Effects of Sibship Structure on Individual Migration: Evidence from Rural China

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Introduction

The declining fertility, as an effect of the nation-wide birth control policy, and the surging floating population with the economic reform since the early 1980s have been perhaps the two most significant demographic phenomena in contemporary China. Notwithstanding numerous studies on the determinants and impacts of these two demographic phenomena, few have linked the two to examine the implications of the changing fertility level to the pattern of internal migration in China. This study, with the use of the China Health and Nutrition Survey (CHNS) longitudinal data from 1989 to 2004, attempts to examine the micro-level migration determinants in the low fertility regime, focusing on the effects of the individual sibship structure, a result of parental fertility decisions. The study sheds light on the link between parental fertility level and child migration probabilities. It also highlights the importance of gender-specific sibship size in individual migration probability within the low fertility regime of contemporary rural China.

Background

The sibship structure, including an individual's birth-order rank and the number of siblings one has, is an important indicator of an individual's family demographic situation. It helps to capture the potential availability of family support from non-resident siblings, who usually live in proximity to the household in question and yet are left out in household surveys (Bian et al. 1998). Additionally, it is indicative of the parental fertility decision, made in consideration of the available household resources and future family support needs. The examination of the effects of sibship structure on individual migration probabilities offers a close look at the household migration decision-making processes.

Earlier studies have often linked the sibship structure with the household decision on resource allocation, and have already identified sibship size, children's birth-order rank, and sibship gender composition as factors influencing the resources a child, or a household member receives (Blake 1989, Buchmann 2000, Downey 2001, Fuwa 2006).

In the Chinese society, in particular, with the influence of the Confucianism, culturally defined norms regarding gender and seniority shape parental perceptions and preferences about resource allocation among children. In traditional patrilineal families, authority and family property are usually transferred from father to son(s) (Stacey 1983, Lin 1988). Even though China follows the system of partible inheritance, still, a firstborn son, with the entitlement to paternal authority, is usually given a greater share of parental attention and family resources. Studies of educational inequality among children in East Asian countries (also with the Confucian influence) have shown evidence of parental preference for educating sons rather than daughters (Greenhalgh 1985, Parish and Willis, 1993). By examining how birth-order rank affects the amount of educational resources received by children, Yu and Su (2006) extend beyond the effect of gender on intra-family educational inequality. They incorporate the dimension of the cultural norms regarding seniority, and find that male firstborns "have additional leverage in sibling competition for family resources", while such privilege does not extend to females (Yu and Su 2006). In addition, family background characteristics are important in intra-household resource allocation. The gender differences in schooling and educational attainment found in earlier studies are conditional on family/parental socioeconomic conditions as well as the household demographic situations (Parish and Willis 1993, Yu and Su 2006).

The evidence from earlier studies on the association between sibship configuration and intra-household resource allocation also sheds light on the variation in migration opportunities by sib set positions. If we perceive migration decision-making as a family process, the choice of which child or household member to migrate can then be regarded as a resource allocation process. The same sibship factors that affect resource allocation may be at work here. Indeed, based on the evidence from rural villages in developing countries adopting the system of primogeniture, some early studies have demonstrated that younger sons in a family are more likely to migrate compared to the eldest sons, who are usually entitled to the inheritance of family farmland and are responsible for old-age support (Connell 1976, Caldwell 1969, Kasdan 1964). In addition, children with larger number of siblings, or from families with greater number of sons are more likely to migrate than those from smaller families (Caldwell 1969, Connell 1976). However, many

of these previous studies are dated, or are based only on ethnographic evidence. Systematic studies of how sibship structure affects individual migration probabilities are limited. Particularly, whether birth-order rank still plays a role in Chinese families, which have the partible inheritance, is unknown. In examining the effects of sibship size, birth-order rank, and gender composition of sib set on individual migration, controlling for individual, household, and community characteristics, I aim to contribute to the migration literature by assisting with a better understanding of the roles of the sibship structure in individual migration probabilities.

The investigation has its special timely importance in reform-era China, where the changing demographic profile has demonstrated significant socioeconomic impacts. Estimates suggest that the national fertility has declined below the replacement level now (Ding and Hesketh 2006, Cai 2008). The declining fertility has important implications for family structure. With more and more couples having only one child, household size has become smaller. Additionally, nuclear families have become more and more prevalent than the traditional extended families (Ma 1987, Zeng 1986). However, the family remains the primary, if not the only source of economic and social support for frail family members like young children and the infirm elderly in rural China. There is widely expressed concern that as the availability of adults providing support declines, the gap between the needed support and the provided support for elders will grow (Zimmer and Kwong 2003). Out-migration of adult family members undoubtedly imposes potential threats to the well being of frail family members who are in need of care. In this current social and demographic context, how sibship structure exerts its effect on adult children's migration status, conditional on household demographic and socioeconomic circumstances, deserves careful examination.

