIBUTION TO PRODUCTIVITY GROWTH BY SECTOR GROUP, 1992-2017

Sector group	Contribution to overall productivity growth (percentage points)					(6)
	(1)	(2)	(3)	(4)	(5)	
	Private sector development (1992–2001)	Integration into global value chains (2002–2007)	Global financial crisis (2008–2010)	Transition to a knowledge economy (2011–2017)	(4)-(1)	Relative productivity, 2017[1/]
Labour-intensive services	4.78	3.98	4.31	3.73	**-1.05**	0.94
Knowledge-intensive services	2.00	2.15	2.54	2.32	**0.32**	2.58
Low/medium-tech manufacturing	3.72	2.91	2.76	1.58	**-2.14**	1.47
Medium/high-tech manufacturing	2.21	1.86	1.96	1.20	**-1.01**	1.79
Construction	1.11	0.84	1.24	0.74	**-0.37**	0.80
Agriculture	2.34	1.07	1.26	0.69	**-1.65**	0.29
Utilities	0.54	0.56	-0.04	0.21	**-0.33**	4.26
Mining	0.81	0.79	0.87	0.05	**-0.77**	2.69
Total productivity growth	17.50	14.17	14.89	10.51	-6.99	1.00

Note: Contribution computed based on the method used by Tang and Wang (2004), based on value added per employee. See appendix B. [1/] Relative productivity based on value added per employee, computed as the ratio of each sector's productivity over the average productivity of the total economy.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed 11 June 2024).

2.1 Private-sector development (1992–2001)

Key messages

- *Between 1992 and 2001 China's economy grew at an annual average rate of 10.4%.*
- *The sectors that contributed the most to GDP growth during this period include: low/medium-tech manufacturing (21.2%); agriculture, forestry, animal husbandry and fishery (13.7%); medium/high-tech manufacturing (12.6%); wholesale and retail (7.8%); and construction (6.3%).*
- *During this period many rural migrant workers and, to a lesser extent, laid-off manufacturing workers from state-owned enterprises (SOEs) moved to labour-intensive services and construction.*
- *These transformations were driven by policy reforms that facilitated the movement of migrant workers, bolstered the development of the private sector and restructured SOEs.*

Between 1992 and 2001 China's economy grew at an annual average rate of 10.4%.[38] The sectors that contributed the most to GDP growth during this period include: low/medium-tech manufacturing (21.2%); agriculture, forestry, animal husbandry and fishery (13.7%); medium/high-tech manufacturing (12.6%); wholesale and retail (7.8%); and construction (6.3%) (Table 4).

[38] IMF (2024). China, People's Republic of Datasets (accessed in August 2024).

TABLE 4. CHINA: SECTORAL CONTRIBUTION TO GROWTH AND PRODUCTIVITY, 1992–2001

Sector group	Contribution to growth[1/]	Relative labour productivity[2/]	Productivity growth
Agriculture, forestry, animal husbandry and fishery	13.7%	0.3	13.0%
Mining	4.6%	2.2	26.3%
Utilities	3.0%	6.2	20.5%
Construction	6.3%	1.0	14.8%
Low/medium-tech manufacturing	21.2%	2.0	17.9%
Medium/high-tech manufacturing	12.6%	3.0	19.0%
Labour-intensive services	27.2%	1.2	14.8%
Knowledge-intensive services	11.3%	3.1	17.9%
Total economy	100%	1.0	17.5%

Note: [1/]Contribution computed based on the method used by Zhao and Tang (2018) (see appendix B). Total may not sum to 100% due to rounding. [2/]Labour productivity based on value added per employee, relative productivity computed as the ratio of each sector's productivity over the average productivity of the total economy. Values correspond to the annual average of the period.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed in June 2024).

During this period many rural migrant workers and, to a lesser extent, laid-off manufacturing workers from state-owned enterprises (SOE) moved to labour-intensive services and construction.[39] For agricultural workers, this shift involved moving from low- to high-productivity activities. However, for SOE workers, it meant transitioning from low/medium-tech manufacturing, with productivity levels twice the national average, to labour-intensive services and construction, where productivity levels were around the national average.

China's Reform and Opening Up initially focused on transitioning from a planned economy to a market economy. A critical element of this transition was removing the restrictions on worker movement. The introduction of the "household responsibility system" in 1978 allowed farmers to participate in non-agricultural activities.[40] Further deregulations in 1984 accelerated the migration of rural workers. By 1990 the number of "rural migrant workers" – those with rural household registrations working in non-agricultural activities[41] – exceeded 90 million.[42]

In 1992 Deng Xiaoping's South China Tour and a series of associated speeches signalled a new phase of China's Reform and Opening Up, focusing on establishing a capital market, reforming the financial and fiscal systems and, importantly, developing the private sector.[43]

By 2000 the private sector accounted for 50%–66% of China's GDP, while its employment increased from 8.4 million in 1992 to 34 million in 2000. This reform contributed to the expansion of construction and labour-intensive services, such as wholesale and retail, hotels and restaurants,

[39] Ministry of Human Resources and Social Security (2002). 中共中央 国务院关于进一步做好下岗失业人员再就业工作的通知.
[40] Ministry of Agriculture and Rural Affairs of the People's Republic of China (2008). 改革开放 30 年我国农业与农村经济取得了辉煌成就.
[41] International Labour Office (2011). *Promoting Decent Employment for Rural Migrant Workers.*
[42] 张车伟, 赵文, & 李冰冰. (2022). 农民工现象及其经济学逻辑. *经济研究*.
[43] AMRO (ASEAN+3 Macroeconomic Research Office) (2019). *China's Reform and Opening-Up: Experiences, Prospects, and Implications for ASEAN.*

transport and storage. By 2000 these activities represented around 60% of private-sector employment.[44]

Development of the private sector was accompanied by the nationwide reform of Chinese SOEs. Improving SOE efficiency became a key focus of China's Reform and Opening Up policy in the late 1990s. The central government adopted the approach of "*Grasp the Large, Let Go of the Small*", merging key large SOEs into several industrial conglomerates controlled by central or local governments, while closing or privatising other large loss-making SOEs and small SOEs.[45,46]

The SOE reform led to 30 million surplus SOE workers being laid off in the 1990s.[47] The consumer-goods manufacturing sector, including the manufacture of textiles, wearing apparel and home appliances, was the primary focus of these SOE reforms.[48] In the textile manufacturing sector, 1.2 million SOE workers were laid off between 1998 and 2000.[49]

Between 1992 and 2001 the employment shares of agriculture, forestry, animal husbandry and fishery declined by 8.9 percentage points, around 27.3 million workers, while the employment shares of the manufacturing sector saw a decline of 0.8 percentage points. In comparison, the shares of labour-intensive services increased by 7 percentage points, around 61.7 million workers, and in construction by 2.1 percentage points, around 18 million workers (Table 5).

