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## 5. Off-farm employment in rural China and the *hukou* system

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Over the past four decades, China has implemented a series of institutional and market-oriented reforms that have resulted in an integration of the rural and urban labour markets and substantially increased off-farm employment. In 1999–2000, only about 10 per cent of rural households in China were involved in off-farm work, while, by 2007–08, that share had risen to 22 per cent (Wang et al. 2017). The increase in off-farm employment has not only provided additional labour supply to support the industrialisation and urbanisation processes in China, but also facilitated the transformation and development of rural China through strengthening the rural non-agricultural sector. Between 1978 and 2015, real GDP per capita in China increased by 16.7 times, with 44 per cent of this coming from labour force reallocation from agriculture to non-agricultural sectors (Cai 2018).

Although non-agricultural sector growth and off-farm employment have significantly contributed to China's economic development, such activities have long been restricted by various institutional arrangements. The household registration system (*hukou*), initially established in the late 1950s, was designed to support urban development. However, as the rural and urban economies became more integrated over time, it became a barrier, restricting rural labour from working in urban areas. Under this system, China's population was divided into 'agricultural' and 'non-agricultural' sectors. As the system is not only a population registration system, but also a comprehensive policy system bundled with other institutional arrangements, it is believed to be one of the most important policies in preventing rural-to-urban migration and off-farm employment in the non-agricultural sector (Cai 2018).

To date, there have been many studies examining the impact of the household registration system on rural-to-urban migration and its economic and social consequences (Meng and Zhang 2010). Some studies suggest that rural and urban integration should be achieved under the constraint of the *hukou* system, since it gives privileges to urban residents to become rich first, which enlarges urban–rural income inequality and thus provides ongoing incentives for rural labour to move into cities (Lu and Chen 2004; Liu 2011). In contrast, other studies argue that the *hukou* system hinders rural-to-urban migration and reallocation of rural labour

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<sup>1</sup> The authors acknowledge financial support from the State Natural Sciences Foundation (No. 71873005 and No. 71742002); ATMAC (43643) Chinese Academy of Engineering (2018-ZD-07-1 and 2018-ZD-07-06-1); and the Data Centre for Management Science, PKU-NSFC (2018KEY06). All errors are the authors'.

(Seeborg et al. 2000; Démurger et al. 2009; Meng 2012). Although no consensus has been reached on the role of the *hukou* system on off-farm employment, gradual reforms have been made since 1984. While the *hukou* system's discrimination in the rights and privileges to off-farm employment and residence in rural areas has been gradually relaxed, discrimination relating to wages/incomes, job division, returns on education capital and social welfare protection for rural labourers working in urban areas remains (Seeborg et al. 2000; Démurger et al. 2009; Meng 2012).

The existing literature provides useful insights on the impact of the *hukou* system on rural-to-urban migration (Chan and Zhang 1999; Wan and Li 2013). Most of these studies, however, focus on the employment and wage status of rural migrants in urban China, and suffer from serious selection bias. This is because the majority of off-farm employment occurs in the non-agricultural sector of rural areas (who are not classified as rural migrants), and there is still a large amount of off-farm labour working in urban areas but not living there. Without properly accounting for this rural labour, the impact of the *hukou* system will not be adequately measured. In addition, although many empirical studies have been conducted, most use either pooled cross-sectional data or short-term panel data, which do not reflect the long-term changes in the *hukou* system and its potential impact on off-farm employment over the past 40 years.

This chapter investigates the evolution of the *hukou* system at the provincial level between 1981 and 2013, and examines its impact on off-farm employment in rural China from an empirical perspective. Off-farm employment is defined as rural labour (those holding rural *hukou*) who have worked in non-agricultural sectors in rural or urban areas, including rural-to-urban migrants, rural labourers working in rural non-agricultural sectors and rural labourers working in urban areas but living in rural areas.

The remainder of the study is structured as follows. Section two reviews China's *hukou* reforms before and after the reform and opening-up period, which began in 1978, along with relevant research on *hukou* policies and non-agricultural employment in the country. Section three constructs the empirical models and describes the data sources. Section four presents the empirical results, as well as the interpretation, while section five concludes the study.

## ***Hukou* system reforms and off-farm employment in China**

Separate urban and rural household registration systems have been in place since the National People's Republic of China Registration Regulations were promulgated in 1958. The system has been changing over time alongside economic and institutional reforms. Taking the reform and opening-up policies that began

in 1978 as a watershed, China's household registration system has experienced two major phases: before 1978 and after 1978. Before 1978, China's household registration system was rooted in a logical structure of 'family-birth-identity-order-control-distribution' (Lu 2002). Consequently, not only was there a need for rural labourers to complete a range of formalities (such as approval, certification and the payment of fees) to undertake off-farm employment, but also, rural workers faced significant restrictions on work and risks of detention. The strictness of the system distorted the allocation of labour resources and widened the gap between urban and rural economic development. The *hukou* system has gradually changed since 1978, when institutional and marketisation reforms were first implemented. In particular, after the mid-1990s, the government carried out a series of reforms to relax the *hukou* system, which allowed more rural migrants to work in urban areas (Song and Li 2014).

Although significant progress has been made by the central and local governments over the past four decades, the segregation of the rural and urban labour markets has continued. Incomplete reforms of the *hukou* system are regarded as one of the most important factors preventing the integration of the rural and urban labour markets by restricting off-farm labourers from gaining equal rights with their urban counterparts in access to basic public services, such as compulsory education for children, personal social insurance, minimum living security, housing and so on. There are two types of restriction policies in place: one restricts equal rights to employment and the other restricts equal rights to social welfare.

Given the importance of this issue, many studies have been conducted to analyse the impact of *hukou* reforms on rural-to-urban migration and off-farm employment in China over past decades. Four groups of related studies are summarised below.