The current analysis is based on the assumption that individual's participation in labor migration is affected by broader familial considerations (conventionally called a "family strategy"), or shaped by familial constraints. Therefore, conditional on family demographic and socioeconomic characteristics, sibship structure influences an individual's migration status. Specifically, larger number of siblings increases a given

individual's probability of migration. Aside from sibship size, gender composition of siblings also makes differences. Given the son preference in traditional Chinese families, I assume that an only son is unlikely to migrate, even if he has female siblings. In this sense, larger number of male rather than female siblings is more important in determining a given person's migration probabilities. Furthermore, with previous evidence showing that first sons normally shoulder greater family responsibilities, particularly in terms of providing old-age support and managing family productive assets, I hypothesize that when the family has multiple sons, the younger ones are more likely to migrate.

Data and Methods

The study uses longitudinal data from the China Health and Nutrition Survey (CHNS), an ongoing international collaborative project designed to examine a wide range of social, economic, and health effects of the socioeconomic transformation of Chinese society during its reform era (Popkin 1994). The survey follows a large sample of communities, households, and individuals over time starting from 1989, a time when the sweeping effects of birth planning policy began to show prominently in China, and internal migration had already begun to grow, just starting to rocket. The timing is perfect for tracking changes in internal migration patterns and for studying possible effects of sibship structure on migration. Being the only publicly available socioeconomic panel data on China that tracks households for over 15 years, the CHNS had five additional panels, respectively in 1991, 1993, 1997, 2000, and 2004, after the first round in 1989[1]. The longitudinal design of the survey permits correct temporal sequencing of events and allows valid inferences about the causal determinants of migration in sending areas (Popkin 1994).

The study population was drawn from both rural and urban areas of altogether nine Chinese provinces that vary substantially in geography, economic development, public resources, and health indicators. Sampling within each province was done using a

[1] The 2006 round was also completed, and the data of which was just made available now. However, the data from 2006 was not available when the current study was conducted, and thus, is not used in this study.

stratified multistage, random cluster technique (refer to the CHNS project website). This sampling procedure keeps the random sampling principle, while also ensures the diversity of the surveyed population at the same time. Given that most of the migrations are rural to urban, and with a special interest in rural China, this study only uses the rural sample.

Dependent variable

Each wave of the household survey asked how many complete months each household member did not live at home. Thereby, those who had been away from home for one month or more and were not currently in school at the time of the survey formed the sample of migrants. Since the round of 1997, survey questionnaires also asked about the specific situations of not living at home. Given the special interests in labor migration of this study, for the 1997, 2000 and 2004 waves, those who were identified as not currently living at home and seeking employment elsewhere for a month or more were defined as migrants[2]. Thus, a dummy variable was created indicating migration status for each individual, with being a migrant in one wave equals 1, and a non-migrant equals 0. It should be noted that since the migrants were still considered members of the household, their migration status was more reflective of their temporary, rather than permanent migration status. These people, who migrate without changing their household registration (known as *hukou* in Chinese) from one administrative area to another, are also called non-*hukou* migrants.

The same method of coding for migrants was performed for each wave. Then data across waves were pulled together to form a longitudinal dataset with repeated observations for each individual.

Independent variables

The key predictor in migration decision-making considered here is individual's sib set position, or namely, whether the individual has elder brothers or sisters. The Birth

[2] Given the change in the definition of migration since the wave of 1997, one might expect different patterns of migration determinants for later as compared with the earlier waves. Separate models were made for the earlier versus the later three waves, and the two models did not differ much in patterns of migration determinants. Thus, I decided to pull all the six waves together in all analyses.

History Master File compiled by the CHNS project team from the 1993-2004 Ever Married Women Survey contains one observation per birth, and identifies the mother for each child. Using the birth date and gender information for each child provided in the birth history data, I construct a variable on sib set position for children of all the ever-married women covered in the CHNS. Individual sib set position at the time of birth is coded as: 1 = with no siblings, 2 = with one male sibling and no female siblings, 3 = with one female sibling and no male siblings, 4 = with two or more male siblings but no female siblings, 5 = with two or more female siblings but no male siblings, and 6 = with one or more both male and female siblings. The first group, those with no elder brothers or sisters, is the reference group.

The above measure focuses on sib set position at the individual's time of birth, thus, does not capture younger siblings of the individual. To complement the above measure, using the birth history data in a similar way, I construct a variable denoting individuals' only child status, that is, whether the individual has any siblings or not. The dichotomous variable is coded as: 1=only child (without any siblings), and 0=not an only child, or with siblings (including younger or older siblings). The group of individuals with siblings is the more prevalent group and is treated as the reference category. In addition, I also construct two other measures on sibling status: the number of male and female siblings that an individual has respectively.

