



Impact of land fragmentation and non-agricultural labor supply on circulation of agricultural land management rights



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ABSTRACT

This study quantitatively examines the effects of land fragmentation and non-agricultural labor supply on the circulation of agricultural land management rights. The examination is conducted from the perspective of labor heterogeneity and family joint decision-making, using the rural fixed observation point data from the Ministry of Agriculture of the People's Republic of China. The results reveal that land fragmentation significantly affects circulation decisions of agricultural land circulation. Land fragmentation strengthens the effect of non-agricultural labor supply on agricultural land outflow, and this effect is more pronounced among females. Compared with males, the female non-agricultural labor supply has a greater effect on agricultural land circulation. When non-agricultural labor supply increases, the effect of the female non-agricultural labor supply on agricultural land circulation becomes significant, land outflows increase, and land inflows decrease. In the areas of eastern, central, and northeastern China, the female non-agricultural labor supply has a significant impact on agricultural land outflow. Furthermore, the number of land plots strengthens the effect of the non-agricultural labor supply on the outflows of agricultural land in eastern and northeastern China; this effect is more pronounced for females in northeastern China. The government and related departments should strengthen non-agricultural employment training, and design conditions and policies to promote the orderly transfer of household labor, thus achieving intense agricultural development in the process of human urbanization.

1. Introduction

Agricultural land policies are a core component of rural production relationships. Restrictions on administrative adjustments for contracted land are increasingly being imposed since the implementation of the household contract responsibility system, and other land policies which leave the rural land contracting relationship unchanged. The result is that land fragmentation exists in China. As of the end of June 2016, of the total 1.3 billion mu of contracted land, the area of contracted agricultural land being circulated was 460 million mu, which is about one-third the total area of contracted agricultural land.¹ Further, of the 230 million farmers in China who have contracted land, about 170 million have not circulated their land and only about 66 million (or about 26%) have either partially or completely circulated their land (Cai, 2016a, 2016b). However, some policies do encourage the circulation of agricultural land management rights. Examples are the land

circulation pilot in 1978, the legal promotion of orderly circulation of land management rights the central No. 1 document in 2016, and, through village organizations, actively encouraging farmers to voluntarily exchange land to achieve contiguous land cultivation in the central No. 1 document in 2017. The implementation of these land policies has led to improvement in the factor functions of agricultural lands, and circulation of agricultural land management rights has gradually become more active.

The relationship between farmers and land is the central focus of current rural reforms. Today,² China has more than 200 million farmers in need of rural work. Chen and Zhao (2017) also shows that there is still an abundance of laborers in rural China. Nowadays, agricultural costs appear to be growing and small-scale operations in agriculture are facing a lower profit when agricultural cost increases exceed agriculture subsidies. Those who depend solely on agricultural income could be unable to pay for education, healthcare, housing, and so on. In

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¹ Data are taken from the Forum for Developing a New Model of Appropriately Scaled Agriculture, hosted by Wang Yang, the vice-premier of the state council, in Huzhou, Zhejiang Province.

² In his speech at a reform forum held on April 25, 2016 in Xiaogang village, Anhui Province, General Secretary Xi Jinping pointed out that “maintaining the stability of land contract relationships is a necessary policy principle in this period of economic transformation.”

Table 1
Hukou Registration Status of Migrant Populations by Gender (in units of 100 million).

	Municipalities in Same County			Other Counties in Same Province			Another Province			Total		
	Subtotal	Male	Female	Subtotal	Male	Female	Subtotal	Male	Female	Total	Male	Female
2000	0.30	0.16	0.15	0.36	0.19	0.17	0.42	0.23	0.19	1.44	0.76	0.68
2010	0.90	0.45	0.46	0.85	0.44	0.41	0.86	0.48	0.38	2.61	1.37	1.24
Growth Rate	1.99	1.86	2.12	1.33	1.26	1.41	1.02	1.09	0.95	0.81	0.80	0.81

Note: (1) Source of data comes from 2000 and 2010 Chinese Population Census. (2) Prior to reform and the opening policies, farmers could only engage in collective work in the countryside and were banned from migrating freely. It has an administrative restriction (Hukou) on the free flow of labor under the unique institution background of China. However, since the mid-1980s, as reform and the opening policy went into effect, policies that restricted the free migration of rural labor have gradually been relaxed, and many rural laborers migrated to cities and entered non-agricultural employment (Lu and Song, 2006; Fan, 2008).

addition, the family is the smallest economic unit in agricultural production, and will self-optimize their resource endowment to maximize profits. The development of the labor employment market has led to changes in labor resources, where a large amount of young and high-quality labor is exiting the agricultural industry, leaving behind a growing labor force comprised of an aging and female population.^{3, 4} Some studies have shown that China has already passed the Lewis turning point⁵ and a shortage of agricultural labor exists (Gai et al., 2014). Nowadays, many farmers are choosing land circulation, land shareholding, and contiguous land cultivation.