The first group of literature explores the impact of *hukou* reforms on employment opportunities for off-farm labour. Before 1978, the *hukou* system severely restricted the occupational choice and work location of rural labour (Lu 2002). An extreme example of this was the campaign to send 'intellectual' urban youth to the countryside. Under this government-authorised anti-urbanisation movement, 18 million 16–20-year-olds migrated from urban to rural areas in the period 1962–78 (Bernstein and Olsen 2009; Kinnan et al. 2015). Since 1978, reforms to the *hukou* system have reduced the constraints on labour mobility, and a massive rural labour force has engaged in non-agricultural employment. However, compared with urban workers, rural migrant or off-farm workers are concentrated in the low-skill market, and face various discriminations (Meng and Zhang 2001; Li and Gu 2011; Démurger et al. 2012; Afridi et al. 2015).

The second group of research discusses the impact of the *hukou* system on rural labour's income levels. The post-reform era has witnessed a significant rise in the real wages of the rural population. However, compared with the urban labour force, rural labourers' wages are generally subject to discrimination because of the phenomenon

of 'different compensation for equal work' (Knight et al. 1999; Dong and Bowles 2002; Démurger et al. 2009; Li and Gu 2011; Meng 2012). Meng and Zhang (2001) applied survey data for urban households from the Population Research Institute of Shanghai's Academy of Social Sciences for 1995–96 and found that household registration discrimination affected wages by 50 per cent, regardless of the difference in rural and urban labour distribution, and it influenced wages within the same industry as much as 82 per cent. Wang and Cai (2005) uses data from the fifth national census in 2000 to examine the impact of the household registration system on rural labour and found that, in the same occupation, it accounted for 39 per cent wage differences between rural and urban workers. However, Knight and Yueh (2004) argue that career conversion can significantly increase the income of rural labourers compared with urban residents. It is worth noting that the current research comparing wage differences between urban and rural labour is based more on the comparison of unit hourly wages than on the comparison of disposable income. Excluding personal income tax will seriously underestimate the degree of discrimination against migrant workers. Overall, although the income level of rural labour has increased since the *hukou* reforms, there is still notable income inequality between urban and rural labour.

The third group of literature focuses on how the *hukou* system influences the spatial migration of rural labour's employment. Dividing the labour market into urban and rural markets, non-agricultural employment and agricultural labour transfers can be achieved only at the margin (Cai 2018). Geographically, with the *hukou* reforms, rural labour transfers have been concentrated mainly in eastern China, followed by the central and western regions (NBS 2018). Moreover, after taking into account city size by using panel data from 123 major cities in China from 2000 to 2013, Yang (2017) finds that the *hukou* reforms in large cities did not attract labour inflows, but instead prompted labour outflows, which is a result of the relatively strict administrative constraints. The settlement threshold and household registration constraints of major cities in the eastern region were higher than those in the central and western regions, so that a massive amount of rural labour was transferred into the central and western regions.

The fourth group of studies contributes evidence of how *hukou* reform affects the social security and welfare of the rural labour force. The *hukou* system has created separate urban and rural social security systems and deepened the unfairness of such welfare in terms of the social insurance level, educational opportunities and housing inequality (Hertel and Zhai 2006; Sun et al. 2011; Tombe and Zhu 2019). Since the gradual relaxation of the family registration system, the opportunity for rural labour to settle in urban areas and obtain equal access to social security has increased (Meng 2000; Song 2014; Garriga et al. 2017; Chen and Yuan 2018).

In sum, most studies find that *hukou* (although it has been relaxed in the post-reform period) is still playing an important role in negatively affecting rural-to-urban migration. However, these studies focus mainly on the impact in urban areas, which leaves room for us to re-examine this issue from the perspective of rural areas.

## Empirical model specification

Although rural-to-urban migration is influenced by the situations in both rural and urban areas, decision-making about migration is made mainly in the rural areas from which rural migrants originate. In this sense, it is essential to examine the impact of the *hukou* policies on the off-farm employment of rural labour, and one can start by looking at rural households.

Following previous literature such as Meng and Zhang (2001) and Démurger et al. (2009), we assume that the choice of off-farm employment by rural labour is a function of the *hukou* restriction policies (Equation 5.1).

### Equation 5.1

$$Y_{hrt} = \alpha_0 + \beta_1 HP_{hrt} + \beta_2 HS_{hrt} + \gamma_1 age_{hrt} + \gamma_2 Marry_{hrt} + \gamma_3 lbr_{hrt} + \gamma_4 man_{hrt} + \gamma_5 area_{hrt} + \gamma_6 lnWageGap_{hrt} + \gamma_7 T_t + \gamma_8 D_h + \gamma_9 D_r + \varepsilon_{hrt}$$

In this equation,  $Y_{hrt}$  denotes the share of off-farm employment in total household labour of rural household  $h$  in region  $r$  at time  $t$ .  $HP_{hrt}$  and  $HS_{hrt}$  denote the two types of household restriction policies in urban areas that could affect the choice of rural households' off-farm employment, respectively: the employment-related restriction policy and the settlement-related restriction policy. We distinguish between the two restriction policies because we expect they may impose different impacts.

The two variables,  $HP_{hrt}$  and  $HS_{hrt}$ , deserve further explanation, as they are the most important dependent variables in our study. First, to measure the change in employment-related restriction policies faced by rural farming households, we collect all migrant employment-related policy in the urban areas of each province and categorise them into three groups according to their level of restriction. A score of 1–3 is assigned to each group of policies, with 1 representing the most restrictive policy and 3 representing the least restrictive policy.<sup>2</sup> Second, how the household restriction policies in urban areas will affect rural labourers' choice of off-farm employment usually depends on where they are going for off-farm employment. To reflect this point, we need to consider the distance from the home village of

2 Please refer to Appendix 5.1 for a more detailed definition of the employment restriction and settlement restriction policies in each province and how we allocate the scores between different types of migration restriction policies.

the rural labourer to the capital city of each province. Third, the probability of rural labourers going to a particular city for off-farm employment is also important. According to China Centre for Agricultural Policy's (CCAP) farm household survey, more than 80 per cent of rural labourers choose to work off-farm within the same province in which they live. Thus, it is not appropriate for us to give the same weights within a province and between provinces. Consequently, we use the proportion of rural labourers in the same village moving for off-farm employment within and between provinces as weights (Equation 5.2).