Other explanatory variables include individual, household, and community level factors. At the individual level, I control for basic individual demographic characteristics, like age, gender, educational level, and marital status; I also include a variable on individual previous temporary migration experience, that is, whether he/she migrated in the immediate previous wave, and if the migration was short-, mid-term or long-term (defined as 0=non-migrant, 1=migrated for over 1 month but less than 6 months, 2=migrated for 6-12 months, and 3=migrated for 12 months or more respectively). It is expected that even though the individual may not migrate to the same destination as before, the prior migration experience tend to reduce the obstacles to migration by

providing more knowledge about the outside world and making the individual better prepared for the move.

Household economy and demography are also under examination. The former is measured by per capita household annual income (in natural log term), the amount of farmland owned by the household, and whether the household has diversified economy other than agriculture. The latter is indicated by the number of working adults at home, the number of family members who were temporary migrants in the immediate previous wave, and three dummy variables on the presence of children under school-age (7 years old), a grandmother of the young child/children, and of elders of 60 years old or older at home (1=yes, 0=no) respectively.

At the community level, community per capita income, population size, road condition, proximity to urban trade centers, existence of village-owned enterprises, percent of migrants (measured as the percent of workforce working outside the village), and the change in such a percentage are controlled.

Sample

The analysis on the association between sibship structure and migration status is only performed for a small sample of all the cases. The Birth History Master File does not include birth history of every adult covered in the CHNS, but only the children of ever married women in the survey. Therefore, about two thirds of those with sibling information are children under 16 years old; hardly any is over 40 years old. To concentrate on those who are at risk of labor migration, I limit the sample to individuals who are between 16 and 40 years old and who have complete information on all the included variables for both the descriptive and logistic regression analyses. This analytic sample over-represents young people, including adolescents, rather than married, elder adults. This special feature of the sample and the smaller sample size should be taken into consideration when interpreting the analytical results.

Analytical procedures

To estimate the effects of sibship structure on the probabilities of migration for individual *i* in household *j* in community *k* at time *t*, controlling for individual, household and community factors I use the random-intercept logistic regression model:

$$\text{Logit}\{\Pr(MIG_{ijk,t} = 1 \mid I_{ijk,t-1},\ H_{jk,t-1},\ C_{k,t-1},\ \zeta_i)\} = \alpha + \beta_1 I_{ijk,t-1} + \beta_2 H_{jk,t-1} + \beta_3 C_{k,t-1} + \zeta_i$$

Where $MIG_{ijk,t}$ is a binary variable that equals one if individual *i* is a migrant in year *t*, and zero if not; $I_{ijk,t-1}$, $H_{jk,t-1}$, and $C_{k,t-1}$ are respectively vectors of individual, household and community characteristics in the previous wave; and ζ_i represents the random effect, the random intercept for individual *i*, with $\zeta_i \sim N(0, \psi)$.

The use of a random intercept model is in consideration of the special feature of the longitudinal data. With multiple observations for the same individual over time, migration determinants for a given individual at one time may not be independent of his or her migration probability at other times, since individuals are predisposed to different probabilities of migration at the first place, either due to unmeasured personal characteristics or the macro environment. We need to model the random effects of individual so as to account for the different propensities of migration across individuals. To keep models parsimonious I only include a random intercept that varies across individuals for the analysis.

I choose to regress individual's migration behavior in wave *t* on individual, household, and community characteristics at *t*-1, the previous wave, so as to address the simultaneity bias. This is because some time-varying individual, household, and community characteristics measured at the same time as the migration outcome may reflect the influences of migration status. The use of the longitudinal data enables modeling current migration status with covariates that are predetermined at time *t*, and addresses the issue of simultaneity bias commonly seen in cross-sectional studies.

The analytical procedure is as follows: First, I use cross-tabulation to look at the bivariate relationships between individual's only child status and migration participation, and

between sib set position and migration status respectively. Second, I calculate descriptive statistics for all the covariates by individuals' only child status. I use t-test to examine if young adults with siblings differ significantly from those without in terms of individual, household, and community characteristics. Then, using the entire rural sample, I build random effect logistic regression models to study the effect of sibship structure on individual subsequent temporary migration status. The predicted probabilities of subsequent migration by individual sib set position are also calculated for all the waves.

Results

The first step is to examine the proportion migrating by one's only child status with the entire sample (rural and urban). Table 1 suggests that an only child is less likely to migrate compared with someone with sibling(s) in all the waves. The difference is significant for later waves, but not for the three earlier ones. This is in accordance with the expectation that an individual's migration status is usually dependent on his or her position in the family and the household demographic situation. Those who have no siblings are less likely to migrate because they are presumably the only source of old-age support for their parents, or the only source of dependable labor for providing family support, both in instrumental and in financial forms, to the household.

