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**Left-Behind Children and Return Decisions of Rural  
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# Left-Behind Children and Return Decisions of Rural Migrants in China

Sylvie Démurger<sup>a</sup> & Hui Xu<sup>a, b\*</sup>

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## Abstract

This paper examines how left-behind children influence return migration in China. We first present a simple model that incorporates economic and non-economic motives for migration duration (or intentions to return). Based on Dustmann (2003b), the parent is assumed to be altruistic and to care about the prospects of her left-behind children. We then propose two complementary empirical tests based on an original dataset from a rural household survey carried out in Wuwei County (Anhui province, China) in fall 2008. We first use a discrete-time proportional hazard model to estimate the determinants of migration duration for both on-going migrants with incomplete length of duration and return migrants with complete length of duration. Second, we apply a binary Probit model to study the return intentions of on-going migrants. Both models find consistent results regarding the role of left-behind children as a significant motive for return. First, left-behind children are found to pull their parents back to the village, the effect being stronger for pre-school children. Second, sons are found to play a more important role than daughters in reducing migration duration.

**Keywords:** return migration, migration duration, left-behind children, discrete-time duration analysis, China.

**JEL classification:** J61, J13, C41, C25, O53.

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# Left-Behind Children and Return Decisions of Rural Migrants in China

## 1. Introduction

Economic development is often combined with the transfer of a large proportion of workers from the rural-based traditional agricultural sector to the urban industrial sector. China has been witnessing such a massive internal transfer since the mid-80s (Li, 2010). The latest official figures from the Sixth National Population Census released in April 2011 estimate the total number of rural migrant workers at 261.4 million in 2010<sup>1</sup>. Such large-scale internal migration results from a series of institutional and structural changes along with rapid industrialization. Before the reforms started in 1978, labor mobility was strictly controlled. Since then, the government policy has been loosened up, moving from permitting rural labor mobility, to guiding rural labor mobility and then to encouraging rural labor mobility (Wang and Cai, 2009). Thanks to the relaxation of various regulations, people are now free to move to places they want (Zhang, 2010), and to decide on the length of their stay.

Yet, while labor mobility in China has dramatically increased over time, temporary migration dominates population movements that are shaped by the strong institutional constraint imposed by the household registration system (*Hukou*). Formally established in 1958, this system requires every Chinese citizen to be registered according to her place of permanent residence and occupation (agricultural *versus* non-agricultural)<sup>2</sup>. As argued by Knight and Song (2005, p. 17), it functions as a “de facto internal passport system” that confers different legal rights to residents. In villages, residents are given rights to land for farming and housing while in cities, residents are given access to urban jobs and rights to a package of welfare and social benefits. Though the system has been reformed in terms of labor mobility, access to public services remains deeply tied to the household registration place, to the disadvantage of migrants. This is notably the case for children education. As the

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<sup>1</sup> In Chinese statistics, rural migrants are persons working and living outside the town of their household registration for a period over six months. Out of the total figure, 40 million were working within their municipality or prefecture-level city and 221.4 million further away from home. Compared to the 2000 Fifth National Population Census, the population in the second category rose by 81 percent over the 10-year period. [http://www.stats.gov.cn/english/newsandcomingevents/t20110428\\_402722244.htm](http://www.stats.gov.cn/english/newsandcomingevents/t20110428_402722244.htm).

<sup>2</sup> See Chan and Buckingham (2008) for a detailed description of the household registration system, both historically and in light of the recent waves of reform.

education budget for the nine-year compulsory education in China is allocated through local governments and is not transferable, urban schools with a limited education budget are reluctant to accept rural migrant children, unless their parents compensate for the additional cost. Hence, though rural migrant children are not officially denied access to the urban public school system, parents are requested to pay “education endorsement fees” (*jiaoyu zanzhu fei*) for children attending school in places other than their place of household registration, and the amount of such fees can be prohibitive for poor migrant families (Lai and Chen, 2010). At the non-compulsory senior high school level, additional registration place-based constraints also apply since the education policy requires students to take the university/college entrance examination in their *hukou* registration area<sup>3</sup>. A direct consequence of such administrative and financial barriers is that migrant children are often left behind in rural home regions as long as they are enrolled in the education system, and looked after either by one parent or by their grandparents or relatives (including family, neighbors or friends).

As more and more people are involved in internal migration, the number of “left-behind” children (*liushou ertong*) is also increasing dramatically. According to the All China Women’s Federation, there were a total of 58 million left-behind children in rural China in 2009, of which more than 40 million were below the age of 14<sup>4</sup>. Together with another 19 million living with their migrant parents in cities, the two groups account for about one quarter of all children in China (Chan, 2009). As compared to 2006, the number of left-behind children in 2009 is almost triple<sup>5</sup>. Data gathered as part of the Rural–Urban Migration in China and Indonesia (RUMiCI) project confirm that many migrant children grow up apart from their parents: in 2007, about 60% of the migrant children aged 16 and below were left behind in the rural hometown (Gong *et al.*, 2008).

As pointed out by Rossi (2008), leaving children behind is a source of potentially high “social cost of migration” although migration may also bring benefits to the left-behind family through remittance transfers that relax budget constraint and thereby increase health and education opportunities (Cox Edwards and Ureta, 2003; Rapoport and Docquier, 2006). Migration can affect children in various dimensions. Children who grow up either with a single parent or with

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<sup>3</sup> The examination system is not uniform across China, and its implementation varies greatly at a provincial level. In 1987, Shanghai municipality pioneered in designing its own university entrance examination. Since then, more and more provinces have participated into this independent decision system. Up to 2005, 14 provinces and municipalities had independently decided the content of their university entrance examination. ([http://www.china.com.cn/education/zhuanti/hfgk30/2007-05/29/content\\_8316780.htm](http://www.china.com.cn/education/zhuanti/hfgk30/2007-05/29/content_8316780.htm)) (in Chinese).

<sup>4</sup> [http://www.gov.cn/jrzq/2009-05/27/content\\_1325494.htm](http://www.gov.cn/jrzq/2009-05/27/content_1325494.htm). (in Chinese).

<sup>5</sup> <http://english.peopledaily.com.cn/90001/90782/6818318.html>.

grand-parents or other relatives may suffer from a lack of parental care that adversely affects their educational outcomes (Frisancho Robles and Oropesa, 2011; McKenzie and Rapoport, 2010). Moreover, the break-up of the family unit can create material and psychological insecurity that affects the well-being of children left behind. As for China, there is small body of literature that examines left-behind children well-being by focusing on different facets of living arrangements' outcomes such as school performance and health condition<sup>6</sup>. Mixed results have been found regarding the effect of migration on children school performance. Using data from the 2006 China Health and Nutrition Survey (CHNS), Lee (2011) shows that migrant children are worse off in terms of school enrollment and years of schooling as compared to children whose parents do not migrate. Using the 2007 RUMiCI data, Gong *et al.* (2008) compare school performance of migrant children who live in cities with those left-behind and find that the latter perform better. On the other hand, using survey data from 36 primary schools in Shaanxi province in 2006, Chen *et al.* (2009) do not find any significant negative effect of migration on school performance. With respect to health outcomes, Gao *et al.* (2010) find that parental migration is a risk factor for unhealthy behaviors amongst adolescent school children in rural China. Gong *et al.* (2008) report better conditions for migrant children living with their parents in cities as compared to children left behind. Finally, Kong and Meng (2010) find that children of migrants (either left-behind or in cities) are less likely to have good education and health outcomes as compared to rural non-migrant children and urban children.