Agricultural land circulation lags behind rural labor migration in China. The rate of agricultural land circulation is 30.4%, which is considerably below the rate of rural residents that find external employment (63.5%; Fu, 2016). In recent years, labor shifts have moved from just individuals to entire families, and this trend is strengthening.⁶ Table 1 shows that, within a span of ten years, China's rural labor experienced a substantial shift, and changed significantly among external populations, both in total and compositional terms. The number of females migrating to cities within the province and nation exceeds that of males, and this is particularly the case for intra-county migration.⁷ As for inter-provincial migration, the number of male migrants slightly exceeds that of female migrants. In the context of rural development and labor migration, there is a relative lag in female non-agricultural labor supply. As the proportion of non-agricultural labor supply increases, agricultural land resources must also be re-allocated. Therefore, in areas where the scale of agricultural land contracts is inadequate, it is first necessary to consider whether the investment in labor is sufficient and whether it will cause circulation of agricultural land management rights. Second, when the scale of agricultural land is adequate but land fragmentation causes poor mechanical efficiency, wasted manpower, and increased costs, it is necessary to consider whether farmers will use circulation of agricultural land management rights to reduce labor investment and increase female non-agricultural labor supply to achieve utility maximization.

The current literature offers inconsistent conclusions regarding the effects of land fragmentation and non-agricultural labor supply on the

³ The United Nations International Labor Organization defines "old labor" as workers aged 45 years and above. Huang et al. (2015) states that in 2005, less than 6% of young workers aged 18–45 years were engaged in agricultural work, implying that China has entered a time of agricultural aging.

⁴ Data from the second national agricultural census shows that females account for 53.16% of the agricultural labor force.

⁵ It refers to that the era of unlimited supply of rural surplus labor is coming to an end with the gradual transfer of rural surplus labor to non-agricultural sector.

⁶ According to the 2016 Report on China's Migrant Population Development, in 2015, the average scale of migrant households in migrant destinations increased to 2.61 individuals, which is a 0.11 increase from the value reported in 2013. Nearly 90% of the newly married generation migrated as a couple, while 60% migrated with their children. Furthermore, an increasing number of households are beginning to migrate with their elderly family members.

⁷ The 2015 National Survey of Agricultural Workers shows that the rate of females in the agricultural workforce increased by 0.6% and local agricultural workers had a relatively high ratio of females.

circulation of agricultural land management rights. Development of any factor market does not occur independently (Kung, 2002; Feng and Heerink, 2008; Xie and Jiang, 2016). Xie and Jiang (2016) shows that rural-urban migrant workers in China face issues of how to effectively arrange land that was contracted to them, and reveals that the improvement of job stability is significantly correlated with land transfer or abandonment. An improved labor market will reduce non-agricultural employment restrictions and increase opportunity costs for different farmers, thus increasing agricultural land circulation by farmers because of the pressure of market competition (Yao, 2000; Chen et al., 2014). Non-agricultural labor supply will promote agricultural land circulation (Yi, 2015; Liu et al., 2016). Furthermore, some researchers suggest that agricultural labor migration is negatively correlated with the probability of renting in land for oneself, and it is positively correlated with that of renting land to others (Qian et al., 2004; Deininger and Jin, 2005; Zhang et al., 2010; Huang and Sun, 2015). However, many studies treat labor participation action as an exogenous variable and are yet to fully consider issues of endogeneity. Undoubtedly, some scholars believe that agricultural land circulation will affect non-agricultural labor supply (Wang, 2013; Tian and Li, 2014; Liu et al., 2017). Tian et al. (2014) show that mature markets for agricultural land management rights can reduce barriers in household labor migration, and promote non-agricultural labor supply. This study also emphasizes the "maturity" of agricultural land markets. That is, when the markets for agricultural land management circulation are in the early stages of development, labor migration may be affected.

However, some academics believe that China's land circulation does not increase because of accelerated agricultural labor migration, which indicates a pattern in which "labor is transferred, but not land." (Li, 2015). As for why land circulation lags behind labor migration, some studies have analyzed this question from the perspectives of resource endowment (Yao, 2000; Liu et al., 2016), land welfare (Cai, 2016a), farmer risk consciousness (Kawasaki, 2010), transaction costs (Wu et al., 2014), land arrangements (Ma et al., 2015; Xie and Jiang, 2016), and the scale of labor migration (Hong et al., 2016). Zhao and Liu (2016) believe that the moderate scale of agriculture should follow the new trend of rural labor migration.

In recent years, labor migration has shifted from individual migration to that of entire families. Yang and Chen (2013) suggest that the changing trend of migration from individuals to couples, children, or entire families has become apparent since the mid-1990s. Individual labor decisions are affected not only by individual characteristics but also the characteristics of one's spouse and other family members (Abdulai and Delgado, 1999; Li, 2001; Jansen and Liefbroer, 2006; Schirle, 2008; Sheng, 2014). Schirle (2008) analyze micro-level survey data from the United States, Canada, and the United Kingdom and find that changes in a wife's employment status can explain between one-fourth and one-half of changes in the husband's employment status.

Current research on agricultural land circulation rarely considers family joint decision-making and labor heterogeneity. In addition, there has been less discussion about the reason agricultural land circulation lags behind labor migration from the perspective of labor heterogeneity

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