Equation 5.2

$$HP_{hrt} = \sum_p \frac{HP_{pt}}{Dist_{rpt}} \times MigShr\_inprovince + \sum_{-p} \frac{HP_{-pt}}{Dist_{r-pt}} \times MigShr\_outprovince$$

In this equation,  $HP_{pt}$  is the comprehensive employment-related restriction policy indicator faced by rural labour in province  $p$  at time  $t$ .  $HP_{-pt}$  are the scores for the employment-related restriction policy in urban areas of other province  $-p$  at time  $t$ .  $Dist_{rpt}$  and  $Dist_{r-pt}$  denote the distance between the sample village and the capital city of province  $p$ , with  $p$  and  $-p$  representing within and between provinces, respectively.  $MigShr\_inprovince$  and  $MigShr\_outprovince$  denote the proportion of off-farm employment within province  $p$ , and between provinces  $-p$ .

A similar procedure is used to measure the change in the settlement-related restriction policy (Equation 5.3).

Equation 5.3

$$HS_{hrt} = \sum_p \frac{HS_{pt}}{Dist_{rpt}} \times MigShr\_inprovince + \sum_{-p} \frac{HS_{-pt}}{Dist_{r-pt}} \times MigShr\_outprovince$$

In this equation,  $HS_{pt}$  and  $HS_{-pt}$  represents the settlement-related restriction policies, while other notations are the same as in Equation 5.2.

In addition to the household restriction policies, there are many other factors affecting rural labourers' choice of off-farm employment. If we do not account for them in Equation 5.1, we will generate a significant measurement problem. In our study, we categorise those control variables into three groups and include them in Equation 5.1.

The first group of control variables includes the logarithm of urban-rural income differences,  $ln\_WageGap_{hrt}$ , which is calculated by taking a ratio of the per capita income of households at the farm level to the per capita disposable income of 28 capital cities across the country in the form of Equation 5.4.

## Equation 5.4

$$\ln\_WageGap_{hrt} = \ln \left( \frac{rural\_wage_{hrt}}{urban\_wage_{hrt}} \right)$$

In this equation,  $rural\_wage_{hrt}$  is the per capita income of households at the farm level. It should be noted that the per capita income for years other than the year of sampling (2000, 2008 and 2013) is imputed based on the per capita income of the province's rural population by using data from the *China Statistics Yearbooks* (NBS various years[a]) and *China Rural Statistical Yearbooks* (NBS various years[b]), while keeping the rural consumer price index (CPI) conversion in 2000 constant values.  $urban\_wage_{hrt}$  refers to the per capita disposable income of 28 capital cities across the country. To be specific, applying the data from the statistical yearbooks while keeping the rural CPI conversion in 2000 constant prices,  $urban\_wage_{hrt}$  is estimated by Equation 5.5 using distance and the proportion of rural labour as weights.

## Equation 5.5

$$\begin{aligned} urban\_wage_{hrt} &= \sum_P \frac{city\_inc_{pt}}{Dist_{rpt}} \times MigShr\_inprovince \\ &+ \sum_{-P} \frac{city\_inc_{r-pt}}{Dist_{r-pt}} \times MigShr\_outprovince \end{aligned}$$

The second group of control variables captures the characteristics of a rural household, which include  $age_{hrt}$  as the average age of all labour in each sampled farm household;  $Marry_{hrt}$ , which is the number of married persons per household as a percentage of the total number of persons per household;  $lbr_{hrt}$  refers to the ratio of the labour population aged 16 to 65 in the household to the total population of the household; and  $man_{hrt}$  denotes the proportion of males in the total population of the household.

The third group of control variables describes family agricultural production features:  $area_{hrt}$  refers to the total land area operated by each farm household.

In addition to the above three groups of control variables, we also control the household-specific effects and the time-specific effects, by using the dummy variables, to reduce the impact of omitted variables. Specifically,  $D_b$  is a vector of rural household and location characteristics that are consistent over time, and  $T_t$  is a dummy variable to control the influence of macroeconomic conditions in each year on the off-farm employment of rural labour.

To effectively estimate Equation 5.1, we need to deal with two potential econometric problems. First, the two variables used to capture the employment-related restriction and the settlement-related restriction could be highly correlated and thus may generate the problem of multicollinearity. To deal with this, we use the ratio of the employment-related restriction variable over the settlement-related restriction variable,  $HS_{hrt}/HP_{hrt}$ , to replace  $HS_{hrt}$ . The estimated coefficient in front of the newly created variable will capture the difference in impact between the employment-related restriction relative to the settlement-related restriction. Second, the estimation of Equation 5.1 using the ordinary least squares (OLS) regression method may suffer from the omitted variable problem, since there are many other household-level or region-level factors affecting rural labourers' choice of off-farm employment that are not well reflected in our model specification. To deal with this problem, we adopt the panel data fixed effect model to estimate Equation 5.1. We acknowledge that this treatment may only help with reducing the omitted variable problem by eliminating those time-invariant factors so we use the time dummy to account for time-variant factors.

Finally, it is widely believed that *hukou* policies may generate different impacts on the different types of off-farm employment choice. In particular, part-time off-farm employment is unlikely to be affected by the settlement-related restriction, in theory. To capture this impact, we distinguish between two types of off-farm employment by using different dependent variables—namely, the ratios of full-time off-farm employment and part-time off-farm employment. Based on Equation 5.1, these two equations can be written as Equations 5.6 and 5.7.