As family ties in the Chinese society remain very strong, there are good reasons to expect that concerns about the welfare of the left-behind family may affect migration (and return) decisions. Accounting for the social cost motive of leaving behind children in the determination of the length of rural-urban migration in China is of importance, not only from an academic point of view but also in terms of policy implication. As an example, the recent growing tension about “migrant labor shortage” in China’s coastal cities, where booming small and private enterprises have absorbed a large quantity of migrants from western China has put forward the importance of family factors in explaining the labor shortage. Hence, anecdotal evidence from interviews conducted by the *Guangzhou Daily* in February 2011<sup>7</sup> indicates that left-behind children are a major reason for migrants not to go back to cities after the Lunar New Year holiday. Moreover, as mentioned above, the *hukou* system is

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<sup>6</sup> The Chinese-language literature is more voluminous on these issues than the English-language literature. For additional references in Chinese, see Chen *et al.* (2009) and Gao *et al.* (2010).

<sup>7</sup> <http://media.worker.cn/c/2011/04/06/110406103941721910878.html> (in Chinese).

considered as an important reason for the transient nature of migration. Evaluating the role of children on individual's decision on migration duration can thus help bringing up a better understanding of the multidimensional impact of the *hukou* system on migration.

The overall goal of this paper is to explore the role of children as a motive for return migration in China. To meet this goal, we first present a simple illustrative model of migration duration (or intentions to return) based on Dustmann (2003b), which accounts for left-behind children through parents' altruistic behavior. The discussion also points to the potential differentiated impact of children on return decisions depending on their age and their gender. Then, using a unique data set collected in 2008, we provide an empirical test based on two complementary approaches. We first use a duration model to estimate the determinants of the length of migration for both on-going migrants with incomplete migration spells and return migrants with complete migration spells. Second, we apply a binary Probit model to study the return intentions of on-going migrants. Both models find consistent results regarding the role of left-behind children as a significant motive for return.

Our paper contributes to the existing literature at least in two ways. First, although children may be important stakeholders in the migration phenomenon, little attention has been given to children in the analysis of migration decisions. A few exceptions are Djajic (2008) and Dustmann (2003b). To our knowledge, this paper is the first to explore the process that links the decision on migration duration and return intentions to concerns about left-behind children in China. By examining the determinants of the length of migration, this paper also contributes to fulfilling the lack of research on migration duration in China. Although the length of migration is an important indicator of the flow and the scale of migration as well as of the economic effects on both receiving and sending regions, it has received limited attention in the migration literature<sup>8</sup>. As pointed out by Dustmann (2003a), "we know little about the determinants of migrant's duration abroad". As far as China is concerned, the issue has a strong political importance because there is a fear that, if cities cannot adequately absorb those migrants, it may eventually lead to social unrest. Yet, up to now, no research has specifically addressed this question for China.

Second, the dearth of data is an important limit to the study of the interaction between left-behind children and migration duration. The dataset used in this paper offers recent and rich information

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<sup>8</sup> One may yet refer to Carrión-Flores (2006), Djajic (2008), Dustmann and Kirchkamp (2002), Dustmann (2003a; 2003b), Kirdar (2010), Lindstrom (1996), Schroll (2009) and Stark *et al.* (1997).

including complete and incomplete length of migration duration, return intentions of on-going migrants as well as detailed individual and household characteristics. This enables us to offer a richer analysis on how left-behind children influence return migration in China.

The paper proceeds as follows. Section 2 describes the study area and provides descriptive statistics on migration duration and intentions to return. Section 3 presents a simple illustrative model. Section 4 examines the determinants of migration duration with a duration model. Section 5 investigates the determinants of return intentions with a Probit model. Section 6 concludes.

## **2. Study area**

### **2.1 Migration in Wuwei County**

The data used in this paper come from a series of rural households' interviews conducted in Wuwei County, Anhui province, from September to November 2008. Wuwei County was selected because of its relatively long labor force export history, the county being famous for sending out domestic service female workers since the beginning of the 1980s. According to local official statistics, at the end of 2006, individuals working outside the county accounted for 43 percent of the entire rural labor force in Wuwei County (Wuwei County Government, 2007). Together with a large-scale migration, Wuwei County is also characterized by a sizable number of left-behind children. A recent survey indicates a total number of about 120,000 left-behind children for a total of 400,000 migrants in the county (Mei, 2009). A detailed investigation conducted by the County Women's Federation in Hedian town (one of the 23 towns of the county) shows that 64.7% of the students at school in the town are left-behind children. Among them, 76.7% have both parents away. In 42.8% of the cases, grand-parents are taking care of the left-behind child, and in the other 56.6%, relatives or friends are taking care of the left-behind child (with 0.6% reported to be left alone with no guardian). The frequency of the parents' visits are once a year for 58.2% of the cases, once every two years for 27.1% and less than once every two years for 14.7% (Mei, 2009).

Four towns were chosen for the survey: Gaogou, Liudu, Dougou and Tanggou. Three administrative villages in each town and twenty households on average in each village were randomly selected. A total of 239 households were interviewed, providing information on 969 individuals. The

data were collected in a form of a questionnaire, consisting of a series of questions about both family and individual members. Individual information includes personal characteristics (e.g., age, sex, education, etc.), actual working position and incomes. For those having a migration and/or return migration history, their working experience during and after migration was also recorded. A separate administrative village survey was also conducted in each village to collect information about the general economic, geographic as well as demographic conditions in the locality.

The sample used in this paper is composed of 284 individuals having a migration and/or return migration history, with 124 return migrants<sup>9</sup> and 160 on-going migrants. This primary data set is unique in the sense that it contains detailed information both on the complete length of migration for each return migrant and the incomplete length of migration for on-going migrants. For return migrants, the length of migration duration is defined from the year of an individual's first time migration up to the year of her last return. For on-going migrants, the length of migration duration is calculated from the year of an individual's first time migration until the year of the survey.

Moreover, for on-going migrants, the survey provides information about return intentions. Indeed, households were asked whether on-going individual migrants wish to remain permanently in the destination area or whether they wish to return home at some point in the future. If on-going migrants were absent from home at the time of the survey, answers were given by family members (e.g. household head or spouse) who also answered other questions in the questionnaire. Out of the 160 on-going migrants, we obtained clear information on their return intentions for 117 individuals and we construct a dummy variable that equals one for those who declared intending to return soon or in the future, and 0 for those declaring to have no intention to return<sup>10</sup>.

Information gathered during the survey gives some hints on the importance of the left-behind children phenomenon in the area as well as on its possible relation with return decision. Most school-age children (76.4%) are found to be living in the local town or village, and only 2.5% are living with their migrant parents in cities. A small part of children (16%) are living alone in other places outside the county: this is mostly the case for students of above high school level who pursue studies in other regions. Though our data did not directly record the situation for pre-school children

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<sup>9</sup> Return migrants are individuals who are currently residing and working in the county, with at least 6 months migration working experience outside the county.

<sup>10</sup> The 43 out-migrants for whom we do not have clear intention to return or to settle in cities are kept in the sample used in the migration duration analysis, but excluded from the sample used in the return intention analysis.