Comparison across waves shows that the percentage of migrants has been in increase over the years for both the only child group and the group with siblings. Yet, the change for the former cannot keep up with the change for the latter, that the difference in migration rate between the two groups has become more salient in later waves. It appears that even though the macro socioeconomic forces have been encouraging labor migration over the years, the labor constraint faced by one-child families has limited the growth in labor migration for them. The households and sites newly added into the survey since the later wave of 1997 may influence the temporal pattern. However, even though the populations surveyed in each wave are not exactly the same, the difference in migration probabilities between an only child and one with sibling is unlikely to be due to artifact.

Table 1 Percentage of migrants and non-migrants by only child status over waves, 16-40 years old

Wave	Only child			With siblings		
	Non-migrant	Migrant	Total (N)	Non-migrant	Migrant	Total (N)
1989	96.4	3.6	137	92.0	8.0	1327
1991	93.1	6.9	160	91.1	8.9	1598
1993	89.2	10.8	166	85.9	14.1	1812
1997	91.4	8.6	220	81.8	18.2	1958
2000	89.2	10.8	381	75.5	24.5	2273
2004	87.1	12.9	596	70.7	29.3	2998

Table 2 contains a tabulation of migration status for rural and urban adults by individual sib set position. The tabulation is based on the summation of the number of people in all the six waves, with possibly multiple observations of an individual. It is only a rough evaluation of the relationship between migration and sib set position. The table shows that those without any siblings at the time of birth are least likely to migrate comparing with those in the other sib set positions. On the other hand, those with both elder brother(s) and sister(s) are most likely to migrate, followed by those with two or more elder brothers, but no elder sisters. Again, such a finding gives evidence to my earlier expectation: those with more siblings are more likely to migrate. Particularly, households that have multiple numbers of both male and female children, or have multiple numbers of boys, are more likely to have "surplus" laborers. It is these "surplus" laborers that are of higher possibilities to enter labor migration market.

Table 2 Migration status by sib set position, 16-40 yrs old

Category	Sib set position	Migrant (%)	Total (N)
1	No elder brothers or sisters	16.2	6,301
2	1 elder brother, no elder sisters	18.7	1,893
3	2+ elder brothers, no elder sisters	19.9	618
4	1 elder sister, no elder brothers	18.0	1,937
5	2+ elder sisters, no elder brothers	18.5	813
6	1+ elder brothers, 1+ elder sisters	23.2	1,959
	Total	18.1	13,521

The above table also shows the distribution of adults by sib set position (refer to the last column in Table 2). Nearly half of all the adults have no elder siblings. At the same time, the number of people in category 3 and 5 above, namely, those who have two or more elder siblings of the same gender is very small. If breaking down the number in each category by wave, it will result in an even smaller number of cases for each category. Since I am not particularly interested in the change over time in percent migrated by sib set, such a cross-tabulation by wave is not performed here.

Table 3 presents descriptive statistics on the independent variables in the full analytical sample and separately for those with and without siblings. Two-sample t-tests reveal significant differences in selected individual, family, and community characteristics between only children and those with siblings. Relative to those with siblings, adults without any siblings are significantly more likely to be younger, better educated, and are less likely to be females. In terms of family characteristics, those without siblings are significantly more likely to be from households that have elders of age 60 and older (39% versus 18%). Households of only children are more likely to have higher income, to be of smaller size, and to have smaller number of people with migration experience. The only-child group not only appears to be positively selected in personal and family socioeconomic status, but also in community socioeconomic conditions. Only-children are more likely to live in communities with higher per capita income, close to urban centers, and with higher migration rates. Note that the means for the full sample are very similar to those for the group with siblings. This is probably because a majority (more than 90%) of the people in the full sample is those with siblings.

Table 3 Means on relevant independent variables for the full sample and by only-child status, for adults 16-40 years old, 1989-2000

Variables	Full sample	With sibling(s)	Only child
Only child status	.07		
Subsequent migration status	.18	.18*	.14
Age	20.54	20.57**	20.07
Female	.40	.41**	.32
Illiterate	.08	.08	.10
Elementary school	.21	.21	.18