#### Equation 5.6

$$\begin{aligned} \ln\_OffFarm_{hrt} &= \alpha_0 + \beta_1 HP_{hrt} + \beta_2 \frac{HS_{hrt}}{HP_{hrt}} + \gamma_1 age_{hrt} + \gamma_2 Marry_{hrt} + \gamma_3 lbr_{hrt} \\ &+ \gamma_4 man_{hrt} + \gamma_5 area_{hrt} + \gamma_6 \ln WageGap_{hrt} + \gamma_7 T_t + \gamma_8 D_h + \gamma_9 D_r + \varepsilon_{hrt} \end{aligned}$$

#### Equation 5.7

$$\begin{aligned} \ln\_FOffFarm_{hrt} &= \alpha_0 + \beta_1 HP_{hrt} + \beta_2 \frac{HS_{hrt}}{HP_{hrt}} + \gamma_1 age_{hrt} + \gamma_2 Marry_{hrt} + \gamma_3 lbr_{hrt} \\ &+ \gamma_4 man_{hrt} + \gamma_5 area_{hrt} + \gamma_6 \ln WageGap_{hrt} + \gamma_7 T_t + \gamma_8 D_h + \gamma_9 D_r + \varepsilon_{hrt} \end{aligned}$$

In Equation 5.6,  $\ln\_OffFarm_{hrt}$  refers to off-farm employment, estimated by using a ratio of off-farm employment to total population at the household farm level. Similarly, in Equation 5.7,  $\ln\_FOffFarm_{hrt}$  denotes full-time off-farm employment, measured by the proportion of full-time off-farm employment in the total labour at the household farm level. The employment-related restriction and the settlement-related restriction are defined by two variables,  $HP_{hrt}$  and  $HS_{hrt}/HP_{hrt}$ , with the latter concerning a multicollinearity between two categories of policies.

Based on Equations 5.6 and 5.7, we propose testing the following three hypotheses. First, a positive (negative) coefficient in front of  $HP_{hrt}$  and  $HS_{hrt}/HP_{hrt}$  may imply that the relaxation of the *hukou* policy in urban areas (or a higher score for the comprehensive household registration policy indicator) will tend to increase the willingness of rural labour to undertake off-farm employment, and vice versa. Second, a positive and significant coefficient in front of  $HS_{hrt}/HP_{hrt}$  implies that the settlement restriction is likely to impose a stronger impact on rural labour's off-farm employment choice. Third, when we distinguish between part-time and full-time off-farm employment, we can show how the relaxation of the household registration policies may affect rural labour's choice between the two types of off-farm employment.

## Data sources and descriptive statistics

Data used in this study mainly come from two sources: microlevel farm household survey data collected by the Agricultural Policy Research Centre of the Chinese Academy of Sciences and the Peking University; and the province-level official statistics from various sources. These data are used mainly to measure the *hukou* system changes faced by rural labour and the rural–urban income gap. Both sets of data span the period from 1981 to 2013.

The CCAP farm household survey is a three-wave repetitive field survey conducted in 2000, 2008 and 2013. According to the ranking of the provincial per capita industrial output value, the survey used a multistage stratified sampling method to randomly select 30 counties, 60 villages and 1,200 farmers in six provinces in the major agricultural regions of China (that is, Hebei, Shaanxi, Liaoning, Zhejiang, Sichuan and Hubei). Figure 5.1 illustrates the geographical distribution of those sample regions.

The survey collects information including the characteristics of rural households, land usage, input usage, output of agricultural production, off-farm employment of each household member and their income, in six provinces. Among these, off-farm employment is divided into current employment status and off-farm employment history. Except for the households that could not be tracked due to uncontrollable reasons such as natural disasters, a total of 1,063 sample households were successfully tracked in the third phase. This chapter formed 33 years of balanced panel data from 1981 to 2013 (see Appendix 5.2 for more detailed information on the sampled farms).

Using the farm survey data, we first define rural labour's off-farm employment using each person's current employment status and their off-farm employment history. Specifically, according to the definition of off-farm employment by Brauw et al. (2002), we split part-time off-farm employment (which is defined as engaging

in agricultural production and having off-farm income) from full-time off-farm employment (which is defined as being isolated from agricultural production, having no farming income and being fully engaged in non-agricultural industries). In addition, we have defined another eight variables: the employment-related household registration policy, the settlement-related household registration policy, the mean age of the household, the proportion of married people per household, the share of the labour force per household, the share of male agricultural labour per household, land area per household and the rural–urban wage gap.

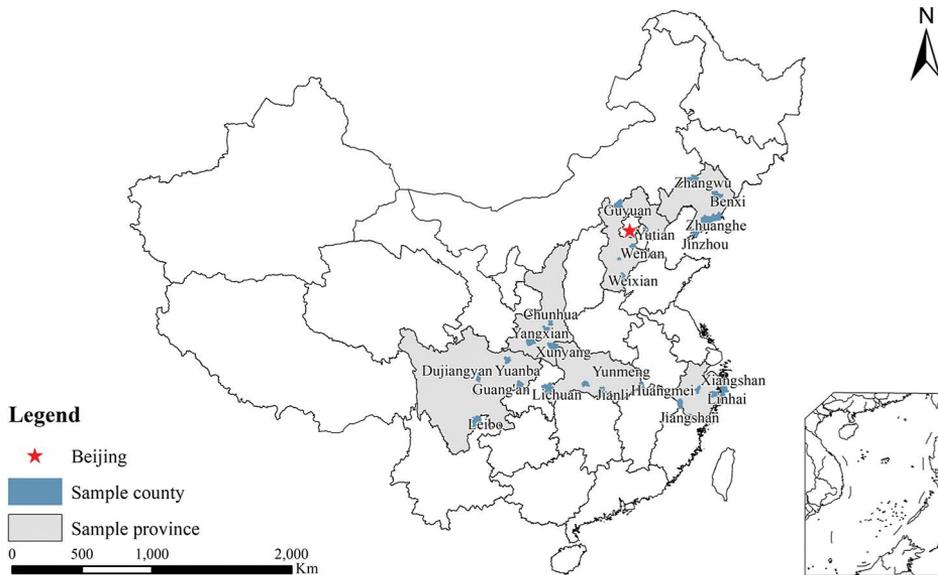


Figure 5.1 Geographical distribution of our sample farms, 2000, 2008 and 2015  
Source: Summarised by the authors based on survey data.