(under the age of 6), pre-school children are facing a similar situation of separation from their parents. The survey also collected information on the reasons for return migration, with multiple answers allowed. Out of all the reasons provided, 25% were related to children, either to “look after children” or “for children’s education”<sup>11</sup>.

## 2.2 Data description

As shown in Table 1, the mean length of migration for the overall sample is 6.81 years, and 32% of migrants have experienced more than 8 years of migration<sup>12</sup>. The mean lengths of stay for both on-going migrants and return migrants are fairly close, though a bit longer for the former (6.87 years vs. 6.74 years). The pairwise correlation of the length of migration with the year of migration is negative and significant for both return migrants and on-going migrants: earlier migrants are more likely to have longer migration duration than more recent migrants<sup>13</sup>.

Table 2 presents descriptive statistics for the overall sample as well as for return migrants and for out-migrants who intend to return. For the overall sample of migrants, the average age is 34 years, the average education level is 6.8 years, and 72% are married. In terms of household characteristics, the average size of the migrant household is 4.7; 53.9% of migrants have children under the age of 16, 28.2% have children under the age of 6, 36.3% have sons (under the age of 16), and 29.2% have daughters (under the age of 16). The average number of children under the age of 16 per migrant is 0.75, with 0.41 sons and 0.35 daughters. Interestingly, when it comes to children under the age of 6 (0.32 per migrant), the gender composition is more equal, with 0.16 sons and 0.17 daughters.

Regarding the sub-sample of return migrants, they are significantly much older and more likely to be married than the out-migrant population<sup>14</sup>. Family characteristics indicate that return migrants have a household size significantly smaller than out-migrants, with significantly fewer young children (under the age of 6). No significant difference is found for children under the age of 16, or for the

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<sup>11</sup> In some instances, parents even reported returning “for the sake of children’s education because of the *hukou*”.

<sup>12</sup> This average duration of migration is consistent with larger urban-based migrant surveys findings, including the 2007 RUMiCI survey, which reports an average duration of 7 to 8 years for on-going migrants. See Gong *et al.* (2008) for a comparison of all survey data available for China.

<sup>13</sup> The correlation coefficients are -0.65 for the whole population, -0.95 for out-migrants, and -0.52 for return migrants. All the correlations are statistically significant at 1 percent.

<sup>14</sup> The comparison between return migrants and out-migrants (whatever their intentions in terms of return) is based on mean tests not reported here.

gender composition of children, whatever their age.

Regarding the sub-sample of out-migrants who intend to return, an interesting finding is that while their individual characteristics do not significantly differ from the sample population<sup>15</sup>, there are a number of significant differences on family composition. The household size is significantly higher. They have more children of both sex, more pre-school children (<6), and more daughters under the age of 6 than both the sample population and other out-migrants. Interestingly, 67.6% of out-migrants who intend to return have at least one child (as compared to the sample mean of 53.9%), and 52.9% have at least one son, against 36.3% for the whole sample. Differences are even more pronounced for pre-school children since 41.2% of out-migrants who intend to return have a pre-school child (against 28.2% for the whole sample), but the gender difference now falls on girls (29.4% have a pre-school daughter against 15.1% for the whole sample).

### **3. A simple model of return decision with left-behind children**

Return migration can be considered as part of a lifetime utility maximization plan with given budget (and liquidity) constraints (Borjas and Bratsberg, 1996). In the existing literature, the return motives notably include location preferences with a higher marginal utility of consumption in the area of origin (Djajic and Milbourne, 1988), a higher purchasing power of the destination area currency at home (Djajic, 1989; Stark *et al.*, 1997) and higher returns to human capital accumulated in the destination area at home (Dustmann, 2001; Dustmann *et al.*, 2011). However, as highlighted by Dustmann (2003b) and Djajic (2008), the decision to return and the optimal time of return can also be influenced by altruistic motives of parents towards their offspring in the household. Hence, the migration behavior, and the decision to return, may be driven not only by individual life-cycle consideration, but also by dynastic motives such as offspring's welfare in the future<sup>16</sup>. Emphasizing the family unit rather than the individual migrant makes sense in rural China where family ties are strong and may be important components in explaining individual decisions. Moreover, with migration patterns shaped by the household registration system (*hukou*) that does not entitle rural migrants to

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<sup>15</sup> However, when only compared to other out-migrants, those who intend to return are older, more likely to be married and less educated.

<sup>16</sup> Considering the household, rather than the individual, as the most appropriate decision-making unit in return migration falls in the line of the "New Economics of Labor Migration" (NELM) literature that explicitly integrates migration decision into a household strategy (Taylor, 1999).

urban benefits and leaves most children behind, such approach seems the most relevant.

The simple model presented below is meant to be illustrative of the conjectured influence of left-behind children on return migration. It builds on Dustmann (2003b) and includes a number of alterations to account for Chinese specific features. First, we assume that the parent migrates alone and leaves behind her child. Second, since we are interested in school-age or pre-school children in the home village, we also assume that the child does not work in the second period. Given these two assumptions, the proposed model captures the situation of a family unit composed of a worker engaged in migration (the parent migrant) and a left-behind child.

We consider two periods. In period 1, the parent works and lives in a city, while her child lives in the countryside and is subsidized by the parent. In period 2, the parent may decide to return or stay in city. The parent decides about her own consumption in periods 1 and 2, as well as the child's consumption in periods 1 and 2. Since the child is not assumed to work in period 2, the altruism of the parent takes place through income transfer to the child in period 1, and through daily care (in case of return) or income transfer (in case of settlement in city) in period 2. As in Dustmann (2003b), the return decision is taken by simply comparing lifetime welfare in the two locations.

The utility functions of the parent are supposed to take the usual logarithmic form. Period 1 utility function  $U^1$  is given by:

$$U^1(c^1, k^1) = \ln(c^1) + \gamma \ln(k^1), \quad (1)$$

where  $c^1$  is the consumption of the migrant parent,  $k^1$  is the consumption of the left-behind child and the parameter  $\gamma$  (assumed positive) is the altruism weight.

Period 2 utility function  $U^{2j}$  depends on the location choice of the migrant: settled in city ( $j=M$ ) or returned home ( $j=R$ ), and is given by:

$$U^{2j}(c^{2j}, k^{2j}) = \ln(c^{2j} a^j) + \gamma \ln(k^{2j} b^j), \quad (2)$$

where  $a^j$  and  $b^j$  are preference parameters. In particular,  $a^R > a^M$  and  $b^R > b^M$  reflect a location preference of the migrant for her home village in terms of both her own consumption ( $a$ ) and her offspring's consumption ( $b$ ).

Under the simplifying assumption of no discounting, the total utility function  $U$  of the parent can be simply expressed as follows:

$$U = \ln(c^1) + \gamma \ln(k^1) + (1-h)[\ln(c^{2M} a^M) + \gamma \ln(k^{2M} b^M)] + h[\ln(c^{2R} a^R) + \gamma \ln(k^{2R} b^R)], \quad (3)$$

where the parameter  $h$  stands for the return decision. At  $h=1$ , the migrant decides to return; at  $h=0$ , she settles in city.

The budget constraint of the parent is supposed to be of the following form:

$$c^1 + (1-h)c^{2M} + hc^{2R} + k^1 + (1-h)k^{2M} + hk^{2R} = y^1 + (1-h)y^{2M} + hy^{2R}, \quad (4)$$

where  $y^1$ ,  $y^{2M}$  and  $y^{2R}$  are income of the parent in period 1, in period 2 in city and in period 2 at home, respectively.