Junior high education	.55	.55**	.47
Senior high education	.11	.11**	.16
Technical school	.04	.04	.06
College	.01	.01	.03
Master or above	0	0	0
Never married	.87	.87	.88
Currently married	.13	.13	.12
Divorced or separated	.00	.00	0
Widowed	.00	.00	0
No migration in the previous wave	.82	.82	.87
Short-term migration	.05	.05	.04
Mid-term migration	.06	.06	.04
Long-term migration	.07	.07	.05
Presence of children under 7 at home	.19	.19	.17
Presence of elderly over 60 at home	.19	.18**	.39
Presence of grandma of the child/children	.08	.09	.06
Number of migrants at home	.51	.52**	.28
Number of working adults at home	4.97	5.06**	3.85
Log of household per capita income	6.79	6.77**	6.96
Amount of household farm land	4.83	4.88	4.24
Household has diversified economy	.61	.61	.62
Log of community per capita income	7.18	7.16**	7.37
Community population size (in 1,000)	2.49	2.52	2.22
Community road condition	2.10	2.10	2.17
Community has its own enterprises	.48	.48	.44
Within 2hrs to trade center	.33	.32**	.41
% of migrants in the community	23.09	22.89*	25.64
Change in community migration rates	2.95	2.97	2.70
Community is urban	.03	.03	.02
N	4,854	4,495	359

*: Differences in means between those with siblings and those without are significant at p< .05;
**: the differences are significant at .01 level

Descriptive analysis indicates that the only-child group is relatively positively selected. Whether the positive selection translates into significant variation in migration probabilities by individual adults' sib set position is another story. Table 4 presents the results from the random effect logistic regression analysis with the rural sample. It shows that only-child status has no significant effect on individuals' subsequent migration status ($\beta = .08$), when controlling for other individual, household, and community characteristics. Among people of different sib set positions, only those with one elder brother but no sisters are significantly less likely to migrate compared with those who have no elder siblings ($\beta = -.30$). It appears that the family strategy is to have the older, rather than the younger children migrate, particularly if the younger child already has an

elder brother. While the effects of only-child status and sib set position are not very evident[3], the significant effect of the number of male siblings (β = .24) attests to the importance of sibling gender composition in a family's migration decision-making. A rural adult's probability of migration increases with the number of male siblings that one has, but not with the number of female siblings, regardless of the ranking in the sib set. Obviously, rural households prefer to have larger number of males, who can provide the labor needed for farming or for other family productions. Only when the labor demands for farming are met, the "surplus" laborers may participate in labor migration to bring in extra cash income and to diversify family economy.

Table 4 Logistic regression coefficients on adults' subsequent migration status, full rural sample and by gender

Variables	Rural adults	Rural adults	Women	Men
Female (reference: male)	-.60**	-.09		
Age	-.07**	-.08**	-.17**	-.05**
Education (reference: illiterate)				
Elementary school	.47**	.86**	.54	1.20**
Junior high education	.41**	.70**	.42	1.06**
Senior high education	.26	.51*	.36	.80*
Technical school	.47*	.83**	.49	1.36**
College	.05	.42	.68	-.60
Marital status (reference: never married)				
Currently married	-.32**	.04	-.02	-.09
Divorced or separated	-1.09	-.30	N.A.	-.51
Widowed	-.19	.37	N.A.	-.60
Previous migration length (reference: none)				
Short-term migration	.86**	.49*	.85*	.42
Mid-term migration	1.46**	1.05**	.84**	1.22**
Long-term migration	1.00**	.82**	1.16**	.80**
Sib set position (reference: 1st child)				
1 elder brother, no elder sisters		-.30*	-.33	-.32
2+ elder brothers, no elder sisters		-.24	-.47	-.22
1 elder sister, no elder brothers		.16	-.09	.25
2+ elder sisters, no elder brothers		-.05	.28	-.26
1+ elder brothers, 1+ elder sisters		.02	-.04	.04
Only child (reference: with siblings)		.08	.04	.01
Number of male siblings		.24**	.19*	.26**
Number of female siblings		.02	-.03	.01

[3] I have also tried the model without the measures of the number of male and female siblings, or the only-child status. Still, sib set position has no significant effect on individual migration. Similarly, when dropping the variables of sib set position and the number of male and female siblings, only-child status still shows no significant effect. It is unlikely that the lack of evidence for the effects of sib set position or the only-child status is due to the collinearity between the measures of sibship composition.

Presence of children under 7 at home	-.15*	.16	-.19	.29
Presence of elderly over 60 at home	-.28**	-.16	-.33	-.17
Presence of grandma of the child/children	.33**	.23	.77	.21
Number of migrants at home	.24**	.28**	.22**	.32**
Number of working adults at home	.05*	-.07	.14	-.17**
Log of household per capita income	-.06	-.10	.05	-.15
Amount of household farm land	-.01	-.00	-.03	.01
Household has diversified economy	.08	-.00	-.09	.01
Log of community per capita income	-.04	.13	.18	.07
Community population size (in 1,000)	-.00	-.00	.00	-.00
Community road condition	-.12**	-.16**	-.19*	-.16**
Community has its own enterprises	-.05	-.17	-.28	-.10
Within 2hrs to trade center	-.21**	-.23**	-.35*	-.19
% of migrants in the community	.01**	.01**	-.00	.01**
Change in community migration rates	.00**	.01**	.00	.01*
Survey wave	.09**	.08**	.05*	.10**
Constant	-174.74**	-154.05**	-97.43*	-193.67**
Sigma_u	.46	.49		.49
rho	.06	.07		.07
N	10,816	3,680	1,323	2,357
Likelihood ratio	-3519.31	-1858.94	-630.56	-1193.12
BIC	7326.58	4038.10	1512.66	2681.31

*: Significant at the .05 level, **: Significant at the .01 level.

Inclusion of the sibship measures in the model alters the effects of selected individual, household, and community characteristics (compare column 1 and column 2 in Table 4). At the individual level, gender and marital status no longer have any significant effects on individual migration. Higher levels of education and previous migration experience, especially migration experience of 3-12 months duration, still significantly increase a rural adult's probability of subsequent migration. Neither household demographic nor economic conditions significantly influence one's probability of subsequent migration in this restricted sample of rural adults. The number of household members with migration experience in the previous wave is the only household level variable that continues to have an effect (column 2 in Table 4).

The disappearance of selected significant effects may result either from the sample variation or the correlation with the sibship measures. As mentioned earlier, the current sample of individuals with sibship information is relatively younger, better educated, and mostly consisted of unmarried adults. The lack of variation in marital status may explain the disappearance of the significant effect of marital status. As for gender, household

income, and the set of variables on household demographic situations, they may be correlated with individual sib set positions. In fact, descriptive statistics in Table 4 already suggest that those with siblings are more likely to be females, and to have larger household size, yet are less likely to have elders at home, or to have higher household income. The inclusion of sibship measures can wash out the significant effects of these household level variables. Another possibility is that for this sample of younger, better educated, and usually single adults, family demographic condition is less of a concern in one's migration decision-making.

Effects of community level variables do not change much with the inclusion of sibship measures (Table 4). Proximity to urban trade centers, community migration rates, and change in community migration level remain significant predictors of individual migration probabilities (β = -.23, .01 and .01 respectively). Note that the effect of community income is not significant. Instead, community road condition exerts a significant negative effect (β = -.16). This is probably related to the correlation between these two measures. In communities with better road conditions, which indicates more developed socioeconomic status or higher income level, people have less economic incentive for labor migration.

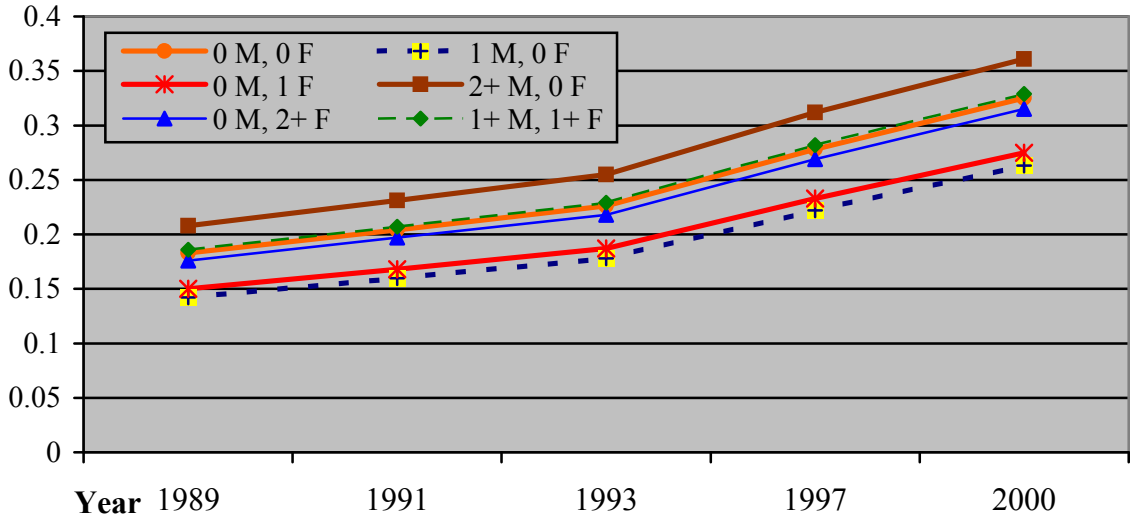
Separate models by gender do not reveal notable gender interactions of the sibship effects (Table 4). For both rural men and women, neither the sib set position nor the only child status has any significant effect on the probabilities of subsequent migration. The probabilities of migration only increase with the number of male rather than female siblings that one has. And this is true for both men and women (β = .26 and .19 respectively). Among the other individual socio-demographic characteristics, only the effects of education vary by gender. While a higher level of education significantly increases a rural man's probability of migration, it has no significant effect on women's migration probabilities. For rural women, only younger age and previous migration experience significantly increase their probabilities of migration.