Figure 5.2 shows the changing trend in the average proportion of off-farm employment in total rural labour at the household level between 1981 and 2013, while Figure 5.3 describes the relative proportion of part-time off-farm employment to that of full-time off-farm employment. Between 1981 and 2013, the proportion of off-farm employment in total rural labour increased from about 10 per cent to more than 60 per cent. Moreover, when we split full-time from part-time off-farm employment, the relative proportion of full-time off-farm employment to part-time off-farm employment increased over time, suggesting that the increase of off-farm employment comes mainly from the increase in full-time off-farm employment. It is notable that there are two ‘cliffs’ that appear at the junction of the three phases (in 2000 and 2008, respectively) of the trend in both Figure 5.2 and Figure 5.3. This is mainly due to the errors in farmers’ recollection of their employment history, which does not affect the estimation of the overall trend of off-farm employment.

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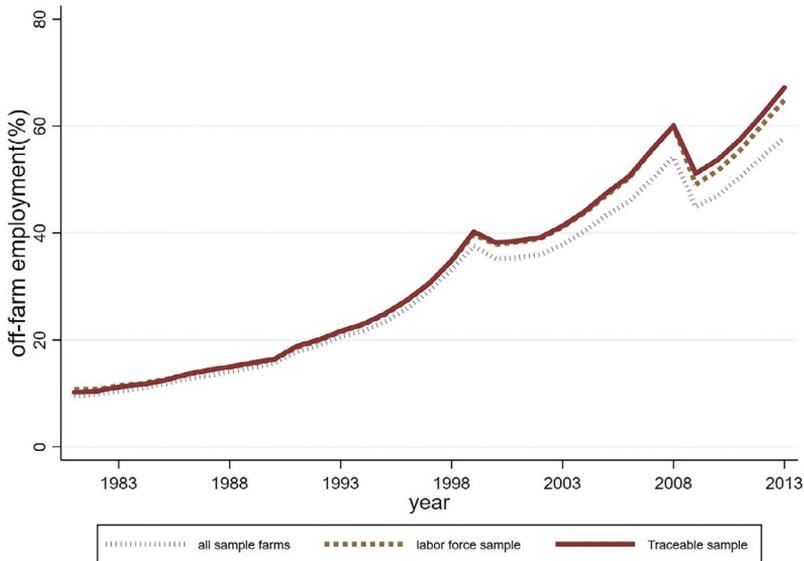


Figure 5.2 Change in relative proportion of off-farm employment in China, 1981–2013

Note: Although there are ‘cliffs’ in 2000 and 2008 in our time-series data due to the unreliable nature of recalled data, they do not affect our results. To test this, a robustness check has been made in Appendix 5.3, in which two dummy variables have been controlled in the regressions, and the results are consistent with our findings.

Source: Authors’ estimations using CCAP farm survey data.

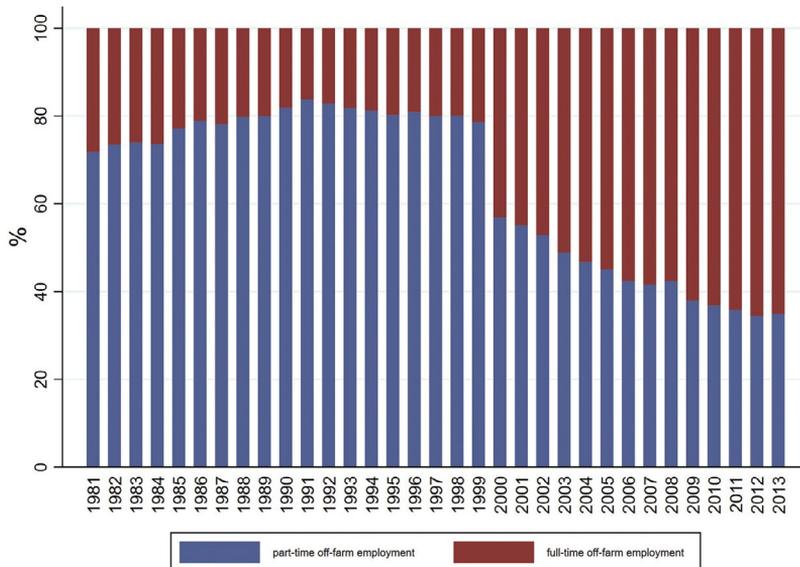
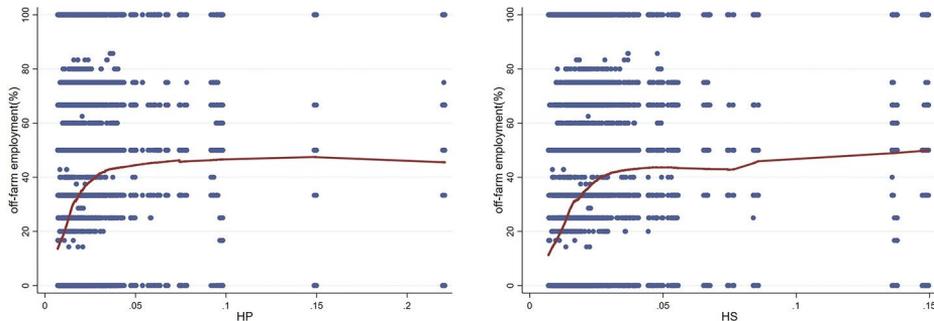


Figure 5.3 Part-time versus full-time off-farm employment, 1981–2013

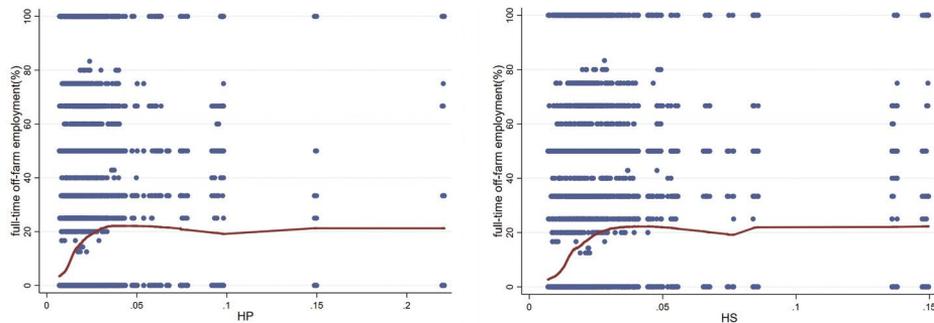
Note: For the ‘cliffs’ in 2000 and 2008, please refer to the note under Figure 5.2.