The return decision of the migrant rests on the maximization of her utility  $U$  with respect to her own consumption in periods 1 and 2, as well as to her left-behind child in periods 1 and 2, under the budget constraint expressed above for two scenarios: settling in city ( $h=0$ ) or returning to the countryside ( $h=1$ ). The intertemporal utility maximization leads to the following results. The migrant parent will choose to return if:

$$2(1+\gamma) \ln\left(\frac{y^1 + y^{2R}}{y^1 + y^{2M}}\right) + \ln\left(\frac{a^R}{a^M}\right) + \gamma \ln\left(\frac{b^R}{b^M}\right) > 0. \quad (5)$$

As in Dustmann (2003b), the first term illustrates the income impact of return on total utility: as earnings can be assumed to be lower at home ( $y^{2R} < y^{2M}$ ), the decision to return will entail a loss in utility. The loss in utility is higher for altruistic parents ( $\gamma > 0$ ) because their reduced earnings also affect the child outcomes. This may be the case for instance if the reduced earnings contribute to reduce opportunities for education or health care. This first term captures the “educational prospect” dimension as described below. What is more, if the migrant has no location preference ( $a^R = a^M$  and  $b^R = b^M$ ), her altruistic behavior would reinforce the standard income effect towards a decision not to return.

The second term shows the influence of the relative location preference of the migrant in terms of her own consumption. If  $a^R > a^M$ , her relative preference for her home village may partly compensate the income effect and logically reduce migration duration.

The third term reflects the parent’s perception of the well-being of the left-behind child. If the child is perceived as suffering from parental absence in her daily life, then  $b^R > b^M$  will give incentive to the parent to return. In the vein of Dustmann (2003b), this model illustrates the trade-off that migrant parents face when deciding to stay or to return: the consumption of the child is multidimensional in that it incorporates daily care and educational prospects that may be somehow

conflicting in terms of the decision to return. Assuming no migrant parent location preference in her own consumption ( $a^R = a^M$ ), the decision to return for an altruistic parent simply reduces to a comparison of the loss in utility due to lower income (and then possibly a reduction in education opportunities) with the gain in utility thanks to a better-off child (through better daily care for instance).

The two dimensions, daily care *versus* educational prospects, are quite intuitively related to the age of the child: one may expect that daily care will be more valued for young children, while educational prospect will be more important if the child is of school-age. Moreover, in a society with a strong tradition of sons' preference<sup>17</sup>, one may further expect that the return-decision outcome is also going to be linked to the gender of the child, although the total children effect may remain ambiguous.

#### **4. Migrant's length of stay in cities: a duration analysis**

##### **4.1 Framework for duration analysis**

Migration duration data are right-censored by definition since the date of transition out the state (i.e. returning home) is unknown for on-going migrants. As highlighted by Jenkins (2004), survival (or duration) analysis offers a number of advantages compared to OLS or binary choice models for such kind of data. In particular, it is well suited to account for the timing of the migration events, including return migration, for the censoring in the data as well as for incorporating time-varying variables into estimation.

As answers from the respondents were given in months, discrete time periods for migration duration are defined in months<sup>18</sup>. As a consequence, we use a discrete-time (grouped data) version of the commonly used proportional hazard (PH) model<sup>19</sup>, developed by Prentice and Gloeckler (1978). When the data set is discrete, the duration time can be divided into  $k$  intervals,  $\{[0,), [,) \dots [, \infty)\}$ . The discrete-time hazard rate can then be defined as follows:

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<sup>17</sup> See Lee (2008) for a review of the long history of pro-son bias in China.

<sup>18</sup> When the duration time is discrete, the estimation function is a bit different. A detailed description can be found in Jenkins (2004).

<sup>19</sup> The general idea of a proportional hazard model is that the effect of an independent variable is seen as having a constant proportional effect on the baseline hazard. The adoption of such model is usually grounded on two important specifications: the distributional assumptions regarding the baseline hazard and the assumption of unobserved heterogeneity (Bhat, 1996).

$$P_{it} = \Pr[T_i = t / T_i \geq t, X_{it}] \quad (6)$$

where  $T_i$  is the discrete random variable representing the uncensored time at which the end of migration occurs. This measures the conditional probability of individual  $i$ 's migration ending at time  $t$ , given that it has not ended yet. Prentice and Gloeckler (1978) show that the complementary log-log model is a discrete-time analogue to the continuous-time Cox proportional hazard model, where the hazard function can be given by:

$$\lambda_i(t, X) = 1 - \exp[-\exp(\beta' X_i(t) + \theta(t))] \quad (7)$$

where  $\lambda(t)$  is the instantaneous probability (hazard rate) of returning at a duration  $t$  months, given that the individual  $i$  stayed in city for at least  $t$  months.  $\theta(t)$ , which depends on  $t$  alone, is a transformation of the baseline hazard common to all individuals.  $\exp(\beta' X_i(t))$  is a person-specific non-negative function of covariates  $X$ , which scales the baseline hazard function common to all persons.

Regarding the specification of the baseline hazard function  $\theta$ , we consider a duration dependence pattern analogous to that in the continuous-time Weibull model<sup>20</sup> by entering as a covariate the log of  $t$ . Finally, failure to control for unobserved heterogeneity that arises when unobserved factors influence duration can lead to severe bias in the estimates of the covariate effects (Lancaster, 1985). Consequently, one could get an under-estimate of the true proportionate response of the hazard if the unobserved heterogeneity is not captured due to potential omitted variables or measurement errors (Jenkins, 2004).

Figure 1 displays the Kaplan-Meier survival curve, which clearly highlights negative duration dependence: the probability that migration ends shortly increases as the length of migration increases. The median survival rate (i.e. stay in cities) is at about 132 to 144 months (11-12 years). When the migration spell reaches more than 252 months (that is about 21 years), the overall survival rate finally stabilizes at a low level around 12%<sup>21</sup>, indicating that 12% of the migrants' population tend to settle permanently outside. The smoothed hazard estimate displayed in Figure 2 confirms that the hazard rate of return increases with migration duration. For example, at 60 months (5 years), the overall hazard rate is only 3% (with a 95% confidence interval from 2% to 3%), whereas at 192 months (16 years), it reaches 14% (with a 95% confidence interval from 13% to 15%).

<sup>20</sup> The most commonly used form in continuous-time duration studies is a parametric hazard (Bhar, 1996) with an assumed Weibull form baseline (Meyer, 1990).

<sup>21</sup> One should note though that for this long duration, the 95% confidence interval gives a range between 5% and 23%. This might be related to the fact that we do not have many individuals with such long migration history.

## 4.2 Estimation results

In order to assess how the presence of children by age and by gender affects the length of stay, we use a set of children-related variables for each individual at the time of migration. We distinguish children at different age levels (children below the age of 16 and children below the age of 6) and by gender (for each age-group). Since the number of children may vary throughout the whole period of migration, and since these changes may influence the decision on the returning date, we also introduce indicator variables that equal one if there is an increase (or no change) in the number of children (by age-group and by gender) during migration and zero otherwise. We believe that introducing such variables in the model may also help alleviating time-varying problems.