The effects of the household demographic and economic variables also do not vary considerably by gender. As in the pulled sample of rural men and women (column 2 of Table 4), these variables have no significant effects on male or female migration for this sample of relatively younger, better educated, mostly single adults.

Comparison between the male and female models does reveal some gender variation in the effects of selected community level variables. Proximity to urban trade centers significantly decreases rural women's probabilities of migration, but has no significant effect on male migration (β = -.35 and -.19 respectively for women and men). In contrast, community migration rates and positive change of community migration levels, as indicators of local migration network, significantly promote male migration, but have no effects on the probabilities of migration for women[4].

Predicted probabilities

Figure 1 Predicted probabilities of subsequent migration for rural men by sib set position, 1989-2000



[4] It should be noted that it is unable to fit a random-effect logit model on subsequent migration for rural women, possibly due to lack of repeated observations for each individual with the attrition in follow-up. Therefore, I simply fit a multivariate logistic regression model for rural women. Though the magnitudes of the variable effects captured in this model may vary from those in a random-effect model, the general pattern of migration determinants is captured.

Using the model on the pooled sample of rural men and women as shown in column 2 of Table 4, I calculate the predicted probabilities of subsequent migration by one's sib set position across waves. These are the probabilities of subsequent migration for people with siblings, but in different sib set positions at the time of birth, setting the number of male and female siblings at the actual values, while holding all the other variables at their mean values.

Figure 2 Predicted probabilities of subsequent migration for rural women by sib set position, 1989-2000

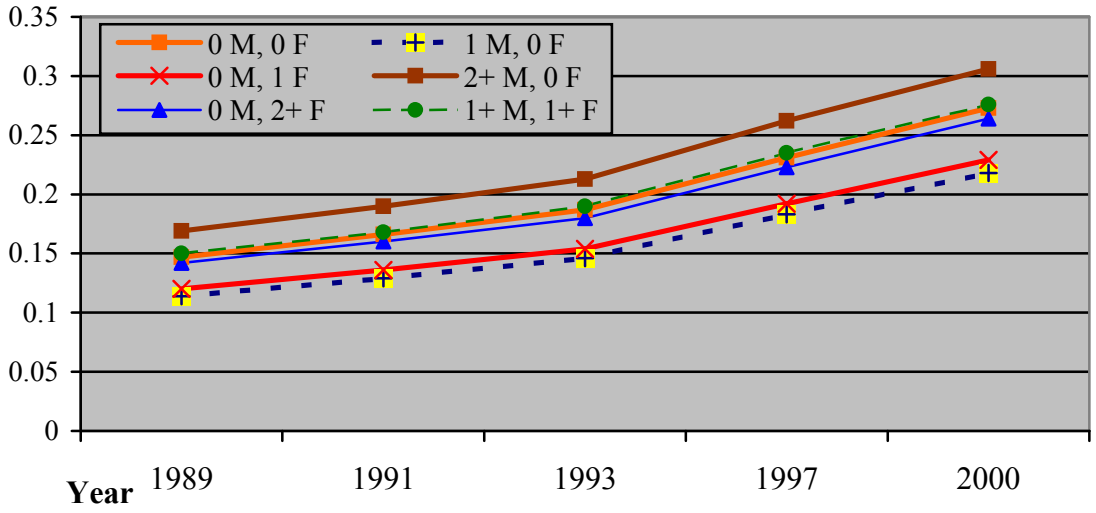


Figure 1 and Figure 2 present the predicted probabilities for rural men and women respectively. While in general, men have notably higher probabilities of migration than women in all the waves, the pattern of variation by sib set positions is very similar for men and women. The probabilities of migration increase over time for both sexes. Regardless of gender, those with two or more elder brothers but no elder sisters have the highest probabilities of subsequent migration, followed by those with at least one elder brother and elder sister. The probabilities of migration for the latter are at virtually the same level as those for people with no elder brothers or sisters (namely, the eldest child), and are slightly higher than those for individuals with two or more elder sisters but no elder brothers. Those with only one elder brother and no sisters have the lowest predicted probabilities of migration, which is consistent with findings from the logistic regression

models. Apparently, for both rural men and women, those with multiple numbers of elder brothers are most likely to migrate, regardless of the number of female siblings one has. Meanwhile, the second child is least likely to migrate regardless of the gender of the elder sibling(s) that the individual has.

Table 5 Predicted probabilities of subsequent migration by only child status for rural men and women

Wave	Not an only child		Only child	
	Male	Female	Male	Female
1989	.19	.15	.16	.12
1991	.21	.17	.18	.14
1993	.23	.19	.20	.16
1997	.28	.24	.25	.20
2000	.33	.28	.30	.24

In addition to the figures that compare predicted probabilities by sib set for individuals with siblings, I also calculate predicted probabilities of subsequent migration for rural adults who have no siblings versus those who have siblings. I set the other sibship measures at their true values, and hold all other individual, family, and community variables at their means. The results show that, comparing to an individual with sibling(s), an only child has lower probabilities of migration in all the waves, regardless of gender (Table 5). The difference by only child status is about the same across waves: around .03 for males, and about .03 to .04 for females. In addition, women have relatively lower probabilities of migration than men in all the waves. The gender difference does not differ much by one's only child status, and is consistent across waves.

Discussion and Summary

The sibship structure offers a vantage from which to examine the family consideration or family strategy of individual migration. Cross-tabulation results demonstrate that, consistent with findings from earlier studies, the first child is least likely to migrate regardless of gender; while someone with multiple numbers of elder brothers or sisters is more likely to migrate. This is possibly because the eldest child normally holds greater

responsibilities for family support. In addition, the first child in the cross-tabulation is possibly the only child, who, possibly as the only labor source in the household, has a lower probability of migration than those with siblings. The inclusion of the only children may confound the findings of the lowest likelihood of migration for the first child.

Logistic regression results and predicted probabilities controlling for the only child status, the gender composition of sibship, and the other individual, household, and community factors show that the first child does not necessarily have the lowest probability of migration. It is the second child who is less likely to migrate compared to the eldest child. If applying the earlier findings on sib set position and intra-household resource allocation, the eldest child, particularly the first son, presumably gets more attention from parents, and receives more household resources (Yu and Su 2006). Given the positive selection of labor migration, the first child, who usually has more human capital, is more likely to be selected for labor migration as a social process. Especially if the migration is not long-term or permanent, a family is more likely to have preference towards the eldest child when deciding the candidates for labor migration, which is perceived as a profitable opportunity. This is possibly because the eldest child, who not only gets more attention in the household resource allocation, but also is expected to share more family responsibilities (Connell 1976, Caldwell 1969, Kasdan 1964), and is consequently more likely to send remittances back to support the household.

The enhanced probability in non-*hukou* (namely, temporary) migration for the first child is negligible when compared with someone with multiple numbers of brothers. Indeed, predicted probabilities clearly show that individuals with two or more elder brothers have the highest probabilities of migration. Similarly, logistic regression suggests that while the variation in the probability of migration by sib set position is not very significant, the significant positive effect of the number of male siblings is strong and consistent. The effect of the number of sons is so overwhelming, that it washes out the effects of the sibship birth-order rank or the only child status.

The cultural norm of gender preference is apparently influential here. This son preference is partially related to the rule of succession by sons rather than daughters (i.e. it is the son who carries on the family name). Another relevant factor is the demand for male labor. Rural households traditionally rely on sons for farm work, and for providing economic support. Since daughters will marry out of the household sooner or later, sons are also relied on for old age support (Jin, Li and Feldman 2006). In this sense, the surplus labor theory for migration is applicable here. Households normally want to keep a male laborer at home, and tend to send the "surplus" labor, usually relatively young male children, out for labor migration.

In addition, for this selected group of relatively younger and mostly unmarried adults, the instrumental care for the elderly or the very young family members (i.e. under school age children) may not be in high demand. The parents of these young adults are not that old; they may still work as family or economic support providers, rather than those who are in need of care. Mostly unmarried, these young adults are also unlikely to have children of their own. These special characteristics of the sampled individuals may explain the disappearance of the effects of selected household and community level variables. Furthermore, the control of the individual sibship structure can wash out some family demography effects, such as the effects of household labor size.

In brief, the examination of the sibship effects on individual migration shows that relative to the individual birth-order rank or the only child status, the gender composition of sib set is the most prominent sibship factor in individual migration. What makes a difference is not simply the number of siblings one has, but more specifically, the number of male siblings that one has, suggesting the gender preference in household labor needs.

Despite the extensive socioeconomic and demographic transitions in reform-era China, the family support mechanism is still in practice in rural China. This traditional support mechanism, which emphasizes the importance of male labor in meeting family support and economic needs, is still functioning in the family decision-making about individual migration. Future studies should examine how the family support mechanism holds up in

the face of the growing number of one-child families in rural China: how families make migration decisions and alternative adaptations as the sibship size further decreases? Will this eventually lead to a lower level of rural-out migration nationally?

The findings shed lights to the importance of building up and improving the social support mechanism in rural China. With a more established social support system, rural households will no longer need to compromise individuals' migration opportunities for family support needs and adult children of different sibship structure may have equal opportunities of labor migration.

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