TABLE 5. CHINA: VALUE ADDED AND EMPLOYMENT SHARES BY SECTOR, 1992 AND 2001

Sector	Value added			Employment		
	1992	2001	Changes (pp.)	1992	2001	Changes (pp.)
Agriculture, forestry, animal husbandry and fishery	21.8%	14.3%	**-7.5**	59.0%	50.1%	**-8.9**
Mining	3.4%	4.7%	**1.2**	2.0%	1.6%	**-0.4**
Utilities	2.3%	3.3%	**1.0**	0.3%	0.4%	**0.1**
Construction	5.2%	5.4%	**0.1**	4.4%	6.5%	**2.1**
Low/medium-tech manufacturing	20.2%	19.3%	**-0.9**	10.4%	10.0%	**-0.4**
Medium/high-tech manufacturing	11.8%	12.2%	**0.3**	4.2%	3.9%	**-0.4**
Labour-intensive services	27.2%	28.8%	**1.6**	17.2%	24.2%	**7.0**
Knowledge-intensive services	8.0%	12.1%	**4.1**	2.5%	3.4%	**0.8**

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed in June 2024).

[44] Asian Development Bank (2003). 中国私营企业的发展.
[45] Hsieh, C. T. and Song, Z. M. (2015). Grasp the large, let go of the small: The transformation of the state sector in China (No. w21006). *National Bureau of Economic Research*.
[46] Japan Research Institute (1999). The "Three Reforms" in China: Progress and Outlook.
[47] 陈甬军. (1999). 中国过渡经济中的劳动制度改革与劳动力市场发展. *中国经济问题*, (5): 1–7.
[48] 王勇. (2017). "垂直结构" 下的国有企业改革. *国际经济评论*, (5): 9–28.
[49] Heytens, P. J. (2003). 9 State Enterprise Reforms. In *China Competing in the Global Economy*. USA: International Monetary Fund.

2.2 Integration into global value chains (2002–2007)

Key messages

- *Between 2002 and 2007 China's economy grew at an annual average rate of 11.3%.*
- *Agriculture continued the contraction of its workforce by approximately 52.4 million workers, while labour-intensive services sustained their expansion, approximately 31.7 million workers. These years also saw the expansion of both low/medium-tech manufacturing and medium/high-tech manufacturing.*
- *The increasing size of medium/high-tech manufacturing and its higher productivity meant that, for the first time, medium/high-tech manufacturing surpassed the contribution of agriculture to GDP growth.*
- *China's accession to the World Trade Organization (WTO) and industrial policy enabled the country to become the "factory of the world" during this period.*

In December 2001 China joined the World Trade Organization (WTO), enabling China to become the "factory of the world". During this phase China's industrial policies focused on transforming and upgrading low/medium-tech industries and developing medium/high-tech industries. [50] This contributed to sustained double-digit growth rates. Between 2002 and 2007 China's economy grew at an annual average rate of 11.3%.[51]

During this period (2002–2007), agriculture continued the contraction of its workforce by approximately 52.4 million workers (-8.4 pp.), while labour-intensive services sustained their expansion (3.5 pp.), approximately 31.7 million workers (Table 6).

These years also saw the expansion of both low/medium-tech manufacturing (2.4 pp.) and medium/high-tech manufacturing (1.6 pp.) employment shares, sectors with productivity levels above the average (Tables 6 and 7). Manufacturing industries that grew their participation in total employment during this period include: apparel and leather products, electronic and telecommunication equipment, rubber and plastic products and electric equipment.

TABLE 6. CHINA: VALUE ADDED AND EMPLOYMENT SHARES BY SECTOR, 2002 AND 2007

Sector group	Value added			Employment		
	2002	2007	Changes (pp.)	2002	2007	Changes (pp.)
Agriculture, forestry, animal husbandry and fishery	13.6%	10.6%	**-3.0**	50.1%	41.7%	**-8.4**
Mining	4.8%	5.0%	**0.2**	1.5%	1.6%	**0.2**
Utilities	3.5%	3.6%	**0.1**	0.5%	0.5%	**0.1**
Construction	5.3%	5.7%	**0.4**	6.5%	6.5%	**0.1**
Low/medium-tech manufacturing	18.7%	20.0%	**1.3**	9.5%	11.9%	**2.4**
Medium/high-tech manufacturing	12.2%	12.7%	**0.5**	3.8%	5.4%	**1.6**
Labour-intensive services	29.3%	28.5%	**-0.8**	24.7%	28.3%	**3.5**
Knowledge-intensive services	12.6%	13.9%	**1.3**	3.4%	4.0%	**0.6**

[50] Ministry of Commerce (2002). 入世后中国外商投资产业政策展望.
[51] IMF (2024). China, People's Republic of Datasets (accessed in August 2024).

Source: Research Institute of Economy, Trade and Industry. *China Industrial Productivity Database 4.0*. (accessed in June 2024).

The increasing size of medium/high-tech manufacturing and its higher productivity meant that, for the first time, medium/high-tech manufacturing surpassed the contribution of agriculture to GDP growth. The sectors that contributed the most to GDP growth between 2002 and 2007 include: low/medium-tech manufacturing (20.5%); medium/high-tech manufacturing (13.1%); agriculture, forestry, animal husbandry and fishery (7.7%); financial intermediation (6.7%); and wholesale and retail (7.8%) (Table 7).

TABLE 7. CHINA: SECTORAL CONTRIBUTION TO GROWTH AND PRODUCTIVITY, 2002–2007

Sector group	Contribution to growth[1/]	Relative labour productivity[2/]	Productivity growth
Agriculture, forestry, animal husbandry and fishery	7.7%	0.3	11.3%
Mining	5.6%	3.3	15.2%
Utilities	4.0%	7.5	14.8%
Construction	5.9%	0.9	15.3%
Low/medium-tech manufacturing	20.5%	1.9	11.6%
Medium/high-tech manufacturing	13.1%	2.7	8.9%
Labour-intensive services	28.1%	1.1	11.2%
Knowledge-intensive services	15.1%	3.5	12.7%
Total economy	100%	1.0	17.5%

Note: Annual averages. [1/]Contribution computed based on the method used by Zhao and Tang (2018) (see appendix B). Total may not sum to 100% due to rounding. [2/]Labour productivity based on value added per employee, relative productivity computed as the ratio of each sector's productivity over the average productivity of the total economy. Values correspond to the annual average of the period.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed in June 2024).

2.3 Global financial crisis (2008–2010)

Key messages

- *Between 2008 and 2010 China's economy grew at an average rate of 9.9%.*
- *To respond to the financial crisis and stimulate domestic demand, China's central government launched a 3-year economic stimulus package in September 2008, amounting to CNY4 trillion (~US$586 billion), equivalent to 12% of GDP.*
- *The manufacturing sector was prioritised in this stimulus package.*
- *Sectors that expanded their employment shares during this period include: labour-intensive and knowledge-intensive services, construction, and low/medium-tech and medium/high-tech manufacturing.*

As China integrated into the global economy, the financial crisis of 2008 halted its double-digit growth. Between 2008 and 2010 China's economy grew at an average rate of 9.9%.[52] To respond

[52] IMF (2024). China, People's Republic of Datasets (accessed in August 2024).

to the financial crisis and stimulate domestic demand, in September 2008 China's central government launched a 3-year economic stimulus package, amounting to CNY4 trillion (~US$586 billion), equivalent to 12% of GDP. As a result, in 2009 investment contributed 92.3% to China's GDP growth, while consumption accounted for 52.5%, and net exports had a negative contribution of -44.8%.[53] The stimulus package focused on ten areas, including: housing, infrastructure (rural and urban), healthcare, culture and education, the environment, innovation, high-tech industry and services, among other.[54]

The manufacturing sector was prioritised in this stimulus package, including industries such as textiles, bioindustry, machinery and equipment, non-ferrous metals, electronics, petrochemicals, steel, automotive, and shipbuilding industries.[55] Low/medium high-tech manufacturing and medium/high-tech manufacturing increased their employment shares by 0.4 percentage points. Manufacturing industries with the largest expansions in this period include: electric equipment (0.16 pp.), food products (0.15 pp.), electronic and telecommunication equipment (0.12 pp.) and leather and apparel products (0.08 pp.).

Other sectors that increased their employment shares include: labour-intensive services (0.8 pp.), such as wholesale and retail trade and transportation and storage; knowledge-intensive services (0.7 pp.), such as business, professional, scientific and technical services; and construction (0.5 pp.).

Compared to previous years, the downward trend in the employment shares of agriculture flattened, only contracting by 2.8 pp, in comparison with the -8 pp. contractions observed in previous periods. This was the result of lower economic activity and rural migrant workers moving back to rural areas (Table 8).[56]

TABLE 8. CHINA: VALUE ADDED AND EMPLOYMENT SHARES BY SECTOR, 2008–2010

Sector group	Value added			Employment		
	2008	2010	Changes (pp.)	2008	2010	Changes (pp.)
Agriculture, forestry, animal husbandry and fishery	10.5%	9.8%	**-0.7**	40.2%	37.4%	**-2.8**
Mining	6.2%	5.2%	**-1.0**	1.6%	1.6%	**-0.1**
Utilities	2.6%	2.4%	**-0.2**	0.5%	0.5%	**0.0**
Construction	5.9%	6.6%	**0.7**	6.9%	7.4%	**0.5**
Low/medium-tech manufacturing	19.7%	19.6%	**-0.2**	12.2%	12.6%	**0.4**
Medium/high-tech manufacturing	12.7%	12.9%	**0.2**	5.8%	6.2%	**0.4**
Labour-intensive services	28.5%	28.6%	**0.2**	28.6%	29.4%	**0.8**
Knowledge-intensive services	13.9%	15.0%	**1.1**	4.2%	4.9%	**0.7**

[53] The People's Bank of China (2010). Annual Report 2009.
[54] China's central government (2009). 发展改革委通报 4 万亿元投资重点投向和资金测算.
[55] *China Daily*. Fiscal Stimulus Package (accessed in June 2024).
[56] Chan, K. W. (2010). The global financial crisis and migrant workers in China: "There is no future as a labourer; returning to the village has no meaning". *International journal of urban and regional research*, 34(3): 659–677.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed in June 2024).

The sectors that contributed the most to GDP growth during this period (2008–2010) include: low/medium-tech manufacturing (18.6%); medium/high-tech manufacturing (13.1%); wholesale and retail (10.6%); agriculture, forestry, animal husbandry and fishery (8.5%); and construction (8.3%) (Table 9).

TABLE 9. CHINA: SECTORAL CONTRIBUTION TO GROWTH AND PRODUCTIVITY, 2008–2010

Sector group	Contribution to growth[1/]	Relative labour productivity[2/]	Productivity growth
Agriculture, forestry, animal husbandry and fishery	8.5%	0.3	17.9%
Mining	5.8%	3.4	13.8%
Utilities	-0.2%	4.8	-0.6%
Construction	8.3%	0.9	16.5%
Low/medium-tech manufacturing	18.6%	1.6	11.7%
Medium/high-tech manufacturing	13.1%	2.1	9.8%
Labour-intensive services	28.9%	1.0	13.1%
Knowledge-intensive services	17.0%	3.2	12.8%
Total economy	100%	1.0	14.2%

Note: Annual averages. [1/]Contribution computed based on the method used by Zhao and Tang (2018) (see appendix B). Total may not sum to 100% due to rounding. [2/]Labour productivity based on value added per employee, relative productivity computed as the ratio of each sector's productivity over the average productivity of the total economy. Values correspond to the annual average of the period.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed in June 2024).

2.4 Transition to a knowledge economy (2011–2017)

Key messages

- *Between 2011 and 2017 China's economy grew at a rate of 7.6%.*
- *This slowdown resulted from a combination of factors, including declining global demand, shrinkage in activities with above-average productivity levels, and slower productivity growth across several sectors.*
- *During this period industrial policy adopted an emphasis on innovation as a key driver of economic development.*
- *The employment share of knowledge-intensive services increased from 5.1% in 2011 to 8.3% in 2017. Because of this expansion and higher productivity growth, for the first time knowledge-intensive services surpassed low/medium-tech manufacturing in their contribution to China's GDP growth.*

After the global financial crisis, China's economy continued to slow down. Between 2011 and 2017 China's economy grew at a rate of 7.6%,[57] falling short of the 8% growth target set by China's

[57] IMF (2024). China, People's Republic of Datasets (accessed in August 2024).

central government, which is regarded as the minimum rate necessary for social stability and confidence in investment and consumption.[58,59]

This slowdown is the result of a combination of factors, including declining global demand, shrinkage of activities with above-average productivity levels, and slower productivity growth across several sectors.

Between 2011 and 2017 global exports grew at an average rate of 3.0% per year, while in the pre-crisis period (2002–2007) they had grown at an average rate of 14.6% per year.[60] This slower trade trend was reflected in the shrinkage and slower growth of some manufacturing industries.

For instance, low/medium-tech manufacturing reduced its employment shares by 1.6 percentage points from 2011 and 2017, and medium/high-tech manufacturing only saw a 0.2 percentage point expansion of employment shares during this period (Table 10), while in the pre-crisis period (2002–2007) it had expanded by 1.6 percentage points. This has had a negative impact on aggregate productivity growth, as both sectors have productivity levels above the national average, that is relative productivity values above "1", as shown in Table 11.

Mining is another sector with above-average productivity that saw a decline in employment shares by -0.6 percentage points from 2011 to 2017 (Tables 10 and 11). The employment decline in mining and low/medium-tech manufacturing is partially explained by the Supply-Side Structural Reform, initiated by the central government in 2015[61] with the aim of cutting excess industrial capacity on steel and coal production.[62]

As employment shares in mining, low/medium-tech manufacturing and agriculture declined, labour-intensive services expanded more rapidly, increasing their employment shares by 5.8 percentage points from 2011 to 2017. This expansion was larger, in relative terms, than that experienced during the pre-crisis period (2002–2007), by 3.5 percentage points.

TABLE 10. CHINA: VALUE ADDED AND EMPLOYMENT SHARES BY SECTOR, 2011 AND 2017

Sector	Value added			Employment		
	2011	2017	Changes (pp.)	2011	2017	Changes (pp.)
Agriculture, forestry, animal husbandry and fishery	9.7%	7.9%	**-1.8**	35.7%	27.3%	**-8.4**
Mining	5.4%	2.6%	**-2.8**	1.5%	0.9%	**-0.6**
Utilities	2.5%	2.0%	**-0.5**	0.5%	0.5%	**0.0**
Construction	6.7%	6.7%	**0.0**	7.7%	9.0%	**1.3**
Low/medium-tech manufacturing	19.2%	17.2%	**-2.0**	12.8%	11.2%	**-1.6**
Medium/high-tech manufacturing	12.8%	12.1%	**-0.6**	6.5%	6.8%	**0.2**
Labour-intensive services	28.5%	32.5%	**4.0**	30.0%	35.9%	**5.8**

[58] Hunan Provincial Bureau of Statistics (2009). "保八"的意义在于树立信心.
[59] The State Council (2011). 政府工作报告解读：2011 年我国 GDP 增长目标为 8%.
[60] The Word Bank. World Development Indicators (accessed in June 2024).
[61] The State Council Information Office (2021). Supply-Side Structural Reform.
[62] The State Council (2016). 为什么说"去产能"是中国经济的关键所在？

Knowledge-intensive services	15.2%	19.0%	**3.8**	5.1%	8.4%	**3.2**

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed in June 2024).

These shifts in employment shares made labour-intensive services the main employer sector in 2017 (Table 10). However, this change has slowed productivity growth, since labour-intensive services have below-average productivity levels, meaning their relative labour productivity is less than "1" (Table 11).

TABLE 11. CHINA: SECTORAL CONTRIBUTION TO GROWTH AND PRODUCTIVITY, 2011–2017

Sector	Contribution to growth[1/]	Relative labour productivity[2/]	Productivity growth
Agriculture, forestry, animal husbandry and fishery	6.6%	0.3	13.1%
Mining	0.5%	2.7	7.7%
Utilities	2.0%	4.3	8.1%
Construction	7.0%	0.8	6.9%
Low/medium-tech manufacturing	15.1%	1.5	9.6%
Medium/high-tech manufacturing	11.5%	1.8	7.8%
Labour-intensive services	35.3%	0.9	9.8%
Knowledge-intensive services	21.9%	2.6	6.1%
Total economy	100%	1.0	14.9%

Note: Annual averages. [1/]Contribution computed based on the method used by Zhao and Tang (2018) (see Appendix B). Total may not sum to 100% due to rounding. [2/]Labour productivity based on value added per employee, relative productivity computed as the ratio of each sector's productivity over the average productivity of the total economy. Values correspond to the annual average of the period.

Source: RIETI (2023). *China Industrial Productivity Database 4.0*. (accessed in June 2024).

In light of the prolonged slowdown of China's economy, and in response to growing concerns about the future, Xi Jinping publicly introduced the term "new normal" in 2014. Xi stated that China's economic growth would shift from high speed to medium/high speed, with ongoing upgrades to the economic structure during this period of the "new normal". He emphasised that innovation would be the key driver of China's future economic development.[63]

As a reflection of this turn in industrial policy, this period also saw a substantial increase in the employment shares of knowledge-intensive services, from 5.1% in 2011 to 8.3% in 2017. Because of this expansion and higher productivity growth, for the first time knowledge-intensive services (21.9%) surpassed low/medium-tech manufacturing's contribution to GDP growth (15.1%). Knowledge-intensive services with some of the largest contributions to growth include financial intermediation (7.2%), leasing, technical, science and business services (7%), and post and telecommunications (3.9%).

[63] Xinhua News (2014). 习近平首次系统阐述“新常态”.

3. ‘High-quality’ development and trade wars: 2018–2022

Key messages

- *In the years following 2017, China's economic growth decelerated, averaging 5.3% annually between 2018 and 2022. Despite this slowdown, China's growth rate remained significantly higher than that of both advanced and emerging economies.*
- *In 2017 Xi Jinping acknowledged that China’s economy had shifted from rapid growth to a stage of ‘high-quality’ development.*
- *The trade conflicts with the US and the EU have had a profound impact on China’s exports and economic growth. Between 2018 and 2022 China’s exports grew at an annual average rate of 0.3%, with negative rates observed between 2019 and 2021.*
- *China’s industrial innovation policy increasingly prioritises transforming traditional industries, fostering emerging industries, and building future-oriented industries. Reflecting this, medium/high-tech manufacturing have grown faster than low/medium-tech manufacturing. Key industries driving this growth include machinery and equipment and computers, communication and electronic equipment.*
- *China has also increased its outward investment in manufacturing, with a focus on industries such as automotive, computers, communication and other electronic equipment, and chemical materials and chemical products. Investments have also diversified towards ASEAN and Latin America.*
- *Simultaneously, China has improved its innovation capabilities. In 2022, China ranked fourth globally in domestic patent applications per million inhabitants and ninth in intellectual property exports. Key areas of expertise include computer technology, measurement, and electrical machinery.*

In this section we explore China’s economic performance after 2017 and the factors influencing this, including trade barriers, the COVID-19 pandemic and structural shifts in the economy. We discuss the strategic policy responses that have shaped China's transition from a labour-intensive to a knowledge-intensive economy, highlighting the role of industrial innovation and sectoral transformation.

3.1 China’s economic growth and international trade

In the years following 2017, China's economic growth further decelerated, averaging 5.3% annually between 2018 and 2022 (Figure 5).[64] Despite this slowdown, China's growth rate remained significantly higher than that of advanced economies, which averaged 1.7%, and emerging and developing economies, which averaged 3.5% during the same period.[65]

This recent slowdown can be attributed to various factors, including increasing trade barriers, the COVID-19 pandemic, weak domestic demand, the real estate crisis and the reconfiguration of global value chains.[66] However, the Chinese government has also recognised that the slowdown

[64] IMF (2024). China, People's Republic of Datasets (accessed in August 2024).
[65] IMF (2024). World Economic Outlook. Real GDP growth.
[66] Nicita, A. and Razo, C. (2021). China: The rise of a trade titan.

is a result of the country's economic development and the related transition from a labour-intensive economy to a knowledge-intensive one. For instance, in October 2017 Xi Jinping stated that China's economy had shifted from a phase of rapid growth to a stage of 'high-quality' development.[67]

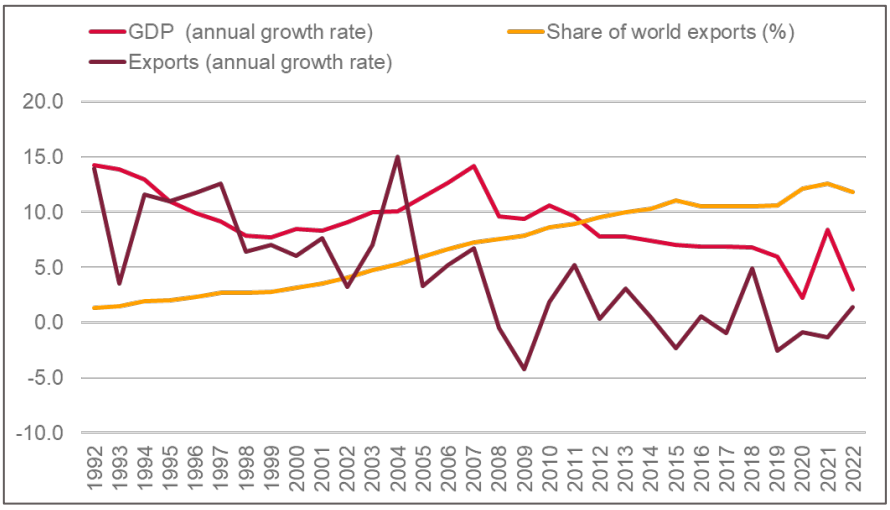
China's economic performance has increasingly relied on exports since its transformation. The contribution of net exports to China's GDP growth increased from an average of 5% between 1998 and 2002 to nearly 25% during 2003-2007.[68] However, the latest contribution of net exports was -11.4% in 2023.[69]

Since joining the World Trade Organization in 2001, China has become a key trading partner for many countries worldwide.[70] For instance, in 2015 it became the top trading partner of the United States, surpassing Canada and Mexico.[71] However, this trade relationship worsened in March 2018 as the United States imposed tariffs on steel and aluminium, followed by additional 25% tariffs on imports from China valued at $50 billion, $34 billion in July 2018 and $16 billion in August 2018, quickly escalating into a trade war.[72]

Since then, China has faced increasing trade barriers from the US, the EU and other trade partners.[73] In parallel, the world is experiencing a relocation of investments, known as "friend-shoring" or "nearshoring".

Between 2018 and 2022 China's exports grew at an annual average rate of 0.3%, with negative rates observed between 2019 and 2021 (Figure 5). Although China's leadership in global exports is unlikely to be significantly challenged in the near future, slower economic and trade growth is expected because of both external tensions and shifts in government's priorities.[74]

FIGURE 5. CHINA: GROSS DOMESTIC PRODUCT AND EXPORTS PERFORMANCE, 1992–2022



[67] Xinhua News (2021). 第一观察丨高质量发展"高"在哪儿？习近平总书记这样解析.
[68] Hong Kong Monetary Authority (2009). *How Much Do Exports Matter for China's Growth?*
[69] National Bureau of Statistics (2024). 赵同录：经济持续稳定恢复 运行态势回升向好
[70] Nicita, A. and Razo, C. (2021). China: The rise of a trade titan.
[71] United States International Trade Commission. U.S. Trade by Industry Sector and selected Trading Partners.
[72] Itakura, K. (2020), Evaluating the Impact of the US–China Trade War. *Asian Economic Policy Review*, 15: 77–93.
[73] Nicita, A. and Razo, C. (2021). China: The rise of a trade titan.
[74] Nicita, A. and Razo, C. (2021). China: The rise of a trade titan.

Source: World Bank. *World Development Indicators* (accessed in June 2024); IMF (2024). China, People's Republic of Dataset (accessed in August 2024).

3.2 Manufacturing as a priority sector

In response to these challenges and as part of its long-term strategies, the Chinese government has prioritised both transforming traditional industries and fostering emerging and future-oriented industries.[75,76] The emerging industries, mainly in high-tech manufacturing, have increased their participation in the economy, accounting for 13% of China's GDP in 2023.[77] In particular, the so-called "New Three" industries – electric vehicles, lithium-ion batteries and solar cells – which have been heavily promoted by the Chinese government, although have increased their participation in the economy, contributed only 4.5% of total Chinese exports in 2023.[78]

In 2015 China's central government published *Made in China 2025*, an industrial policy focused on developing domestic technology and innovation capabilities. It targets high-tech manufacturing industries and R&D activities, making resources available to invest within China and abroad.[79]

In 2017, while stating that China's economy had entered a phase of 'high-quality' development, Xi Jinping pledged that the party would focus on developing industrial systems to upgrade the economic structure by leveraging synergies among the 'real' economy, technology and innovation, finance and human capital. Following this statement, a series of sectoral-oriented industrial policies were published between 2019 and 2023, targeting medium/high-tech manufacturing, including: electric vehicles, photovoltaics, energy electronics, biogas, robots, medical devices, industrial machinery and integrated circuits.[80]

Supported by these policies, medium/high-tech manufacturing industries have experienced faster growth than low/medium-tech manufacturing industries (Figure 6). Between 2018 and 2022, most medium/high-tech manufacturing sectors saw increases in profits and/or employment, with the exception of car makers, which experienced a 17.2% decrease in profits and a 3.5% decrease in employment during the reference period.

In 2022, the manufacture of computers, communication and other electronic equipment; and electrical machinery and equipment ranked among the most profitable manufacturing sectors, generating CNY 785 billion (~USD 117 billion) and CNY 582 billion (~USD 87 billion) respectively. These are also the industries with among the largest employment shares in manufacturing employment, 14% for the manufacture of computers, communication and other electronic equipment, and 8% for electrical machinery and equipment.[81]

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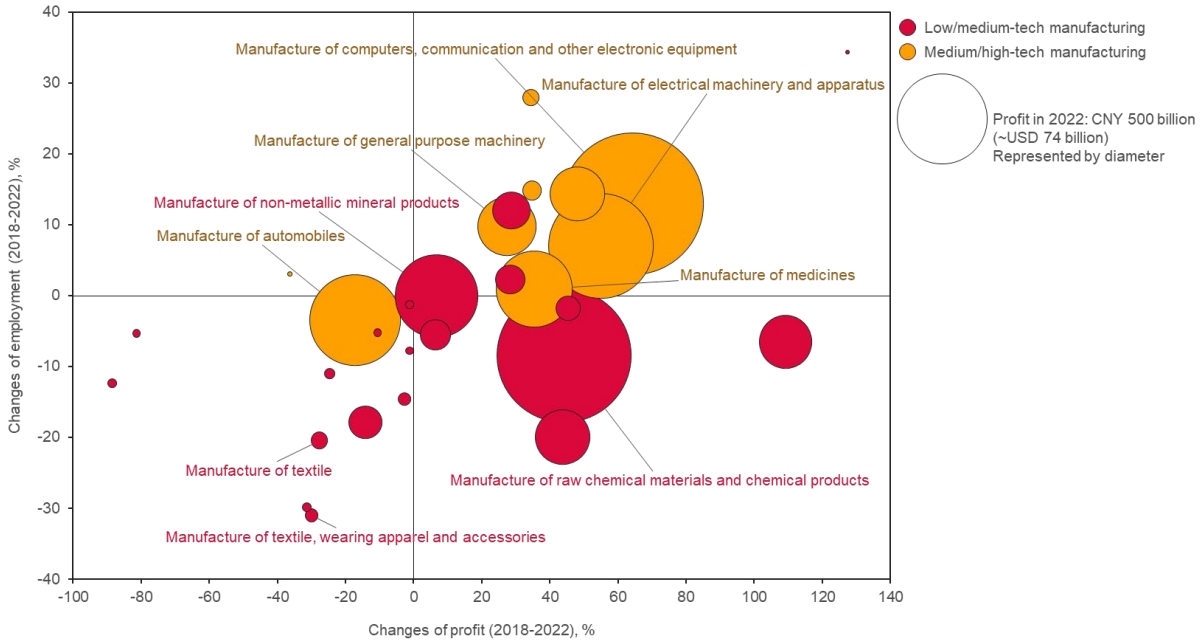
[75] *Financial Times* (2024). China's Xi Jinping bets on high tech for "great rejuvenation".
[76] Fan, Z. (2024). China's emerging industrial vision: the significance and impact of "New Quality Productive Forces". Cambridge Industrial Innovation Policy.
[77] *People's Daily* (2024). 新华社经济随笔丨"新三样"逆袭的启示.
[78] Citi (2024). China Economics: Out With the Old Three and In With the New Three.
[79] Wübbeke, J. (2016). *Made in China 2025. The making of a high-tech superpower and consequences for industrial countries.* Papers on China. Mercator Institute for China Studies.
[80] Our Scottish Future (2023). The Case for Industry Sector Strategies.
[81] National Bureau of Statistics (2023). *China Statistical Yearbook 2023.*

In comparison, many low/medium-tech manufacturing industries experienced declines in both profits and employment between 2018 and 2022. Although some industries, such as the manufacture of raw chemical materials and chemical products, did record profit growth, their employment levels decreased during this period.

FIGURE 6. PROFITS AND EMPLOYMENT CHANGES IN MANUFACTURING, 2018-2022

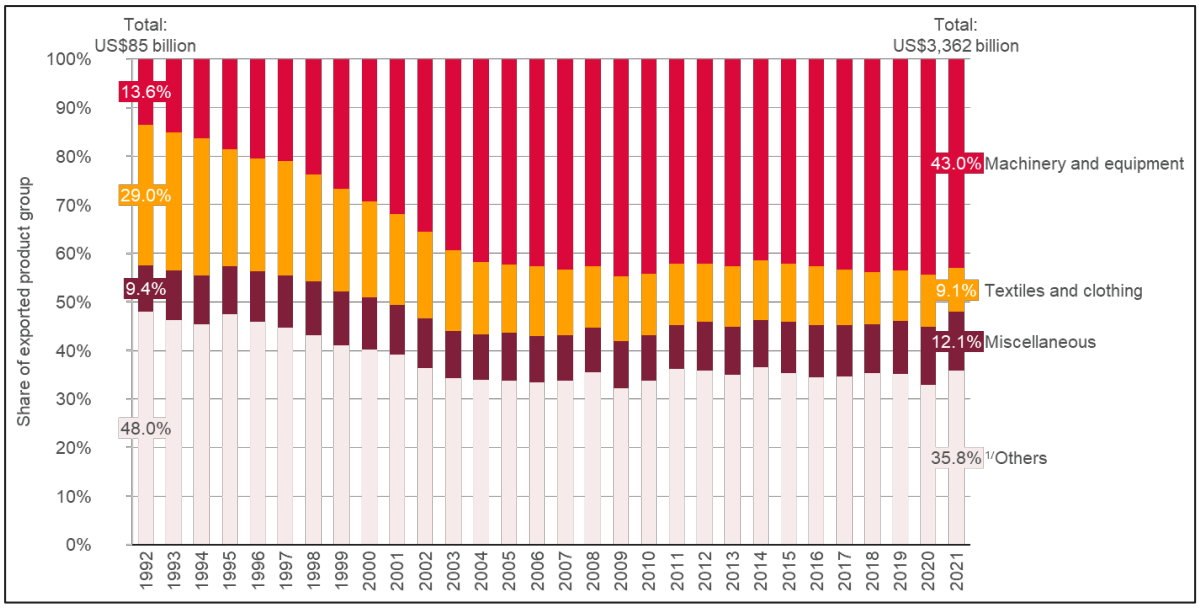


Note: Include 'above designated size' manufacturers only. Since 2011, manufacturers above Designated Size refer to all manufacturing enterprises whose annual primary business incomes exceed CNY 20 million, covering both state-owned and private enterprises.

Source: National Bureau of Statistics of China. *Statistical Yearbook.*

Machinery and equipment have also become the main export from China. In 1992 machinery and equipment represented 13.6% of total exports, while textiles and clothing accounted for 29%. Meanwhile, in 2021 machinery and equipment represented 43% of total exports, while textiles and clothing decreased to 9.1% (Figure 7).

FIGURE 7. CHINA: EXPORTS BY PRODUCT, 1992–2021



Note: 1/ '*Others*' includes the product groups of minerals, animal, vegetable, leather products, food products, fuels, wood, footwear, stone and glass, plastic or rubber, transportation, chemicals, and metals.

Source: World Bank (2024). *World Integrated Trade Solution* (accessed in June 2024).

Shifts in investment flows also illustrate changes in the central government's priorities and the structural transformation of the Chinese economy. Manufacturing has seen a decline in its share of foreign direct investment (FDI). In 2002 manufacturing represented 70% of total FDI in China, but by 2022 this had decreased to 26.3%. While manufacturing remains the primary recipient of FDI, other industries have seen significant increases. In 2022 leasing and business services accounted for 17.5% of inward FDI in China, scientific research and technical services accounted for 16%, and information technology and communication accounted for 12.6%.[82]

At the same time, since 2015 China has increased its outward investment in manufacturing. Between 2016 and 2021 Chinese investments in overseas manufacturing activities totalled over US$150 billion, almost twice the amount recorded between 2011 and 2015.[83] Key industries receiving these investments include: automotive (US$25 billion); computers, communication and other electronic equipment (US$15 billion); raw chemical materials and chemical products (US$15 billion); and medicines (US$12 billion).[84]

Meanwhile, the main receptor countries/regions of China's manufacturing investment in 2022 were Hong Kong (US$73.7 billion), ASEAN (US$49.3 billion), Latin America (US$47.7 billion), the EU (US$34.3 billion) and the US (US$24.8 billion). Notably, since 2020, when investments exceeded

[82] National Bureau of Statistics. National data (accessed in June 2024).
[83] Ibid.
[84] Ministry of Commerce of the People's Republic of China, Statistical Bulletin of China's Outward Foreign Direct Investment (2016–21).

US$40 billion,[85] Latin America has been an attractive destination for Chinese investments in manufacturing.

3.3 A rising leadership in technology and innovation

Over the past decade, China has strengthened its capabilities in technology and innovation. The number of domestic patent applications per million inhabitants in China experienced a nearly five-fold increase between 2010 and 2022, recording 1,037 in 2022. China ranks fourth globally, following South Korea (3,559), Japan (1,749) and Switzerland (1,168).[86]

In 2022 China generated US$13.5 billion from exporting intellectual property (IP), ranking ninth globally, ahead of Singapore, which earned US$13.2 billion in the reference period. China's IP exports have seen a significant rise from 22nd place in 2010.[87] Computer technology, measurement and electrical machinery were the top three technology fields with the most patent publications from Chinese applicants in 2022.[88]

During the same period (2010–22), the number of China's scientific publications increased by 51.8%, from 1.4 million to 2.2 million.[89] In 2022 the top five disciplines accommodating the most Science Citation Index (SCI) publications were clinical medicine, chemistry, biology, materials science, and electronics and communication.[90]

China continues to strengthen its innovation capacity by developing highly skilled personnel and investing in research and development (R&D) activities. In 2023 there were 6.6 million R&D personnel (full-time equivalent) in China, a 158% growth compared to 2.6 million in 2010. China's total R&D expenditure in 2022 was ¥3.1 trillion (~US$458 billion), accounting for 2.5% of its GDP. In comparison, the total R&D expenditure of China in 2010 was ¥706 billion (~US$104 billion), equal to 1.7% of China's GDP in the same year.

The business R&D expenditure accounted for 79% of the more-than CN¥3 trillion R&D investment.[91] Among the sectoral distribution of the top 1,000 private enterprises by R&D investment, the top three sectors were: (i) the manufacture of communication equipment, computers and other electronic equipment; (ii) information technology (IT) services; and (iii) the manufacture of electrical machinery and equipment.[92]

[85] Ibid.
[86] WIPO. IP Statistics Data Centre (accessed in June 2024).
[87] WIPO (2024). Cross-border Payments for the Use of Intellectual Property (IP) surpass 1 trillion US Dollars in 2022, a record high.
[88] WIPO. *WIPO IP Statistics Data Center* (accessed in August 2024).
[89] National Bureau of Statistics. National data (accessed in June 2024).
[90] Institute of Scientific and Technical Information of China (2023). Statistical Data of Chinese S&T Papers.
[91] National Bureau of Statistics. National data (accessed in June 2024).
[92] All-China Federation of Industry and Commerce (2023). 2023 研发投入前 1000 家民营企业创新状况报告.

4. Final reflections

In September 1982 Deng Xiaoping proposed the concept of “Socialism with Chinese Characteristics” at the 12th National Congress of the Chinese Communist Party.[93] This concept provided a theoretical framework for Reform and Opening Up policies. As Deng’s successors continued to develop and enrich this concept, it has become the guiding theory for China's development.[94]

In his 1984 speech Deng outlined the key principles of “Socialism with Chinese Characteristics”: developing productive forces, opening up to global trade, conducting urban reform, mobilising the rural workforce, and attracting foreign investment, technology and management expertise.[95] By adhering to these principles, both central and local governments have facilitated China's profound transformation, as discussed in this report.

However, several challenges have raised concerns about the future of these principles and the private sector’s role in China’s economy. The slowdown in economic growth since 2011, the disruption caused by the COVID-19 pandemic, and recent geopolitical tensions have all contributed to the uncertainty about the continued momentum of China’s economic growth since the Reform and Opening Up.[96]

Our analysis provides evidence of a declining structural bonus (productivity gains from workers moving from lower- to higher-productivity sectors) as a key factor in China’s economic slowdown since 2011. As more sophisticated industries expand their participation in the economy, rural migrant workers are increasingly moving to lower-productivity service sectors rather than low/medium-tech manufacturing roles, which have higher productivity levels. This is particularly relevant because agriculture workers still accounted for 22% of the total workforce in 2021, representing approximately 165 million people.[97]

Our study also underscores the ongoing influence of industrial policy in shaping China's economic performance. Developing productive forces and engaging in global trade and investment remain widely emphasised across China’s policies. In September 2023 Xi Jinping proposed the concept of “New Quality Productive Forces”, highlighting the importance of innovation, technology and the manufacturing sector in China's future economic development.[98]

Chinese companies continue investing in the manufacturing sector, particularly expanding their presence in the “Global South”, a term that has gained prominence in China’s official narratives in

[93] Science and Technology Innovation and Development Center, China Academy of Sciences. 建设有中国特色社会主义是如何提出的.
[94] *People’s Daily*. 坚定不移走中国特色社会主义道路.
[95] Deng Xiaoping (1984). Building a Socialism with a Specifically Chinese Character.
[96] *Financial Times* (2024). The future of “communist capitalism” in China.
[97] Asian Productivity Organization, APO (2024). *APO Productivity Database 2023 Ver. 1.*
[98] Fan, Z. (2024). China’s emerging industrial vision: the significance and impact of “New Quality Productive Forces”. Cambridge Industrial Innovation Policy.

recent years.[99,100] Additionally, enhancing its leadership among the Global South has emerged as one of China's latest movements to expand its international influence and market share.[101]

What can be expected for China's future economic performance? Our sectoral analysis indicates that, as the manufacturing sector slows its expansion and rural migrant workers increasingly move into labour-intensive services, it is unlikely that ongoing structural change will sustain double-digit growth rates in the future. However, recent economic performance and policy developments also suggest that China's growing leadership in innovation and technology may enable the country to maintain growth rates above those of most emerging and advanced economies.

[99] *The Economist* (2024). Who's the big boss of the global south?
[100] Qiushi (CPC Central Committee Bimonthly Journal) (2024). 全球南方新的历史使命.
[101] SOAS China Institute (2024). *Xi Jinping's attitude towards the Global South*. [Podcast]. Available at: https://soundcloud.com/soas-china-institute/ep167-xi-jinpings-attitude-towards-the-global-south

Appendix A. Sector classifications

Table A1. Sector classification and statistical China Industrial Productivity (CIP) codes

Classification of sectors based on the China Industrial Productivity Database (CIP) classification					
Classification	CIP code	Sector	Classification	CIP code	Sector
Low/medium-tech manufacturing	6	Food and kindred products	Agriculture	1	Agriculture, forestry, animal husbandry and fishery
	7	Tobacco products	Construction	26	Construction
	8	Textile mill products	Mining	2	Coal mining
	9	Apparel and other textile products		3	Oil and gas extraction
	10	Leather and leather products		4	Metal mining
	11	Saw mill products, furniture, fixtures		5	Non-metallic minerals mining
	12	Paper products, printing & publishing	Utility	25	Power, steam, gas and tap water supply
	24	Miscellaneous manufacturing industries	Labour-intensive services	27	Wholesale and retail trades
	13	Petroleum and coal products		28	Hotels and restaurants
	15	Rubber and plastics products		32	Real estate activities
	16	Stone, clay, and glass products		29	Transport and storage
	17	Primary & fabricated metal industries		34	Public administration and defense
	18	Metal products		36	Health and social security
Medium/high-tech manufacturing	19	Industrial machinery and equipment		37	Other services
	20	Electric equipment	Knowledge-intensive services	30	Post and telecommunications
	21	Electronic and telecommunication equipment		31	Financial intermediation
	22	Instruments and office equipment		33	Leasing, technical, science & business services
	23	Motor vehicles & other transportation equipment		35	Education
	14	Chemicals and allied products			

Note: The China Industrial Productivity Database (CIP) is a research result of the "East Asian Industrial Productivity" project under the "Raising Industrial and Firm Productivity" programme of the Research Institute of Economy, Trade and Industry (RIETI), in cooperation with the Growth Lab of Peking University and the Institute of Economic Research of Hitotsubashi University.

Table A2. Sector classification and national codes of China's National Bureau of Statistics

Classification of sectors based on the industrial classification for national economic activities					
Classification	**National code**	**Sector**	**Classification**	**National code**	**Sector**
Low/medium-tech manufacturing	13	Processing of food from agricultural products	**Agriculture**	1-5	Agriculture, forestry, animal husbandry and fishery, and related services
	14	Manufacture of foods	**Construction**	47-50	Construction
	15	Manufacture of liquor, beverages and refined tea	**Mining**	6-12	Mining and quarrying
	16	Manufacture of tobacco			
	17	Manufacture of textile			
	18	Manufacture of textile, wearing apparel and accessories			
	19	Manufacture of leather, fur, feather and related products and footwear	**Utility**	44-46	Production and supply of electricity, heat, gas and water
	21	Manufacture of furniture	**Labour-intensive services**	51-52	Wholesale and retail trades
	22	Manufacture of paper and paper products		61-62	Hotels and catering services
	23	Printing and reproduction of recording media		70	Real estate
	24	Manufacture of articles for culture, education, arts and crafts, sport and entertainment activities		53-60	Transport, storage and post
	41-43	Other manufacture, recycle and repair		76-79	Management of water conservancy, environment and public facilities
	20	Processing of timber, manufacture of wood, bamboo, rattan, palm and straw products		80-82	Household service, repair and other services
	25	Processing of petroleum, coal and other fuels		84-85	Health and social service
	26	Manufacture of raw chemical materials and chemical products		86-90	Culture, sports and entertainment
	29	Manufacture of rubber and plastics products		91-97	Public management, social security and social organization
	30	Manufacture of non-metallic mineral products	**Knowledge-intensive services**	63-65	Information transmission, software and information technology
	31	Smelting and pressing of ferrous metals		66-69	Financial intermediation
	32	Smelting and pressing of non-ferrous metals		71-72	Leasing and business services
	33	Manufacture of metal products		73-75	Scientific research and technical services
Medium/high-tech manufacturing	27	Manufacture of medicines		83	Education
	28	Manufacture of chemical fibres			
	34	Manufacture of general purpose machinery			
	35	Manufacture of special purpose machinery			
	36	Manufacture of automobiles			
	37	Manufacture of railway, ship, aerospace and other transport equipment			
	38	Manufacture of electrical machinery and apparatus			
	39	Manufacture of computers, communication and other electronic equipment			
	40	Manufacture of measuring instruments and machinery			

Note: The national codes are for *Industrial classification for national economic activities* published by China's National Bureau of Statistics.

Appendix B. Methods

B.1 Contribution to growth

Sector contribution to real GDP growth is computed following Zhao and Tang's (2018)[102] approach. The method decomposes the aggregate real GDP into its sectoral components:

$$V_t^r = \frac{V_t}{P_t} = \frac{\sum_i v_{it}}{P_t} = \frac{\sum_i p_{it} v_{it}^r}{P_t} = \sum_i \widetilde{p_{it}} v_{it}^r$$

where

V_t: nominal GDP

V_t^r: real GDP

P_t: GDP deflator in year *t*

v_{it}: nominal value added of sector *i* in year *t*

v_{it}^r: real value added of sector *i* in year *t*

p_{it}: value-added deflator of sector *i* in year *t*

$\widetilde{p_{it}} = p_{it}/P_t$: relative price of value added of sector *i* in year *t*

Real GDP can be written as a weighted sum of real value added of its sectors, and the weight for each sector is the relative price of value added of the sector. It suggests that the importance of a sector in real GDP increases with its real output (real value added) or the relative price of the output.

[102] Zhao, J. and Tang, J. (2018). Industrial structure change and economic growth: A China-Russia comparison. *China Economic Review*, *47*: 219–233.

To estimate the sectoral contribution to real GDP growth from year *s* to year *t* (*t* > *s*), the formula in the level format can be written as:

$$\dot{V}^r_{s\to t} \equiv \frac{V^r_t - V^r_s}{V^r_s} = \frac{1}{V^r_s}\sum_i (\tilde{p}_{it} v^r_{it} - \tilde{p}_{is} v^r_{is})$$

$$= \frac{1}{V^r_s}\sum_i [\tilde{p}_{is}(v^r_{it} - v^r_{is}) + (\tilde{p}_{it} - \tilde{p}_{is})(v^r_{it} - v^r_{is}) + (\tilde{p}_{it} - \tilde{p}_{is}) v^r_{is}]$$

$$= \sum_i \frac{\tilde{p}_{is} v^r_{is}}{V^r_s}\left(\frac{v^r_{it} - v^r_{is}}{v^r_{is}} + \frac{\tilde{p}_{it} - \tilde{p}_{is}}{\tilde{p}_{is}} + \frac{v^r_{it} - v^r_{is}}{v^r_{is}}\frac{\tilde{p}_{it} - \tilde{p}_{is}}{\tilde{p}_{is}}\right)$$

$$= \sum_i \left[\frac{v_{is}}{V_s}\dot{v}^r_{i,s\to t} + \frac{v_{is}}{V_s}(1 + \dot{v}^r_{i,s\to t})\dot{\tilde{p}}_{i,s\to t}\right]$$

$$= \sum_i w_{is}\dot{v}^r_{i,s\to t} + \sum w_{is}(1 + \dot{v}^r_{i,s\to t})\dot{\tilde{p}}_{i,s\to t}$$

where

$w_{is} = \frac{v_{is}}{V_s}$: nominal value-added share in total GDP

$\dot{v}^r_{i,s\to t}$: real value-added growth of sector *i* over the period from *s* to *t*, and

$\dot{\tilde{p}}_{i,s\to t} = \frac{\tilde{p_{i,t}} - \tilde{p_{i,s}}}{\tilde{p_{i,s}}}$ is the percentage change in the real value-added price of sector *i* over period *s* to *t*.

B.2 Productivity growth decomposition

We apply the generally exactly additive decomposition (GEAD) by Tang and Wang[103] to examine the sources of industrial contribution to aggregate labour productivity growth across countries. We decompose productivity growth at two different levels of disaggregation: eight sector groups and 35 sectors (see Table A1)

Tang and Wang's methodology allows us to estimate additive sectoral contributions to aggregate labour productivity growth, even when output is measured in chain linked volumes. This methodology recognises that economy-wide labour productivity growth rates depend on: (i) sectoral productivity growth rates, (ii) real output price changes, and (iii) changes in sectoral labour input shares.

Tang and Wang's approach introduces the role of changes in industry output prices and recognises that a sector's contributions to aggregate productivity growth are determined by changes in its relative size. This can be due to a change in a sector's share of total employment, its real output prices, or both. For instance, an increase in a sector's prices compared with the economy-wide price level will increase the sector's contribution to aggregate labour productivity growth, even in the absence of a shift in labour inputs. In this decomposition these effects are combined.

In order to quantify the extent to which economic sectors help to explain the aggregate trends described earlier, we decomposed productivity growth rates in two main components, as described in Tang and Wang: (i) a within effect, which captures the productivity growth of each industrial sector and its relative weight in the overall economy; and (ii) a between effect, which captures changes in the relative size of sectors.

$$g_t = \underbrace{\sum_i \frac{Y_{it-1}}{Y_{t-1}} g_{it}}_{within\ effect(1)} + \underbrace{\sum_i \left(\frac{Z_{it-1}}{Z_{t-1}} (p_{it} l_{it} - p_{it-1} l_{it-1})\right)}_{between\ effect\ (2)}$$

where:

g_t is the aggregate growth in labour productivity measured on the basis of gross value added

[103] Tang, J. and Wang, W. (2004). Sources of aggregate labour productivity growth in Canada and the United States. *Canadian Journal of Economics*, 37(2).

g_{it} is the labour productivity growth of sector i at time t

Y_{it} is the value added of sector i at time t

Y_t is the aggregate value added at time t

Z_{it} is the productivity level of sector i at time t

Z_t is the aggregate productivity level at time t

p_{it} is the relative price of sector i to economy-wide prices, and

l_{it} is sector i's share in total employment.

The within effect captures the contribution made by each sector to the overall labour productivity growth rate, given by the product of each sector's productivity growth rate and its relative size. The between or allocation effect, in contrast, captures the contribution of sectors to aggregate productivity growth due to changes in their relative size over time, given their relative productivity levels. The total contribution of a sector i to national productivity growth is given by the sum of the within and between effects. And the sum of the total sectoral contributions is the aggregate labour productivity rate of a particular year (or sub-period).

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About us

Cambridge Industrial Innovation Policy (CIIP) is a global, not-for-profit policy group based at the Institute for Manufacturing (IfM), University of Cambridge. CIIP works with governments and global organisations to promote industrial competitiveness and technological innovation. We offer new evidence, insights and tools based on the latest academic thinking and international best practices.

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