Control variables for migration duration include individual characteristics such as age<sup>22</sup>, gender, education and marriage, individual migration experience measured by an occupational dummy variable that equals one if wage-worker and zero if self-employed during the last job in city (current job for on-going migrants), and hometown characteristics measured by the logarithm of the town average rural per capita annual net income between 2004 and 2008. We also control for household characteristics that may influence the decision to return through the household size.

Estimation results on the determinants of the hazard rate of returning to source regions with and without unobserved heterogeneity are displayed in Table 3 and in Appendix, respectively<sup>23</sup>. The findings are very similar, which indicates that the unobserved heterogeneity is rather small and can be ignored. Our interpretations are therefore mainly based on Table 3<sup>24</sup>. While other things are the same, Model 1 and Model 2 use a set of control variables related to children under the age of 16 while Model 3 and Model 4 focus on pre-school children. Under the age of 16, the children population comprises both pre-school children and students at school essentially from primary school to senior middle school. Model 1 shows that the estimated coefficients for both the number of children under 16 at the time of migration and the change in this number during migration are positive and highly significant. One more child in the household at the time of migration is significantly associated with a 68% higher

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<sup>22</sup> The age variable is recomputed in order to reflect the age at the moment of migration.

<sup>23</sup> The estimation results presented in Table 3 and in Appendix exclude five observations whose length of migration is longer than 20 years. Our results are robust to the inclusion or exclusion of these five observations.

<sup>24</sup> We choose to concentrate on results displayed in Table 3 because we encountered some convergence problem in the estimation of Model 4 when controlling for unobserved heterogeneity.

hazard rate<sup>25</sup>. The coefficient estimates also indicate that individuals whose number of children during migration has increased (or remained unchanged) have a 162% higher hazard rate than others. Model 2 estimates the separate impact of daughters and sons under 16. Both the number of sons and the number of daughters as well as their respective change during migration are positive and significant. Nevertheless, two noteworthy differences can be highlighted. First, the sons-related covariates are significant at 1%, while the daughters-related covariates are significant only at 5%-10% level. Second, the coefficient estimates for sons-related covariates are much larger than those for daughters. In fact, having an additional son at the time of migration and an increase in the number of sons during migration are associated with respectively 147% and 256% higher hazard rates, while the corresponding estimates for daughters are associated with 56% and 125% higher hazard rates. These results indicate that although both sons and daughters play an important role in shortening the length of migration, sons have an even higher weight in the return decision.

Model 3 and Model 4 present results with a set of variables related to pre-school children (under the age of 6). As shown in Model 3, the number of pre-school children and the change in this number during migration are both associated with positive and significant coefficients. Hence, individuals who have more pre-school children at the moment of migration return earlier, and migrants for whom the number of pre-school children has increased (or remained constant) during migration also have higher hazard rates *ceteris paribus*. These results are fully consistent with the above findings for children below 16 years old, and the estimated impacts appear to be substantially higher for pre-school children. Regarding the gender of pre-school children, Model 4 shows positive and significant coefficient estimates for the number of pre-school sons, but no significant estimates for the number of pre-school daughters. In addition, an increase in the number of both sons and daughters during migration is also associated with shorter migration duration, although the level of significance and the degree of the measured impact differ. These results confirm the importance of pre-school sons in return decision among rural migrants.

To sum up, the main results regarding the impact of left-behind children on migration duration can be summarized as follows: *i*) individual migration duration is driven by family motives, with left-behind children being important determinants of return, whatever their age and gender; *ii*)

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<sup>25</sup> This is calculated from the exponentiated coefficient, not reported here, which gives the hazard ratios as in a continuous time model.

pre-school children are a stronger focus for those willing to return, which indicates that daily care may be an important driving motivation for individuals; *iii*) the gender of left-behind children matters on the magnitude of the impact on migration spell, with sons pulling parents back even stronger as compared to daughters. These results suggest that altruistic parents care about children, whatever their age and gender, and they care even more about younger children, with a general gender bias in favor of sons.

In addition to children-related variables, we find consistent and interesting results regarding other explanatory variables in all the four models. Unsurprisingly, the baseline hazard increases with elapsed survival time, which means that return probabilities depend positively on the length of migration spell to date. The increasing baseline can be interpreted as an illustration of the temporary nature of the migration phenomenon in China. To further illustrate this point, Figure 3 displays the smoothed mean predicted hazard rate based on the estimation of Model 1<sup>26</sup>. It shows that the predicted hazard rate is increasing all along migration duration, at a decreasing speed up to the 200<sup>th</sup> month and an increasing afterwards.

The source region economic conditions are found to have a positive and significant impact on the hazard rate: the elasticity of the hazard rate with respect to the town average rural per capita annual net income between 2004 and 2008 ranges from 0.82 to 1.28. This finding indicates that favorable economic conditions contribute to attracting migrants back home, which is consistent with the theoretical prediction that an increase of wage in home country leads to a reduction in the optimal international migration duration (Dustmann, 2003a). Therefore migrants from poorer regions may be willing to stay longer in the host region than migrants from wealthier emigration regions. The result is also consistent with the empirical findings of Schroll (2009) on the case of Denmark.

Regarding individual characteristics, we find a positive impact of age on the hazard of return. People who migrated at an older age are more likely to have higher hazard rates of return. Gender also influences the length of migration, with female migrants being significantly more likely to have shorter length of stay than male migrants. In terms of household characteristics, a migrant from a larger family is more likely to stay longer at destination, which is consistent with the hypothesis that increasing returns to scale in household chores for households with a larger size and more labor

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<sup>26</sup> The mean predicted hazard rate is calculated based on the mean level of the predicted hazard rate for each person given the values of his or her covariates and the spell month value (Jenkins, 2004).

availability make it easier to let some members engage in migration.

## 5. Intended return of on-going migrants

To complement the analysis of migration duration, this section tests the impact of left-behind children on the intended return of on-going migrants. As described above, our survey provides information on out-migrants' intentions to return or to settle in cities. This enables us to empirically examine the determinants of return intentions and to provide a different approach to the evaluation of children-related motives to return. As in the migration duration section, we test the impact of children by age and by gender.

The dependent variable is a binary one: it equals one if out-migrants declared their intention to return and zero if they declared their intention to stay in cities. The intention to return is postulated to reflect the underlying individual's utility from this choice ( $y_i^*$ ):

$$y_i^* = \beta_0 + X_i\beta + \varepsilon_i \quad (8)$$

where  $\varepsilon_i$  is assumed to be independent from  $X_i$  and to have a standard normal distribution. The intention to return is given by the following:

$$y_i = \begin{cases} 1 & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases} \quad (9)$$

In the above Probit model, the vector  $X_i$  includes a series of variables representing children-related factors, individual characteristics, household characteristics, current occupation in destination and source region characteristics. Since we exclude answers to the question on return intentions that were not strictly 'yes' or 'no', we are left with 117 individuals currently working outside of Wuwei County.

Table 4 reports the estimates of marginal effects for the probability of intended return. The first column shows the results using a baseline specification with the number of children below the age of 16. The next two columns focus on testing the impact of children by age, and the last four columns introduce differences by gender. Model 1 to Model 3 all suggest a positive impact of children of different age level on migrants' intention towards return. More precisely, each additional child under the age of 16 in the household increases the return propensity by 16 percentage points. Distinguishing

age groups reveals that pre-school children have a strong impact on the intention to return: the presence of pre-school children in the household is associated with an increase in the probability to return by 38 percentage points, and an additional pre-school child increases the return propensity by 32 percentage points. Moreover, Model 2 and Model 3 both indicate that the presence and the number of school-age children (between 6 and 12) in the household are also associated with a higher probability to return, although the impact seems smaller as compared to pre-school children. These results are consistent with the predictions of the duration model, demonstrating the positive role of children, whatever their age, in pulling migrants back, and the even stronger force of younger children (under 6) in attracting on-going migrants back to the rural hometown.

In the last four columns of Table 4, we introduce a further distinction by gender. The estimates show that the gender-bias may be different depending on the age of the child. On the one hand, for school-age children, the presence of a son has a significant and positive impact on the intention to return, while the presence of a daughter does not seem to have any significant influence. On the other hand, the presence of pre-school daughters seems to be more influential than pre-school sons in influencing the return decision.

In light of the prediction of our model, the results by age-group and by gender bring along an additional interesting perspective on the trade-off that migrant parents face regarding the education prospect of their offspring. On the one hand, since compulsory education is free for children living in their official place of registration (i.e. in rural areas for migrant children), an altruistic parent may have an incentive to leave her child behind and possibly return if daily parental care is believed to be important. On the other hand, for higher education, an altruistic parent may be willing to stay in city to be able to support the education fees of her child. As we focus here on school-age children aged 6 to 12, our findings may capture the first dimension. Moreover, our results by gender indicate that migrant parents may value differently the importance of daily care for boys and girls. On the one hand, they may worry more of the potentially adverse effect that the lack of parental care produces on education outcome of their son(s) rather than their daughter(s) (either because they put more weight on the educational achievement of a son, or because they consider that sons require higher monitoring in their studies). On the other hand, they may worry more on the impact of parental absenteeism on young

(pre-school) daughters<sup>27</sup>.

Besides these findings on the effect of children, the estimates of the Probit models also prove to be consistent with the predictions of the duration model. First, the household size has a negative impact on individual's return intention, suggesting that migrants from larger family are more likely to settle outside rather than return to home villages (where they are less needed). Second, individuals from richer regions are more likely to return, suggesting that a favorable economic environment in sending regions tends to attract out-migrants back. In terms of individual characteristics, the model finds that less educated migrants have a higher probability to express intention to return. This finding implicates a potential "brain drain" of less developed rural labor-exporting regions, the most educated migrants being the ones willing to settle in cities. Finally, regarding the current occupation in cities, wage workers are found to be less likely to return as compared to self-employed.

## 6. Conclusion

This paper examines the role of left-behind children as a motive for return migration in China. A simple model based on Dustmann (2003b) is proposed to account for left-behind children through altruistic parents' care about the prospects of their offspring, and to discuss the potential differentiated impact depending on children's age and gender. We then propose two complementary empirical tests based on an original dataset from a rural household survey carried out in Wuwei County (Anhui province, China) in fall 2008. We first use a discrete-time proportional hazard model to estimate the determinants of migration duration for both on-going migrants with incomplete length of duration and return migrants with complete length of duration. We then examine the return intentions of on-going migrants and specifically estimate the impact of children-related factors by considering both age and gender differences.

A key empirical finding is that both the migration duration study and the return intention study show consistent results regarding the role of left-behind children. The duration analysis shows that both the number of pre-school children and the number of children under 16 at the time of migration as well as an increase in the number of children (for each age-group) during migration have a negative

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<sup>27</sup> For pre-school children, the key issue is health rather than education. As summarized by Lee (2008), empirical studies on gender equality in China found the gender bias to be stronger in health care expenditures and in the intake of nutrients than in education. To reduce the potentially negative impact of her absence on her pre-school daughter's health status, an altruistic parent may have a stronger incentive to return.

impact on an individual migrant's length of stay in city. Compared to all children under 16, pre-school children have an even stronger impact on migrants' return decision, and compared to daughters, the presence of sons is more influential in shortening a migrant's length of stay in city. The study of on-going migrants' return intentions confirms the role of left-behind children, whatever their age, as a significant motive for return, with a relatively stronger impact of pre-school children on pulling their parents back home. As for gender differences, the analysis of return intentions indicates that school-age sons and pre-school daughters have a stronger influence than their counterparts of a same age-group.

The proposed analysis contributes to the understanding of migration dynamics within China, by exploring the determinants of the spell of rural-to-urban migration and of return decision and taking into account the cost of leaving behind children. While important interregional economic disparities in China drive the massive rural exodus, our analysis suggests that children-related factors contribute to the counter-flow of urban-to-rural return migration. These findings have timely implications regarding the "migrant labor shortage" that coastal regions are currently facing. By emphasizing the importance of family demand factors in return migration, they highlight the multidimensional nature of migration. The simple "success" (NELM) or "failure" (Lewis, 1956; Todaro, 1969) dichotomy and the "double selection" theory (Borjas and Bratsberg, 1996) on return migrants may not properly capture all the dimensions at stake in migration and return migration. In the case of China where particular institutions impose strong constraints on individual or family choice, our findings point to the importance of accounting for both economic and non-economic determinants of migration duration to analyze the dynamics of migration. In that, they contribute to the literature on migration by stressing the importance of using a "family unit" framework in modeling return migration decision mechanisms. As Djajic (2008, p. 483) argues, *"one of the shortcomings of the existing literature is that, in explaining decisions related to return migration, it focuses primarily on the individual migrant, rather than on the family unit"*.

Moreover, as internal migration is the main engine of urbanization in China (Wang and Cai, 2009), understanding the factors that explain variations in migration duration is important for designing optimal migration and urban development policies. As discussed above, one of the key issues regarding migration duration in China lies in the prevailing "involuntary" separation of migrants and their left-behind children, as a social consequence of the restrictions imposed by the

*hukou* system and education policies. Children undoubtedly need physical and mental care from their parents. Therefore, a direct implication of our findings is that including migrant children into the local urban education system and allowing them to take higher education entrance exams in the places where they have attended schools, would certainly contribute to freeing choices for migrants to migrate and settle down in cities. This would not necessarily entail a full reform of the *hukou* system but rather the access to public services not being tied anymore to the household registration place.

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**Table 1 - Migration spells statistics**

	<b>Average migration spell</b>	<b>0-1 year</b>	<b>1-3 years</b>	<b>3-5 years</b>	<b>5-8 years</b>	<b>≥8 years</b>
		<i>Percentage</i>				
<b>On-going migrants</b>	6.87 (5.57)	13%	19%	19%	18%	30%
<b>Return migrants</b>	6.74 (5.51)	15%	25%	15%	12%	33%
<b>All</b>	6.81 (5.54)	14%	22%	18%	15%	32%
<b>Observations</b>	284	39	62	50	43	90

*Source:* Wuwei 2008 Survey

*Notes:* Standard deviation in parenthesis.

**Table 2 - Descriptive statistics**

<i>Mean value or %</i>	<i>Full sample</i>	<i>Return migrants</i>	<i>Out-migrants with intention to return</i>
Age (years)	34.23	40.02	34.29
Female (=1)	0.415	0.411	0.353
Married (=1)	0.722	0.887	0.824
Education (years)	6.750	5.903	6.382
Household size	4.673	4.250	5.147
Having at least one child less than 16 (=1)	0.539	0.565	0.676
Having at least a son less than 16 (=1)	0.363	0.347	0.529
Having at least a daughter less than 16 (=1)	0.292	0.298	0.353
Having at least one child less than 6 (=1)	0.282	0.234	0.412
Having at least a son less than 6 (=1)	0.130	0.105	0.118
Having at least a daughter less than 6 (=1)	0.151	0.129	0.294
# children less than 16	0.754	0.710	1.088
# sons less than 16	0.405	0.371	0.559
# daughters less than 16	0.349	0.339	0.529
# children less than 6	0.324	0.266	0.441
# sons less than 6	0.158	0.129	0.118
# daughters less than 6	0.165	0.137	0.324
Having return migrants and/or migrants in the household (=1)	0.630	0.556	0.647
# other out-migrants in the household	0.975	0.782	1.294
# return migrants and migrants in the household	1.447	1.315	1.706
# return migrants and migrants in the village	28.30	27.94	26.41
Age at first migration (years)	24.11	26.31	23.88
Length of stay (years)	6.815	6.742	9.711
Occupation before return (wage worker=1)	0.782	0.685	0.765
Average rural per capita annual net income (2004-2008) (Yuan)	3628.7	3775.9	3727.2
Observations	284	124	34

*Source:* Wuwei 2008 Survey

*Notes:* Some averages are calculated over a smaller number of observations because of missing values. We only report the total number of observations for reference.

**Table 3 - Discrete time proportional hazard estimates  
(without controlling for unobserved heterogeneity)**

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
Baseline hazard (log spell month identifier)	0.389*** (0.000)	0.429*** (0.000)	0.371*** (0.000)	0.433*** (0.000)
Age at migration	0.0452*** (0.000)	0.0472*** (0.000)	0.0327*** (0.003)	0.0395*** (0.001)
Married (=1)	0.239 (0.412)	0.208 (0.482)	0.458 (0.113)	0.316 (0.281)
Female (=1)	0.655*** (0.001)	0.578*** (0.005)	0.664*** (0.001)	0.605*** (0.002)
Years of education	0.0378 (0.271)	0.0516 (0.147)	0.0320 (0.329)	0.0390 (0.244)
Occupation before return (wage worker=1)	0.261 (0.215)	0.346 (0.115)	-0.168 (0.482)	-0.113 (0.619)
Log average rural per capita annual net income (2004-2008)	1.070** (0.024)	0.889* (0.062)	1.284*** (0.007)	0.820* (0.096)
Household size	-0.328*** (0.000)	-0.324*** (0.000)	-0.371*** (0.000)	-0.297*** (0.000)
# children (<16) at migration	0.521*** (0.002)			
Increased number of children (<16) during migration (=1)	0.964*** (0.001)			
# sons (<16)		0.902*** (0.000)		
Increased number of sons (<16) during migration (=1)		1.270*** (0.000)		
# daughters (<16)		0.447* (0.062)		
Increased number of daughters (<16) during migration (=1)		0.813** (0.022)		
# of children (<6) at migration			0.992*** (0.000)	
Increased number of children (<6) during migration (=1)			1.494*** (0.000)	
# sons (<6)				1.835*** (0.000)
Increased number of sons (<6) during migration (=1)				1.842*** (0.000)
# daughters (<6)				0.435 (0.294)
Increased number of daughters (<6) during migration (=1)				1.118** (0.040)

Constant	-17.03*** (0.000)	-16.99*** (0.000)	-18.50*** (0.000)	-16.81*** (0.000)
Number of person-month observations	21869	21869	21869	21869
Log likelihood	-734.7	-730.7	-735.1	-728.9

*Source:* Wuwei 2008 Survey

*Notes:* p-values in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. The coefficients are estimated using the complementary log-log model, where the coefficient on the duration dependence variable is the log of time.

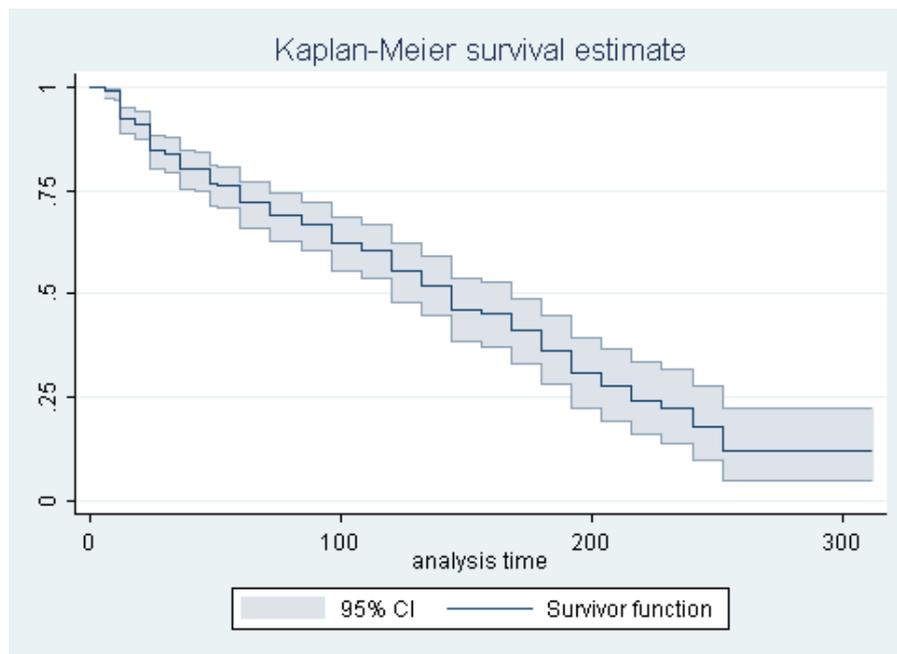
**Table 4 - Probit estimates of out-migrants' return intention (Marginal effect)**

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>	<i>Model 7</i>
Age at migration	-0.00804 (0.387)	-0.0117 (0.177)	-0.0106 (0.231)	-0.0104 (0.253)	-0.0105 (0.224)	-0.00997 (0.272)	-0.00929 (0.309)
Age	-0.0347 (0.300)	-0.0333 (0.325)	-0.0410 (0.255)	-0.0398 (0.275)	-0.0356 (0.314)	-0.0378 (0.304)	-0.0416 (0.252)
Age square	0.000549 (0.209)	0.000604 (0.170)	0.000696 (0.145)	0.000682 (0.152)	0.000620 (0.167)	0.000644 (0.172)	0.000688 (0.146)
Married (=1)	0.181 (0.231)	0.0854 (0.583)	0.0582 (0.726)	0.0714 (0.663)	0.0873 (0.586)	0.0761 (0.645)	0.0671 (0.690)
Female (=1)	-0.0567 (0.533)	-0.0313 (0.732)	-0.0582 (0.520)	-0.0490 (0.587)	-0.0422 (0.652)	-0.0581 (0.527)	-0.0631 (0.486)
Years of education	-0.0289* (0.091)	-0.0354** (0.028)	-0.0380** (0.025)	-0.0324* (0.068)	-0.0355** (0.035)	-0.0344* (0.059)	-0.0380** (0.034)
Household size	-0.0979*** (0.006)	-0.111*** (0.005)	-0.137*** (0.000)	-0.132*** (0.002)	-0.108*** (0.008)	-0.126*** (0.004)	-0.132*** (0.001)
Current job (wage worker=1)	-0.362* (0.056)	-0.402** (0.036)	-0.421** (0.024)	-0.417** (0.039)	-0.415** (0.032)	-0.416** (0.039)	-0.424** (0.027)
Log average rural per capita annual net income	0.698** (0.042)	0.839** (0.018)	0.726** (0.029)	0.765** (0.021)	0.763** (0.023)	0.725** (0.027)	0.682** (0.039)
# children (<16)	0.161* (0.072)						
At least one child under 6		0.380** (0.014)		0.429** (0.012)			
At least one child between 6 and 12		0.208 (0.114)			0.231* (0.080)		
# children under 6			0.320** (0.016)				
# children between 6 and 12			0.247** (0.037)				
At least one son between 6 and 12				0.280* (0.100)		0.254 (0.130)	0.286* (0.085)
At least one daughter between 6 and 12				0.181 (0.358)		0.194 (0.330)	0.266 (0.196)
At least one son under 6					0.253 (0.228)	0.347 (0.149)	
At least one daughter under 6					0.479*** (0.008)	0.492*** (0.008)	
# sons under 6							0.249 (0.141)
# daughters under 6							0.341** (0.019)
Pseudo R <sup>2</sup>	0.197	0.226	0.237	0.242	0.238	0.247	0.241

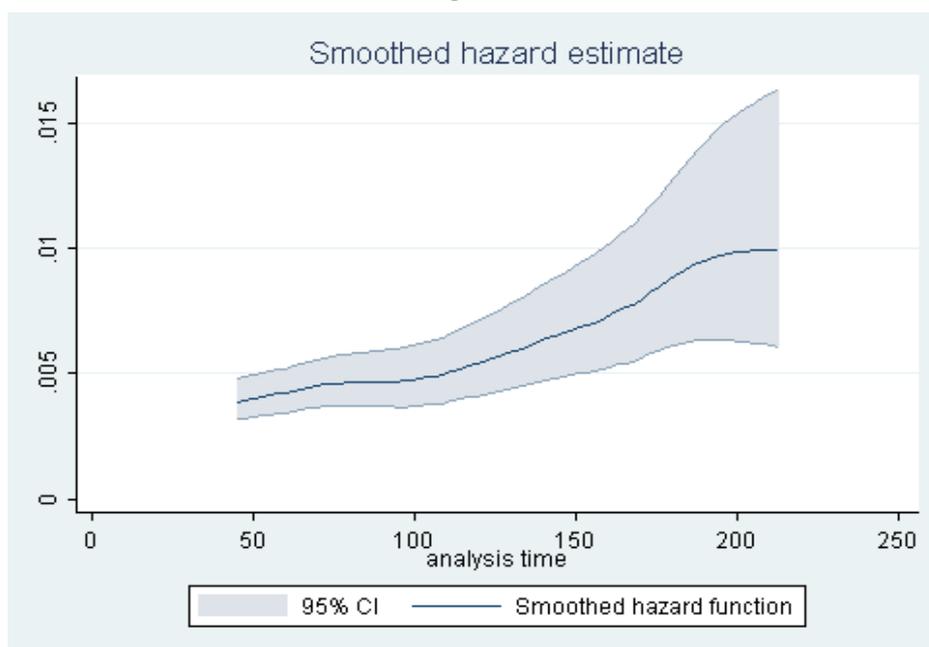
Source: Wuwei 2008 Survey.

Notes: Sample size (for all models): 117 observations.  $p$ -values in parentheses; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Marginal effects measure the change in the probability of intended return from a unit change in the explanatory variable. Robust standard errors are adjusted for clustering by households (82 households).

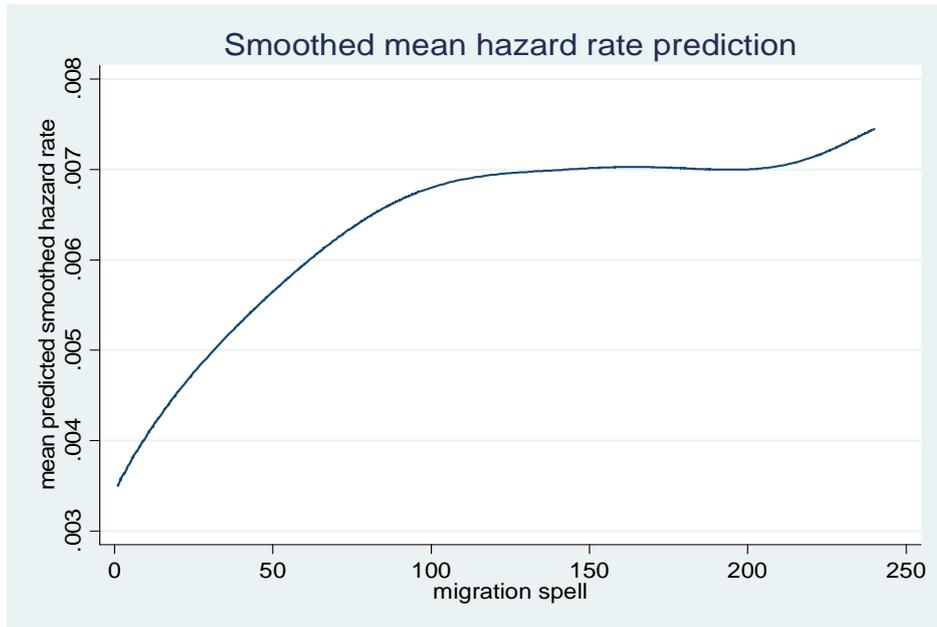
**Figure-1**



**Figure-2**



**Figure 3**



**Appendix - Discrete time proportional hazard estimates  
(controlling for unobserved heterogeneity)**

	Model 1	Model 2	Model 3
Baseline hazard (log spell month identifier)	0.389*** (0.000)	0.429*** (0.000)	0.371*** (0.000)
Age at migration	0.0452*** (0.000)	0.0472*** (0.000)	0.0327*** (0.002)
Married (=1)	0.239 (0.412)	0.208 (0.480)	0.459* (0.093)
Female (=1)	0.655*** (0.002)	0.578*** (0.004)	0.664*** (0.001)
Years of education	0.0378 (0.299)	0.0516 (0.145)	0.0321 (0.319)
Occupation before return (wage worker=1)	0.261 (0.216)	0.346 (0.115)	-0.168 (0.470)
Log average rural per capita annual net income (2004-2008)	1.068 (0.118)	0.889*** (0.010)	1.286*** (0.000)
Household size	-0.328*** (0.000)	-0.324*** (0.000)	-0.371*** (0.000)
# children (<16) at migration	0.521*** (0.002)		
Increased number of children (<16) during migration (=1)	0.964*** (0.001)		
# sons (<16)		0.902*** (0.000)	
Increased number of sons (<16) during migration (=1)		1.271*** (0.000)	
# daughters (<16)		0.447* (0.062)	
Increased number of daughters (<16) during migration (=1)		0.813** (0.021)	
# children (<6) at migration			0.992*** (0.000)
Increased number of children (<6) during migration (=1)			1.494*** (0.000)
Constant	-17.01*** (0.004)	-16.99*** (0.000)	-18.52*** (0.000)
Number of person-month observations	21869	21869	21869
Log likelihood	-734.7	-730.7	-735.1

*Source:* Wuwei 2008 Survey

*Notes:* p-values in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

Due to a convergence problem in the estimation for the constant, we do not report here the results of the model that corresponds to Model 4 in Table 3.