Labour reallocation, productivity growth and dualism: The case of China

Fung Kwan [a], Yang Zhang [b], Shuaihe Zhuo [c,*]

[a] Department of Economics, University of Macau, Taipa, Macao
[b] Department of Finance and Business Economics, University of Macau, Taipa, Macao
[c] School of Business, Macau University of Science and Technology, Taipa, Macao

A B S T R A C T

Building upon Temple and Wöβmann (2006), we propose a three-sector model to identify the role of labour reallocation to the growth of total factor productivity (TFP) in China since the 1980s. Based on System Generalized Methods of Moments (GMM) dynamic panel data models and a newly-developed provincial human capital stock dataset, our results show that labour reallocation from agriculture to rural non-agriculture is more important than the urban counterparts to output growth and that this effect is more evident in coastal areas of China. Implications of structural transformation for other populous developing economies are discussed.

1. Introduction

Differences in productivity, or more specifically total factor productivity (TFP), have been regarded as highly important in explaining different living standards and levels of economic development among countries. The work by Hall and Jones (1999) is one of the first studies to pinpoint that no less than 60 per cent of the variation in per-worker output can be attributed to differences in TFP. While Chenery and Syrquin (1975) and Stern (1991) contribute to the understanding of structural changes in the economy worldwide, and Headey (2008) examines policy determinants across developing countries (LDCs), the role of structural change on TFP growth through labour reallocation within sectors is very much under-researched.

The importance of inter-sectoral labour reallocation can be traced back to the setting of dualism, which has long been a feature of many developing countries. This analytical framework assumes that an economy has both a traditional sector and a modern sector.[1] The former employs household-based decision-making units to produce goods for subsistence purposes, whereas the latter contractually hires factor inputs to produce goods for profit. Lewis (1954) and Ranis and Fei (1961)[2] claim that the transfer of inefficient labour to modern industrialized sectors is essential to output growth, increasing total production without affecting agricultural output and benefiting the urban manufacturing sector through additional labour supply (Basu, 1997).

One feature of China's industrialization that has not been addressed in the literature is the rapid expansion of non-agricultural production in the countryside. Applying a traditional two-sector model is inadequate to capture the full impact of such labour

---

Table 1
Sectoral Composition of GDP in China (1980–2014, selected years).

	Rural Agriculture	Rural Industry	Rural Service	Urban Industry	Urban Service
1980	29.1	4.5	3.3	42.4	20.7
1985	28.4	8.6	6.7	34.5	21.8
1990	27.1	11.3	9.7	30.4	21.6
1995	20.5	20.7	10.4	28.1	20.3
2000	15.1	21.1	12.2	24.8	26.8
2005	12.1	21.6	12.2	25.8	28.3
2010	10.1	21.2	12.6	25.5	30.7
2011	10.0	21.1	12.2	25.5	31.1
2014	9.2	19.1	13.0	23.5	35.2

Note: All numbers are in percentage terms. Urban agriculture accounts for less than 1 per cent total output.
Sources: Chinese Academy of Social Sciences and National Bureau of Statistics, various issues.

transfer from agriculture to both rural non-agriculture and urban non-agriculture. Extending the two-sector model, Wu (1995) is among the first to investigate the division of labour between agriculture, township and village enterprises (TVEs), and state-owned enterprises (SOEs). Brandt, Hsieh, and Zhu (2008) use a three-sector structural model to study the effect of labour reallocation between rural agriculture and state-owned and non-state owned non-agricultural sectors. They find that non-state non-agricultural production was the main impetus for growth from 1978 to 2004 and that 74 per cent of agricultural TFP growth can be attributed to labour reduction in agriculture. They also argue that distortions and barriers were important to limited resource allocation among sectors before economic reforms and that the removal of such obstacles could enable China to experience higher TFP growth afterwards.

However, their efforts in building a three-sector model focusing on ownership is not able to identify labour reallocation between the countryside and the cities, as non-agricultural production has become popular in both urban and rural China since the 1980s. A more precise classification is therefore necessary to better capture the cross-sector reallocation between rural and urban areas and among rural sectors. In this paper, we propose a three-sector framework to examine the relation between China's TFP growth and its structural transformation, emphasizing labour reallocation from the rural agricultural sector to both the rural non-agricultural sector and to the urban sector.

Our model is motivated by the following stylized facts. China's structural transformation, measured by each sector's share of output, began in earnest with economic reforms starting in the late 1970s. Agriculture made up 30 per cent of total GDP in 1980 but less than 10 per cent in 2014. Its share in rural output was more than 70 per cent in the early 1980s but was only 22 per cent in 2014. In comparison, industrial production has been 45 per cent of the country's GDP for the past few decades, with its share of rural output rising from 9.6 per cent in 1980 to 44.8 per cent in 2014. During the same period, the share of rural output coming from services more than tripled, from 9 per cent in 1980 to 32 per cent in 2014. As indicated in Table 1, production in rural China has become more diversified since the 1980s and agriculture and the countryside are no longer synonymous. This points to a growing and important rural non-agricultural sector which needs to be considered in labour reallocation models.

The products made in rural and urban China further demonstrate the structural change of the Chinese economy. Table 2 gives some hints. Labour-intensive outputs, such as garment and textile production and food manufacturing and processing, have been essential in rural areas, constituting 28 per cent and 25 per cent of rural industrial output in 1995 and 2014 respectively. The share of these industries in urban output dropped from 22 per cent to 15 per cent, showing the declining significance of labour-using production in cities. Notably, machinery manufacturing has recently become more popular in the countryside, accounting for 23 per cent of total industrial output in 2011.

These stylized facts demonstrate that the composition of output in rural areas is diverse, prompting us to explore a better framework to capture China's structural transformation and TFP growth. This modeling decision is also driven by the three following concerns.

First, labour productivity in the Chinese agricultural sector changed significantly when non-farm agricultural activities developed quickly after the agricultural reform of the late 1970s. Fishing, forestry and animal husbandry experienced higher labour productivity growth than cultivation.

Second, a considerable number of peasants in rural China have been employed by different non-agricultural sectors since the 1980s, initially by rural enterprises (mainly the TVEs) and later by formal and informal production in the countryside. Admittedly, more TVEs have become privatized since the late 1990s.[3] Due to sectoral variation, the marginal product of labour in agriculture is likely to be noticeably different from that of rural non-agriculture.

Third, because of the household registration system (HRS, *hukou*), the workforce engaged in urban formal and informal production includes a large number of rural workers with the status of temporary migrants in cities.[4] They have had more choices in the urban job market, especially since China's WTO membership was reconfirmed in 2001.

---

[3] Since then, the direct capital contributions of local governments to TVEs has become insignificant, and certain TVEs can now raise funding from the stock market. Some TVEs have obtained capital through foreign investment.

[4] The practice of *HuKou* allows no permanent migration into cities (unless one can change his/her status). There exists workers in urban non-agricultural production from the cities and the rural areas. In other words, the urban workforce is supposed to be larger than just the urban-based labour. The conventional two-sector model pools urban migrant workers with urban workers and therefore cannot account for this group properly.