Source: Authors’ estimations using CCAP farm survey data.

It is widely believed that there are two important factors that may affect the choice of off-farm employment of rural labourers: the rural–urban wage gap and the household registration system. Before we conduct an analysis of the causal relationship, it is useful to look at the apparent relationship between these two factors and the average proportion of off-farm employment of rural labour at the farm level. As shown in Figures 5.4 and 5.5, the average proportion of off-farm employment has been increasing with the increasing rural–urban wage gap, as well as the relaxation over time of the *hukou* restrictions. This implies that further relaxing *hukou* restrictions is likely to increase the probability of rural labourers choosing off-farm employment. Although the visual relationship is informative, we need more thorough regression analysis to examine our hypotheses.



Panel (A) Household registration policy versus part-time non-agricultural employment



Panel (B) Household registration restrictions versus full-time non-agricultural employment

**Figure 5.4 The apparent relationship between household registration restrictions and average off-farm employment**

Source: Authors' estimations using CCAP farm survey data.

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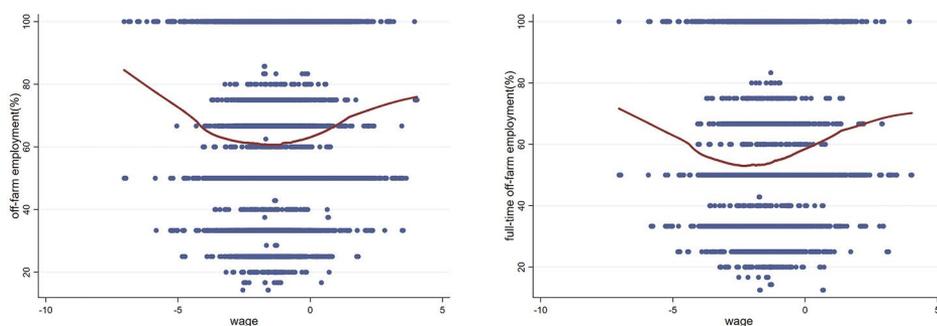


Figure 5.5 The apparent relationship between the urban–rural income gap and average off-farm employment

Source: Authors' estimations using CCAP farm survey data.

Finally, for other control variables, Table 5.1 provides some descriptive statistics on how they have changed over time between the three survey years: 2000, 2008 and 2013. Overall, it shows that a rise in the average scores of both categories of policies indicates the gradual relaxation of *hukou* policies, which is in accordance with the reform procedure. It is also notable that the degree of employment-related restrictions is relaxed more quickly than that of settlement-related restrictions. Since the wage variable is measured by the rural–urban income ratio, the increase in the mean of the wage variable, from 0.63 in 2000 to 0.31 in 2013, reveals an expansion in the urban–rural income gap over that time. The change in land area shows a decline from 6.34 mu to 5.61 mu across periods. The rise in the share of the labour force from 53.81 per cent to 56.92 per cent may facilitate non-agricultural employment.

Table 5.1 Descriptive statistics of key variables, 2000, 2008 and 2013

Year	1981–2013		2000		2008		2013	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Share of agricultural labour (%)	69.41	35.94	63.25	36.60	44.20	36.67	40.79	39.41
Share of part-time off-farm labour (%)	17.04	28.00	21.34	31.37	23.80	31.62	20.49	30.76
Share of full-time off-farm labour (%)	13.55	27.29	15.41	27.19	32.00	34.62	38.72	38.67
Employment-related household registration policy	0.02	0.02	0.02	0.01	0.03	0.02	0.04	0.03
Settlement-related household registration policy	0.02	0.02	0.02	0.01	0.03	0.03	0.03	0.03
Mean age of the household (year)	29.35	9.61	30.68	7.50	37.33	8.20	39.71	8.44
Share of married family members (%)	72.51	21.90	73.31	22.19	69.99	21.46	77.83	17.21
Share of labour force (%)	53.87	24.76	53.81	21.23	55.71	25.01	56.92	27.30
Share of male agricultural labour (%)	50.18	16.25	49.92	16.97	50.14	16.94	49.31	17.31
Land area (mu)	6.22	9.78	6.34	7.55	6.31	14.88	5.61	6.89
Ratio of rural–urban income (%)	0.62	2.02	0.63	1.71	0.40	2.01	0.31	1.17
Observations	35,079		1,063		1,063		1,063	

Source: Authors' estimations using CCAP farm survey data.

## Empirical results: Impact of the *hukou* system on off-farm employment

The essential question we seek to answer is what are the impacts of the *hukou* policy on the off-farm employment of rural labour? To answer this question, we apply the panel data to estimate Equations 5.6 and 5.7 so as to quantify the impact of the employment-related and settlement-related policies, respectively, on the off-farm employment of rural labour. The estimation results obtained by using the OLS regression and the panel data regression with fixed effects are presented in Table 5.2.

