Risk Attitudes and Household Migration Decisions

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ABSTRACT

We analyze the relation between risk attitudes and household migration decisions. Using data of rural–urban migrants in China and their family members left behind, we obtain three key findings: (i) conditional on migration gains, less risk-averse individuals are more likely to migrate; (ii) conditional on own risk aversion, individuals are more likely to migrate the higher the risk aversion of the other household members; and (iii) conditional on average risk aversion, households with more dispersed risk preferences are more likely to send migrants. These findings are in line with a stylized model that we develop. Our results provide evidence that the distribution of risk attitudes within the household affects whether a migration takes place and who will emigrate. They also suggest that the risk diversification gain to other household members may lead to migrations that would not take place when decisions were made at the individual level.

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[Submitted October 2019; accepted October 2020]; doi:10.3368/jhr.58.3.1019-10513R1
JEL Classification: J61, 015, R23, and D81
ISSN 0022-166X E-ISSN 1548-8004
Supplementary materials are freely available online at: http://uwpress.wisc.edu/journals/journals/jhr-supplementary.html
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I. Introduction

Previous work has established a relationship between *individual* migration and the individual's *own* risk aversion (see, for example, Jaeger et al. 2010; Gibson and McKenzie 2011). When migration decisions are taken at the household level, however, risk preferences of other household members might also play a role. We investigate for the first time how the probability of a household sending a migrant depends on the distribution of risk attitudes within the household. The context we study is rural–urban migration in China, where risk diversification is likely to play a relevant role.

To structure our empirical investigation, we develop a simple model of household migration decisions, with heterogeneous risk preferences among family members in a setting where the household chooses not only whether to send a migrant but also whom to send. Migration decisions taken on the individual level are a special case of our model. We show that as long as migrants are exposed to higher uncertainty than nonmigrants, less risk-averse individuals are more likely to migrate, no matter whether the migration decision is taken at the individual or household level. However, in the latter case, the likelihood of an individual's migration increases with the risk aversion of other household members. Furthermore, migrations that would not take place under individual decision-making, may take place when decided by the household. The model also implies that, among two households with the same average risk aversion, the one with more variation in its members' risk preferences benefits more from a migration and will thus be more likely to send a migrant.

Our empirical analysis focuses on three aspects. We first examine whether migrants are indeed less risk averse than nonmigrants. We then explore whether and in which way the risk aversion of other household members affects an individual's migration probability. Finally, we investigate which households send migrants and how this depends on the *distribution* of risk preferences among the household members. We find that individuals who migrate are less risk averse than those who do not migrate, a result that lends further support to the findings of Jaeger et al (2010) and Gibson and McKenzie (2011) for internal migration in Germany and international migration to New Zealand, respectively. Investigating further how the migration probability of one household member is affected by the risk aversion of other household members, we show that among two identical individuals with the same risk aversion, the one whose household members are relatively more risk averse is more likely to emigrate. Turning to the last implication of our model, we show that among households with the same average risk aversion, those with more dispersed risk preference are more likely to send a migrant.

These findings indicate that the within-household distribution of risk preference is an important factor that determines migration decisions across different households, as well as among individuals within a household. To illustrate the implications of these findings for migration flows, we calibrate our model in the final part of the paper to illustrate that migration flows can differ considerably, depending on whether migration decisions are taken at the individual or household level.

Our empirical focus is on internal migration in China. We base our analysis on unique survey data that elicit willingness to take risks from both migrants and nonmigrant family members. As we explain in Section II, the Chinese institutional setting makes household decision models a particularly appropriate tool for analyzing internal migration (see Rozelle, Taylor, and deBrauw 1999; Taylor, Rozelle, and de Brauw 2003).[1] However, the mechanisms we consider—both theoretically and empirically—are not specific to the Chinese context and are generalizable to other settings where the household plays a role in migration decisions of individual members, and where risk spreading is an important component of those decisions.

