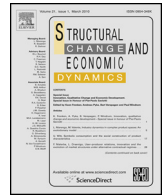




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Understanding agricultural growth in China: An international perspective

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ABSTRACT

This paper studies the evolution of the agricultural sector in the Chinese economy, with a comparison to a number of selected economies that are at different stages of economic development. It shows that China's unprecedented agricultural growth comparing to other emerging and developed countries was mainly driven by its world-beating productivity improvement, resulting from a series of fundamental reforms that have been undertaken in the Chinese agricultural sector since 1978. Despite the remarkable achievement, however, agriculture is playing a diminishing role in the growing Chinese economy, including declining agricultural employment. The paper illustrates that, as in other developed countries, the decline trend in China is an outcome of market forces in balancing various demands and supplies for goods and services as income rises. The research results will have important implications for further policy designs that seek to maintain a healthy agricultural growth in China in the future.

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1. Introduction

China has undertaken a series of economic reforms since 1978, moving from a globally-isolated, centrally-planned economy towards a more market-based and globally-integrated one. These reforms began with the phasing out of collectivized agriculture. The de-collectivization, together with the gradual liberalization of prices and more recent specific measures such as encouraging land transfer, liberalizing agricultural product (e.g., grain) marketing, improving rural transportation, promoting rural financial development, and providing technical assistance for farmers, has improved substantially economic incentives and unlocked the supply-side potential in the agricultural sector in China.¹

As a result, the agricultural sector in China has registered unprecedented growth over the past three decades. The average annual growth rates in real gross output and value added in China in 1982–2008 were 12.7 and 11.9 percent, compared correspondingly to the average rates of 2.2 and 3.8 percent for major countries

that are also China's main trading partners (Table 1).² The high growth over the long period spanning three decades was world-beating by any standard. Similarly, labour productivity, which is another indicator of the economic performance of this sector, also experienced highly exceptional growth. Real gross output labour productivity, defined as real gross output per employee, recorded an average annual rate of 11.9 percent over the same period. The extraordinary economic development has substantially improved the living standards of farmers, ensured food security, and lifted hundreds of millions of people out of poverty and malnutrition in China (e.g., Zhou, 2010; Fan and Rue, 2015).³

The economic reforms and their impacts on agricultural growth in China have been researched extensively.⁴ The literature generally suggests that the economic reforms in agriculture have led

² The list of countries includes Australia, Canada, India, Japan, South Korea, and the United States. The selection is mainly based on data availability, which is discussed in section 2.

³ International trade also plays an important role in meeting increased demand for agricultural products in China. As Wang et al. (2013) show that China is the leading importer of soybeans and cotton and has recently emerged as an importer of other major commodities, including corn, pork, wheat, and rice.

⁴ In this paper, we focus on the agricultural sector. For a discussion and a better understanding of sources of overall economic growth in China, please see, for example, Cao et al. (2009), Zhu (2012), or Zhao and Tang (2015).

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¹ For a discussion of the structure and reform of rural finance in China, please see Guo and Jia (2009). For a general review of agricultural policy in China and other countries, please refer to OECD (2011) and Jiang (2009).

Table 1
Annual Average Output and Labour Productivity Growth in the Agricultural Sector of Selected Countries*.

	China	Australia	Canada	India	Japan	Korea	US
1982–2008**							
Real gross output growth (percent)	12.7	3.3	1.9	3.1	−0.5	2.3	2.9
Real value added growth (percent)	11.9	3.0	1.8	3.3	0.2	1.8	2.6
Labour productivity growth (percent)	11.9	3.4	3.4	2.1	2.6	6.6	4.4
1982–1999							
Real gross output growth (percent)	15.1	4.9	2.5	3.2	−0.3	2.6	3.4
Real value added growth (percent)	14.0	3.8	1.8	3.4	0.1	2.0	3.1
Labour productivity growth (percent)	13.0	4.1	3.0	2.0	3.0	6.8	5.0
2000–2008**							
Real gross output growth (percent)	7.8	−0.3	0.8	2.8	−0.8	1.5	2.9
Real value added growth (percent)	7.6	1.2	1.9	3.0	0.4	1.5	2.6
Labour productivity growth (percent)	9.6	1.9	4.3	2.5	1.7	6.3	4.4

Sources: Authors' calculation based on data from the World KLEMS database.

*Labour productivity is defined as real gross output per employee. **1982–2007 or 2000–2007 for Australia.

substantial improvements in production efficiency by providing economic incentives to stakeholders in the sector. There have been a number of studies showing that the unprecedented agricultural growth is mainly driven by remarkable growth in productivity as a result of the economic reforms. For example, [Lin \(1992\)](#) shows that de-collectivization improved productivity and accounted for about half of the agricultural output growth in the 1978–1984 period. He also finds that the adjustment in agricultural product price over this period contributed positively to output growth. More recently, based on longitudinal micro data from the China Health and Nutrition Survey, [Cao and Birchenall \(2013\)](#) also observe that agricultural growth in China over the 1991–2009 period was mainly driven by an improvement in productivity.⁵

Missing from the literature, however, is an international perspective of agricultural development in China. First, few studies have systematically compared China's agricultural growth to that in developed countries and other emerging economies.⁶ To better appreciate China's achievement in agriculture, we shall better understand the sources of the differences in agricultural growth between China and other countries. Second, few studies have explained why agriculture is playing a diminishing role in the Chinese economy. Can the experiences of developed countries shed light on this important issue? An international perspective will highlight the differences in the sources of agricultural growth and the different roles being played by the agricultural sector in overall economic growth in those economies. The results will have important implications for further policy designs that seek to maintain a healthy agricultural growth in China in the future.

To fill the void in the literature, in this paper we study the evolution of the agricultural sector in the Chinese economy, with a comparison to a number of selected economies that are at different stages of economic development. We address four specific research questions:

- (1) How is China different from other countries in the sources of agricultural output growth in labour, capital, intermediate inputs, or multifactor productivity?
- (2) Is the improvement in agricultural gross output labour productivity in China is driven by an improvement in capital

deepening, intermediate input intensity, or multifactor productivity? How does it compare to other countries?

- (3) What is the evolution of the role of agriculture in the Chinese economy? Can the experiences of developed countries offer some lessons for the trend development in China?
- (4) What is the economic rationale for the diminishing role of agriculture in the growing Chinese economy?

The remainder of the paper is organized as follows. Section 2 discusses data. Section 3 estimates the sources of agricultural real gross output growth and labour productivity growth in China, with a comparison to those in other countries. Section 4 examines the evolution of the importance of the agricultural sector in the Chinese economy from an international perspective, including an economic rationale for the diminishing role of agriculture. Section 5 concludes.

2. Data

An empirical study of agricultural growth in a country requires the production data of the agricultural sector in the country. They include information on output and various inputs. There are two output concepts that are commonly used in practice: gross output and value added. In this paper, we choose gross output since it allows us not only to study the effects of labour and capital but also the impact of intermediate inputs.⁷

In addition, we compare China's experience to those in a number of other countries. To ensure unbiased results for country comparisons, those data have to be reasonably comparable across those countries in question.

The World KLEMS database serves the purposes.⁸ The database was developed under the World KLEMS initiative based on Harvard University in the United States, and was supported by the EU KLEMS program based on the Groningen Growth and Development Center at the University of Groningen in Netherlands. For developing the data, great effort was made to increase comparability across countries in various aspects, including input definitions, price concepts, aggregation procedures and comparable measures of inputs.⁹

⁵ Similar to [Lin \(1992\)](#) and [Cao and Birchenall \(2013\)](#), [Yu et al. \(2011\)](#) show that technical and efficiency changes played a dominant role in China's agricultural output or labour productivity growth.

⁶ [Gautam and Yu \(2015\)](#) compared agricultural productivity growth in China to that in India, but the comparison was very limited.

⁷ When an analysis is based on value added, which excludes intermediate inputs, we can only examine the effects of labour and capital.

⁸ The World KLEMS database is available from <http://www.worldklems.net/data.htm>

⁹ For the general methodologies that were used to consistently construct the data for countries in the world KLEMS database, please see [O'Mahony and Timmer \(2009\)](#). For the specific data construction for China, please see [Wu and Ito \(2015\)](#) for input-output tables, [Wu \(2015\)](#) for capital, and [Wu et al. \(2015\)](#) for labour.

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