Table 5.2 Regression results

Variables	Off-farm employment		Full-time off-farm employment		Part-time off-farm employment	
	(1) OLS	(2) Fixed effect	(3) OLS	(4) Fixed effect	(5) OLS	(6) Fixed effect
$HP_{hrt}$	0.378*** (0.015)	0.440*** (0.006)	0.305*** (0.013)	0.393*** (0.005)	0.050*** (0.014)	0.011 (0.017)
$HS_{hrt}/HP_{hrt}$	0.254*** (0.022)	0.276*** (0.009)	0.157*** (0.019)	0.188*** (0.007)	0.084*** (0.024)	0.060** (0.025)
$age_{hrt}$	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.005*** (0.001)
$Marry_{hrt}$	-0.003*** (0.000)	-0.002*** (0.000)	-0.001** (0.000)	-0.000*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
$lbr_{hrt}$	0.002*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)	-0.000 (0.000)
$man_{hrt}$	0.000 (0.000)	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)	-0.000 (0.000)	-0.000 (0.000)
$lnWageGap_{hrt}$	0.002 (0.002)	0.003*** (0.001)	0.002*** (0.001)	0.004*** (0.000)	0.005*** (0.001)	0.005*** (0.001)
$area_{hrt}$	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	0.001* (0.000)	0.001** (0.000)
Constant	1.634*** (0.132)	1.878*** (0.093)	1.167*** (0.065)	1.508*** (0.024)	0.407*** (0.065)	0.187** (0.087)
Observations	33,355	33,355	33,355	33,355	33,355	33,355
Number of hhcode	1,011	1,011	1,011	1,011	1,011	1,011
R-squared		0.275		0.275		0.049

\*\*\* p < 0.01 statistically significant at the 10 per cent level

\*\* p < 0.05 statistically significant at the 5 per cent level

\* p < 0.1 statistically significant at 1 per cent level

Note: Standard errors in parentheses.

First, using the average proportion of off-farm employment in total labour at the farm household level, we examine the impact of the employment-related restriction policy and the settlement-related restriction policy on rural labour's choice of off-farm employment. Controlling household characteristics, the estimated coefficients in front of the employment-related restriction policy based on the panel regression with the household fixed effects is positive and significant at the 1 per cent level. This implies that the relaxation of the employment-related restriction policy positively contributes to an increase in the proportion of rural labour choosing off-farm employment. Moreover, the coefficients in front of the ratio between the settlement-related restriction policy and the employment-related restriction policy are also positive and significant at the 1 per cent level. This implies that relaxing the settlement-related restriction policy is likely to generate a larger impact on the off-farm choice of rural labour than relaxing the employment-related restriction policy.

Second, we further use the average proportion of full-time off-farm employment in total labour at the farm household level as the dependent variable and redo the exercise. As is shown in Table 5.2 (Columns 3 and 4), the impacts of both the employment-related restriction policy and the settlement-related restriction policy on the off-farm employment of rural labour are close to those obtained for total off-farm employment. The estimated coefficients in front of the employment-related restriction policy and the settlement-related restriction policy are positive and significant at the 1 per cent level. In addition, when compared with those estimates when the dependent variable is the proportion of part-time off-farm employment in total labour, the estimated impact seems to increase. This implies that the household restriction policies are likely to affect the full-time off-farm employment choices of rural labour much more than their part-time choices.

Third, although relaxing both the employment-related restriction policy and the settlement-related restriction policy will tend to increase average off-farm employment of rural labour at the farm level, the impact of the settlement restriction policy is more relevant to the increase of off-farm employment. According to the estimates in Table 5.2, in the scenario of the average proportion of off-farm employment (Columns 1 and 2), the positive and statistically significant coefficients in front of  $\frac{HS_{hrt}}{HP_{hrt}}$  imply that the impact of the settlement-related restriction policy is 25.4 per cent to 27.6 per cent higher than that of the employment-related restriction policy. Meanwhile, in the scenario of the average proportion of full-time off-farm employment (Columns 3 and 4), the positive and statistically significant coefficients in front of  $\frac{HS_{hrt}}{HP_{hrt}}$  indicate that the impact of the settlement-related restriction policy is 15.7 per cent to 18.8 per cent higher than the employment-related restriction policy.

As for control variables, a positive coefficient in front of the rural–urban wage gap, which implies that the rural–urban wage gap is one of the most important factors affecting the choice of off-farm employment. Comparing the estimates based on Equations 5.6 and 5.7, the coefficients in front of the wage gap when the dependent variable is the average proportion of full-time off-farm employment are greater than those in the case where the average proportion of off-farm employment in total labour is the dependent variable. This indicates that the wage gap is likely to exert more influence on full-time off-farm employment. The negative and statistically significant coefficients in front of the average age of a household indicate that average age negatively impacts on off-farm employment. The proportion of those married in the total population at the farm household level affects off-farm employment negatively and significantly based on Columns 1–4 in Table 5.2. Moreover, a positive and statistically significant coefficient in front of the share of the labour force in the total population at the farm household level implies that, with an increase in the share of the labour force, the average proportion of off-farm employment will increase as well. In addition, as is shown in Table 5.2, the positive and statistically significant coefficients in front of the average proportion of males in the total population at the farm household level imply that households with a higher proportion of males are more likely to participate in off-farm employment.

## Concluding remarks

This chapter investigates the impact of household registration policies in urban areas on the off-farm employment of rural labour by using household-level data for the period 1981–2013. The study makes three main contributions. First, we construct a panel dataset of off-farm employment at the household level spanning 1981 to 2013, which allows us to examine the long-term effects of the *hukou* system on the off-farm employment of rural labour. Second, we compile a comprehensive indicator to capture the trans-temporal and cross-regional changes in the *hukou* system throughout the whole post-reform period and the potential impacts of policy reforms. Third, instead of conducting analysis from the perspective of urban areas, we concentrate on the rural side and attempt to investigate the behaviour of farm households under *hukou* reforms.

We show that the off-farm employment of rural labour tends to increase with the relaxation of *hukou* policies throughout the whole post-reform period, when the rural–urban wage gap and other farm household level characteristics are well controlled. In particular, when splitting full-time off-farm employment from part-time off-farm employment, we show that full-time off-farm employment is more likely to be restricted by the settlement-related policy. This implies that institutional

barriers related to the *hukou* system are still important barriers to the integration of rural and urban labour markets. Further reforms are required to relax this system so as to facilitate rural-to-urban migration.

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## Appendix 5.1 The household registration policy classification and score method

Based on the history of *hukou* reforms since 1958, we summarise all migrant policies in the urban areas of 28 provinces—excluding Tibet, Xinjiang, Gansu, Hong Kong, Macau and Taiwan—in each period of reform, and we find that employment-related and settlement-related restriction policies are essential administrative drivers of off-farm employment. Therefore, the *hukou* system referred to in this chapter is divided into two categories: the employment-related and settlement-related restriction policies. Each category is further divided into three groups, according to the level of restriction. A score of 1–3 is assigned to each policy group, with 1 representing the most restrictive policy and 3 representing the least restrictive policy. If the *hukou* system of a province in that year conforms to Category A, it will receive 1 point; if it conforms to Category B, it will receive 2 points; and if it conforms to Category C, it will be given 3 points. Since we define the category based on the quantified extent to which the *hukou* system evolves over time and is consistent between provinces, it allows us to make a quantitative comparison (although the method is simple). Table A5.1 provides the detailed definitions of the employment restriction and settlement restriction policies and scores for the two types of household registration systems in 28 provinces from 1981 to 2013.

Table A5.1 Household registration policy classification and score method

Level of policy relaxation	Employment-related policy	Settlement-related policy	Score of policy effects
A	Rural labourers are allowed to work outside household registration areas, but there are restrictions on the types of work, and the 'Mobile Personnel Employment Permit' and 'Mobile Personnel Employment Card' are required.	Rural labourers are allowed to register a residence permit if they are living legally and stably in this city; are employed legally and stably in this city and have been participating in the city's employee social insurance scheme for six months; are staying with relatives with local household registration; or have been studying for more than six months, etc.	1
B	Rural labourers are allowed to work outside the household registration area, there are no restrictions on the types of work, but a temporary residence permit is needed. The temporary residence permit requires workers to have a permanent place of residence (including a lease) and legal work. Basically, rural labourers cannot share the civil rights of urban residents.	If the holder of a residence permit continues to live in the same place and pays social insurance premiums for five years, has a stable occupation and meets the family planning policy, his or her children receive preschool education and compulsory education the same as permanent resident students.	2

Level of policy relaxation	Employment-related policy	Settlement-related policy	Score of policy effects
C	Temporary residence permit processing only requires resident ID card or other valid identification certificate. After processing, rural labourers can directly enjoy some citizen rights.	Rural workers with their spouses, unmarried children and parents living together are allowed to apply for registration of permanent residence if they are employed legally and stably for more than a year in a small or medium-sized city, have a legal and stable residence (including a lease) and participate in a social insurance scheme for a certain number of years.	3

Note: Two categories of the household registration policy are summarised according to the national household registration system policy from 1958 to the present, combined with the provincial household registration policy of 1981–2018 in 28 provinces, excluding Tibet, Xinjiang, Gansu, Hong Kong, Macau and Taiwan.

## Appendix 5.2 The distribution of sample farms: 2008 and 2013

Table A5.2 summarises the distribution of sample farms in the second and third phases (2000 and 2008, respectively) of the CCAP farm household surveys.

Table A5.2 The distribution of sample farms, 2008 and 2013

Province	Number of sample farms	2008		2013	
		Field survey	Telephone survey	Field survey	Telephone survey
Nation	1,063	999	64	972	91
Hebei	177	173	4	173	4
Shaanxi	192	175	17	180	12
Liaoning	192	184	8	168	24
Zhejiang	180	177	13	153	27
Sichuan	150	147	3	143	7
Hubei	172	153	19	155	17

Source: Summarised by authors using CCAP farm survey data.

## Appendix 5.3 Robustness check for the cliffs in 2000 and 2008

Table A5.3 Regression results incorporating dummy variables for 2000 and 2008

Variables	Off-farm employment		Full-time off-farm employment	
	(1) OLS	(2) Fixed effect	(3) OLS	(4) Fixed effect
$HP_{hrt}$	0.356*** (0.031)	0.420*** (0.024)	0.292*** (0.033)	0.382*** (0.028)
$HS_{hrt}/HP_{hrt}$	0.250*** (0.033)	0.270*** (0.031)	0.164*** (0.030)	0.192*** (0.030)
$age_{hrt}$	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000*** (0.000)
$Marry_{hrt}$	-0.003*** (0.000)	-0.003*** (0.000)	-0.000** (0.000)	-0.000 (0.000)
$lbr_{hrt}$	0.002*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
$man_{hrt}$	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.001* (0.000)
$lnWageGap_{hrt}$	0.002 (0.002)	0.003 (0.002)	-0.004** (0.002)	-0.002 (0.002)
$area_{hrt}$	0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.001)
$dum\_2000\_2008$	0.036*** (0.009)	0.039*** (0.009)	0.005 (0.008)	0.009 (0.008)
$dum\_2008\_2013$	0.066*** (0.009)	0.046*** (0.009)	0.072*** (0.010)	0.047*** (0.008)
Constant	1.568*** (0.131)	1.821*** (0.096)	1.103*** (0.150)	1.456*** (0.115)
Observations	33,355	33,355	33,355	33,355
Number of hhcode	1,011	1,011	1,011	1,011
R-squared		0.278		0.277

\*\*\* p < 0.01 statistically significant at the 10 per cent level

\*\* p < 0.05 statistically significant at the 5 per cent level

\* p < 0.1 statistically significant at the 1 per cent level

Note: Standard errors in parentheses.

This text is taken from *The Chinese Economic Transformation: Views from Young Economists*, edited by Ligang Song, Yixiao Zhou and Luke Hurst, published 2019 by ANU Press, The Australian National University, Canberra, Australia.

[doi.org/10.22459/CET.2019.05](https://doi.org/10.22459/CET.2019.05)