Our work adds to the existing literature in various ways. The role of risk diversification in migration decisions has been previously explored in the migration literature, both when the migration decision is an individual choice (for example, Dustmann 1997) and when it is taken at the household level (see, for example, Stark and Levhari 1982; Rosenzweig and Stark 1989; Chen, Chiang, and Leung 2003; Yang and Choi 2007; Yang 2008; Gröger and Zylberberg 2016; Munshi and Rosenzweig 2016; Morten 2019). Although these studies pinpoint risk diversification as a key element in a household's decision problem, they do not investigate how migration choices depend on risk attitudes of other household members, nor do they discuss how the distribution of risk attitudes within households may affect across-household migration decisions, which is the main contribution of this study.

We also add new insight to the literature that investigates migrant selection using models of individual migration decisions (see, for example, Borjas 1987; Borjas and Bratsberg 1996; Chiquiar and Hanson 2005; McKenzie and Rapoport 2010; Dustmann, Fadlon, and Weiss 2011; Fernandez-Huertas Moraga 2011; Angelucci 2015; Borjas, Kauppinen, and Poutvaara 2019). Recent findings suggest risk aversion is negatively correlated with both cognitive ability (Dohmen et al. 2010) and the probability of engaging in entrepreneurial activity (Ekelund et al. 2005; Levine and Rubinstein 2017; Batista and Umblijs 2014), thus pointing to it being a key factor determining immigrant success. Our analysis adds to this literature by showing that the risk preferences of *other* household members and their distribution within the household may determine who emigrates and therefore affect the average risk aversion of the migrant population. Thus, if ability and risk aversion are correlated, and migration decisions are taken at household level, immigrant selection may also be determined by household circumstances and alternative household risk diversification strategies.

Section II describes the institutional background of internal migration in China. Section III outlines our theoretical framework for the relation between individual risk aversion and the household decision of whether to send a migrant and whom to send. Section IV describes the data and reports descriptive statistics. Section V explains our empirical strategy and reports the estimation results. Section VI provides a simulation exercise. Section VII concludes.

1. The importance of household migration decisions as mechanisms to cope with unexpected negative shocks is illustrated by Jalan and Ravallion (1999) for rural China, who show the poorest households passing up to 40 percent of income shocks onto current consumption. Further, Giles (2006) and Giles and Yoo (2007) show that the liberalization of internal migration flows in China in the early 1990s provided rural household with a new mechanism to hedge against consumption risk. Finally, Kinnan, Wang, and Wang (2018) show that improved access to migration reduces the volatility of consumption or rural Chinese households and allow them to engage in high-risk and high-return activities.

II. Background

The total number of rural–urban migrants in China has increased from around 30 million in 1996 to 169 million in 2016 (Chinese National Bureau of Statistics). However, despite the gradual relaxation of migration restrictions that occurred during the last 20 years, and due to the household registration system in place (or hukou), migrants in cities are treated as guest workers: they are still largely excluded from social services and social insurances that are available to urban hukou holders (Meng and Manning 2010). For instance, migrants (and their dependents) are rarely covered by the city health insurance system in the case of illness, and their children are excluded from urban local schools. Another important institutional arrangement, which is relevant to understanding Chinese internal migration, is its land tenure system. Land is collectively owned in rural China and allocated to households by local and village authorities. In order to maintain the household entitlement to the land—which is the most important safety net for all its members—some of the household members must remain in rural areas to farm (Giles and Mu 2007, 2014).

In response to such an institutional setting, internal migration in China has predominantly been characterized by temporary and circular movements back and forth from rural to urban areas. Most migrants leave their family members behind and maintain close links.[2] Repeated short-term migration spells are common. In our sample, migrants spend an average 9.6 months per year working in destination regions and the remaining 2.4 months at home (see Section IV.C). These institutional settings make household decision models a particularly appropriate tool for understanding internal migration in China.

According to the Chinese National Bureau of Statistics, per capita net income in urban and rural areas in the year 2009 (the year our survey data were collected) was 17.2 and 5.1 thousand yuan, respectively.[3] According to the 2009 migrant survey of the RUMIC survey (the data we use in this paper; see Section IV), migrants earn 1,800 yuan per month in urban areas, approximately 2.2 times their estimated earnings in rural areas.

Despite this sizeable income gap, life in cities is hard for Chinese internal migrants. They give up on whatever social services and insurances they had in rural areas to move to places where most of these services and insurances are not available to them. In addition, most migrants in cities are engaged in "3D" (dirty, dangerous, and demeaning) jobs that their urban local counterparts are unwilling to take (see Meng and Zhang 2001; Meng 2012). In particular, they are disproportionally exposed to hazardous environments, being more likely to work in high-risk occupations (for example, construction or chemical industries), have strenuous working schedule, and lack safety equipment and coverage with occupational injury insurance (Zhao et al. 2012; Frijters, Meng, and Resosudarmo 2011). In addition, migrants receive lower pay than urban residents even within the same occupation (Frijters, Gregory, and Meng 2015; Meng and Zhang 2001). These

2. On average, migrants send back 10–15 percent of their urban per capita income. For those with left-behind spouse or children, transfers increase to 20–25 percent of their per capita income in cities (Meng, Xue, and Xue 2016).

3. This income gap reflects the gap between the average rural hukou households in rural areas and urban hukou households and most likely overstates the gain in earnings experienced by rural migrants in Chinese cities. Migrants, indeed, are unable to obtain most of the type of jobs available to an average urban hukou local worker, being confined to occupations at the lower end of the distribution of urban jobs.

working conditions combined with poor housing and no access to healthcare contribute to generating serious health hazards (Du, Park, and Wang 2005). When jobs are scarce, rural migrants are usually the first group of workers to be laid off (Kong, Meng, and Zhang 2009). Lacking unemployment insurance, rural migrants are particularly vulnerable during unemployment spells and may be forced to return home to avoid starvation. Income variance is also large for migrants in employment. According to data from the 2009 RUMIC migrant survey (see Section IV.A), migrants' monthly earnings have a coefficient of variation close to one, whereas for the earnings they would have expected to make in their hometown, the coefficient of variation is only 0.58.

Despite the existence of a sizable rural–urban income gap, rural migrants in Chinese cities are exposed to large uncertainty, making migration a rewarding but risky enterprise. Thus, similarly to other countries characterized by sizeable rates of internal migration, there is a trade-off between a household's desire for income diversification, and the higher risk an individual migrant faces.[4] This trade-off is one of the main features captured in the model we present in the next section.

III. Theoretical Framework and Empirical Hypotheses

Our model extends earlier work on household migration decisions and risk (for example, Stark and Levhari 1982; Hoddinott 1994; Chen, Chiang, and Leung 2003) by adding heterogeneous risk preferences among family members and allowing the household to choose not only whether to send a migrant but also whom to send. We consider rural households that choose to send one of their members as a migrant to a city to diversify the household exposure to risk and improve overall household welfare. We allow for household members to have heterogeneous risk preferences (Section III.A) and derive the model's implications for who will migrate (Section III.B and III.C) and which households will send migrants (Section III.D).

A. Setup

Individual earnings y_j in $j=S$ (source) and D (destination) consist of a deterministic component $\bar{y}_j$ and a stochastic component ϵ_j, with $E(\epsilon_j)=0$; $V(\varepsilon_j)=\sigma_j^2$; for $j=S, D$. We assume that shocks to earnings in source and destination region are uncorrelated [Cov $(\varepsilon_S\varepsilon_D)=0$].[5] Migration from S to D incurs a monetary cost c that is heterogeneous across households, and equally allocated within households to all members.[6] Earnings in the two regions are thus

(1) $$y_S=\bar{y}_S+\varepsilon_S$$

(2) $$y_D=\bar{y}_D-c+\varepsilon_D$$

4. In the context of rural Bangladesh, Bryan, Chowdhury, and Mobarak (2014) show that seasonal internal migration movements can be profitable—although highly risky—choices, especially for households that are close to subsistence.

5. Allowing for a nonzero correlation between shocks in source and destination regions does not change any of our conclusions (analysis available from the authors).

6. Households may differ in wealth, access to credit, distance from the destination region, etc.

For simplicity, we assume that each household consists of two members.[7] The degree to which households pool their income is governed by the parameter $\alpha \in [0, 1]$, where $\alpha = 1$ represents perfect income pooling.[8] Total pooled income if one household member has emigrated is therefore given by $y_S + \alpha y_D$. Defining $\tilde{y}^{NM}$ and $\tilde{y}^{M}$ as the individual disposable income of the nonmigrant (*NM*) and migrant (*M*) household member, respectively, we obtain:

$$(3) \quad \tilde{y}^{NM} = \frac{y_S + \alpha y_D}{1 + \alpha}$$

$$(4) \quad \tilde{y}^{M} = \frac{\alpha y_S + y_D}{1 + \alpha}$$

Consider the extreme cases $\alpha = 0$ and $\alpha = 1$. If $\alpha = 0$, there is no income pooling, and non-migrant and migrant receive $\tilde{y}^{NM} = y_S$ and $\tilde{y}^{M} = y_D$, respectively. If instead $\alpha = 1$, each household member receives half of the household's total income: $\tilde{y}^{NM} = \tilde{y}^{M} = (y_S + y_D)/2$. While in the first case, the migrant is fully exposed to uncertainty in region *D* and no within-household risk sharing takes place (which corresponds to the case of individual decision making), in the second case, migration can reduce the overall household variance in income, and the migrant and nonmigrant members face the same exposure to uncertainty. In the intermediate case ($0 < \alpha < 1$), individual disposable income is a weighted average of earnings in source (y_S) and destination (y_D) region.

B. The Household Migration Decision

The household's decision is based on comparison of household utility under no migration, and when one household member migrates to region *D*. Household members $i = 1,2$ differ only in their degree of risk aversion k_i, have a mean-variance utility function, and jointly maximize the sum of their utilities. Thus, if both members remain in the source region *S*, household utility is given by $U_{SS} = [E(y_s) - k_1 V(y_s)] + [E(y_s) - k_2 V(y_s)]$. If instead one household member migrates to region D (individual *i*) and one remains in region *S* (individual $-i$), household utility is given by $U_{SD_i} = [E(\tilde{y}^{NM}) - k_{-i} V(\tilde{y}^{NM})] + [E(\tilde{y}^{M}) - k_i V(\tilde{y}^{M})]$. The decision rule regarding whether to send a migrant is then simply a comparison of utility under the two scenarios, and a migration takes place if:

$$(5) \quad U_{SD_i} - U_{SS} = \Delta E(\tilde{y}^{NM}) + \Delta E(\tilde{y}^{M}) - \left[k_{-i} \Delta V(\tilde{y}^{NM}) + k_i \Delta V(\tilde{y}^{M})\right] > 0$$

for at least one of the two household members $i = 1,2$.

To focus on the role of income risk for the decision of a household to send a migrant, assume that there are no earnings differences between the two regions and that migration cost $c = 0$. The expression in Equation 5 then reduces to:[9]

7. Our theoretical framework can be straightforwardly extended to *N* household members. In the simulation presented in Section VI, we use four household members, reflecting the average household size in our data (see Section IV.C).

8. The model could be extended and allow households to determine endogenously their degree of income pooling. We cannot explore this aspect in our empirical analysis because household transfers are not observed in the data we use (see Section IV). We have therefore decided to keep the parameter α exogenous in the model.

9. Note that: $V(\tilde{y}^{NM}) = \frac{\sigma_S^2 + \alpha^2 \sigma_D^2}{(1+\alpha)^2}$ and $V(\tilde{y}^{M}) = \frac{\alpha^2 \sigma_S^2 + \sigma_D^2}{(1+\alpha)^2}$.

$$(6)\quad U_{SD_i} - U_{SS} = -\left[k_{-i}\Delta V(\tilde{y}^{NM}) + k_i \Delta V(\tilde{y}^{M})\right]$$
$$= (k_{-i} + k_i)\sigma_s^2 - \left[\frac{k_{-i}(\sigma_s^2 + \alpha^2\sigma_D^2) + k_i(\alpha^2\sigma_s^2 + \sigma_D^2)}{(1+\alpha)^2}\right]$$

If $\alpha = 0$, Equation 6 reduces to $k_i(\sigma_s^2 - \sigma_D^2)$. Migration in this case only takes place if it reduces the variance of earnings for the migrant (individual *i*), that is, if $\sigma_s^2 > \sigma_D^2$. This is precisely the decision rule for an individual migration decision under consideration of income risk. On the other hand, if $\alpha = 1$, Equation 6 reduces to $(k_{-i} + k_i)\left[\frac{3}{4}\sigma_s^2 - \frac{1}{4}\sigma_D^2\right]$. Risk is diversified across household members, and a migration takes place even if $\sigma_D^2 > \sigma_S^2$, as long as $\sigma_D^2 < 3\sigma_S^2$. Likewise, for any intermediate value of α $(0 < \alpha < 1)$, a migration may take place even if the income variance at destination is higher than at source.

Furthermore, for $\sigma_D^2 > \sigma_S^2$ (a scenario that we will focus on from now onwards), it is straightforward to show that the migrant is always exposed to at least as high an income risk as the nonmigrant:

$$(7)\quad V\left[\tilde{y}^{M}\right] \geq V\left[\tilde{y}^{NM}\right] \text{ if } \sigma_D^2 \geq \sigma_S^2.$$

For extreme values of σ_D^2, both migrant and non-migrant member experience either a reduction (low σ_D^2) or an increase (high σ_D^2) in income variance due to migration, so that the optimal choice will be migration (low σ_D^2) or no migration (high σ_D^2), respectively, no matter whether decisions are taken on an individual level or on the level of the household. An interesting case is when σ_D^2 takes intermediate values. Now a migration may increase the income variance for the migrant, but decrease it for the nonmigrant, so that migration may be the optimal choice when decisions are made at the household level, although no migration would be optimal if the decision were taken at the individual level (which corresponds to $\alpha = 0$).

C. The Choice of Who Migrates

The household's choice on which of its members to send as a migrant is based on comparison of utilities from sending either Individual 1 (U_{SD1}) or Individual 2 (U_{SD2}). Migration will take place if $\max(U_{SD1}, U_{SD2}) > U_{SS}$. It is straightforward to show that

$$(8)\quad U_{SD2} - U_{SD1} = (k_1 - k_2)\left[V(\tilde{y}^{M}) - V(\tilde{y}^{NM})\right].$$

As long as $V(\tilde{y}^{M}) - V(\tilde{y}^{NM})$, Equation 8 implies that it is optimal to choose the least risk-averse individual in the household as the migrant ($U_{SD2} > U_{SD1}$ if $k_1 > k_2$ and $U_{SD2} < U_{SD1}$ if $k_1 < k_2$), as they will suffer a lower reduction in utility from being exposed to the higher income variance.

Therefore, as in the case where the migration decision is taken at the individual level (corresponding to no income pooling, $\alpha = 0$), a household-level decision (that is, $\alpha > 0$) also implies that migrants are less risk averse than nonmigrants. However, in the latter case, the probability of an individual to migrate will depend *also* on the relative ranking of risk attitudes within the household. As illustrated by Equation 8, the larger the gap in risk attitudes between the two household members, the larger is the gap in utility gains associated with migration of the least and most risk-averse individual.

An implication of this observation for our empirical analysis is that individual risk aversion should be negatively correlated with the probability of migration, no matter if decisions are taken on individual or household level (as long as $\sigma_D^2 > \sigma_S^2$). If decisions are taken on the household level, however, the probability of migration should also increase with the risk aversion of other household members, conditional on an individual's own risk aversion. We will test both these hypotheses in Section V.

D. