



Off-farm employment and agricultural specialization in China



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ABSTRACT

While it is well known that China's off farm labor market is emerging rapidly, less is known about the effect of movement off the farm on the farming practices of those that have continued to farm. The overall goal of this paper is to analyze the effects of changes in China's off farm employment on one aspect of the performance of China's agricultural sector: the emergence of specialization in farming. To achieve this goal, we have three specific objectives. First, we document the changes in the flow of labor out of China's villages. Second, we examine how specialization in farming has changed over time. Third, we examine the association between off farm labor flows and specialization. Using panel data from a national representative data collected by the authors between 1999 and 2008, the analysis finds that off farm employment is indeed rising rapidly. At the same time, specialization is occurring off and on the farm. There is a strong and robust correlation between off farm employment and on farm specialization. The results imply that China's agriculture has responded dynamically to the modernization happening elsewhere in the economy.

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In recent years researchers have studied intensively the rise of China's rural labor markets in terms of employment outcomes and the effect on wages. Many papers that have sought to measure the flow of labor out rural areas into urban areas and the industrial labor force (de Brauw, Huang, Rozelle, Zhang, & Zhang, 2002; World Bank, 2007; Cai & Wang, 2010; Knight, Deng, & Li, 2011; Wang, Huang, Zhang, & Rozelle, 2011; Gong, Kong, Li, & Meng, 2008). The estimates of the flows of labor from rural villages to the cities range from 35% to 65% in 2008. Despite these differences, the papers have one element in common: the number of participants in China's off farm labor market is large and rising.

The literature has a number of papers in recent years that suggest that off farm labor markets have been rising fast and that village economies have been changing as a result. In one set of papers, it is reported that large share of rural individuals are outmigrating and creating sharp changes to the demographics in the villages (Li, Huang, Luo, & Liu, 2013; Huang & Ding, 2015). In another set of papers, there is a description of China's rapidly rising wage rate in the period after 2000 (Zhang, Yang, & Wang, 2011; Li, Li, Wu, & Xiong, 2012; Wang, Yamauchi, & Huang, 2016). This, of course, is evidence that—at least at some level—large numbers of rural individuals have entered the off farm labor market but that the scope of further rises is less optimistic. In other words, since the number of individuals in rural communities have stabilized and there are fewer workers who want to leave, there is upward pressure on the wage rate.

There is one part of China's off farm labor market literature, however, that has had less attention. Few empirical studies have analyzed the effect of the changes in off farm employment on the sector the workers left behind: agriculture. There are studies

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that are interested in understanding how China's food economy and its food security agenda will evolve as China develops. These big picture studies, however, are based either on reviews of the literature (Fan & Agcaoili-Sombilla, 1997; Ash, 2011) or modeling (Huang, Yang, & Rozelle, 2010; OECD-FAO, 2011). There are also empirical studies that are interested in whether or not there are economies of scale in agriculture (Heerink, Qu, Kuiper, Shi, & Tan, 2007). Such research, however, has not been conducted in the context of changes of off farm employment. In sum, then, there is an absence of research on how the rise of off farm employment is affecting the strategies of households in allocating their labor across sectors and how these allocations are affecting farming. This lacuna of research, in part, may explain why both casual observers seem to suggest that China's food economy will suffer from China's ongoing industrialization and urbanization (Christiansen, 2009).

The nature of the shifts in off farm labor markets could very well also be associated with healthy changes in the agricultural sector that might produce a village economy that is more efficient. The mechanism, of course, would be specialization. In the literature it has been shown that in some economies when labor becomes more scarce and hired labor does not completely substitute the family labor, the households/individuals that remain in farming begin to specialize in order to more efficiently use their labor, farm more area and produce higher incomes (D'Antoni, Khanal, & Mishra, 2014). In the theoretical literature (which was initially examining developed countries), Roumasset, Setboonsarng, Wickramasinghe, Estudillo, and Evenson (1995) shows that outmigration of certain types of households also leads to changes in farming systems. These shifts are characterized as changing subsistence farming to specialized activities in farming, according to the comparative advantages of the families that are left behind.

There are clear examples where this has occurred in developed countries. For example in the United States, trend was oriented toward the cultivation of specialized commodities by farmers in counties that specialized in those commodities (Winsberg, 1982). Moreover, it is the counties that experienced the greatest outflow of labor during the post-World War II era that experienced the greatest shifts toward specialization. Their empirical findings are mirrored by the work of Kimhi and Bollman (1999) which demonstrated that changing labor markets off the farm were associated with more specialization in Canada's farming.

In more recent years, a literature has emerged that has examined this issue (rising off farm labor flows out of the village and specialization of farming of those left in the villages) in the context of developing countries. Theoretically, the household model frameworks derived by De Janvry, Fafchamps, and Sadoulet (1991) and De Janvry and Sadoulet (2006) demonstrates that when off farm labor does not flow (partly due to market failures in local labor markets), farming system tend to be remain subsistence in nature and not specialize. Empirically, Omamo (1998) presented data that show that small-scale farmers tend to shift away from diversified cropping to pure-stand (specialized) production as opportunities for off farm jobs rise (in Omamo's context this occurred as new roads shortened the distance to the market in Kenya).

Unfortunately, there is almost no work on documenting the rise of the specialization of agriculture in China's village or the effect of changes in labor markets. There is mention of changes in the ways that farmers are choosing their cropping patterns against the risk of the extreme weather events (Huang, Jiang, Wang, & Hou, 2014). There are also discussions of changing cropping patterns in villages (Chen, Sushil, & Ding, 2013). The only existing paper that has linked a rise in specialization with the better access to market is published by Yu and Zhang (2016), but their paper only exams several villages in Guizhou and is not focused on off farm labor flows per se. In fact, there is no paper—to our knowledge—that seeks to assess the relationship between changing off farm labor market trends and specialization.

The overall goal of this paper is to analyze how changes in China's off farm employment may affect one aspect of the performance of China's agricultural sector: the emergence of specialization. To achieve this goal, we will be looking to answer several specific questions: What are implications of rising off-farm employment for crop production? Has rising off-farm employment been associated with the specialization of households in farming? At the village level, is there more specialization occurring in villages with more off farm labor movement?

To meet this goal and answer these questions, we have three specific objectives. First, we document the changes in the flow of labor out of China's villages. Second, we examine how specialization in farming has changed over time. Third, we examine the associations between off farm labor flows and specialization. To meet this final objective, we exam data at both the household and village levels.

1. Data

The data used in this study are a subset of a dataset that was collected during two rounds of nationwide surveys. The authors carried out the surveys in December 2000 (collecting data for the year 2000) and early 2009 (collecting data for the year 2008). The dataset for the year 2000 includes information from 60 randomly-selected villages in 6 provinces representing China's major agricultural regions. The provinces selected include Hebei, Liaoning, Shaanxi, Zhejiang, Sichuan and Hubei. For each province five counties were selected. Two villages were randomly selected from each county. Twenty households were chosen from each village. Among a total of 1200 households investigated, 1194 records were complete. Importantly, in addition to collecting data for the year 2000, we also asked respondents to recall the information for the previous year (1999).

In the 2009 survey, we went back to the same villages that were surveyed in 2000. There were two exceptions. Because of the 2008 earthquake in Sichuan, we were not able to do the survey in two of the villages. As a consequence, the sample size (including those without complete records in 2001) was reduced from 1200 to 1160. Among the remaining 1160 households surveyed in 2000, we were able to re-investigate 1046 households in 2009. Of the 114 households that we could not find in the village, 89 of them had moved out of the village and resided in an urban area. The other 25 households either disappeared because all of the members had died (seven households) or were living in the village but were not engaged in farming activities (18

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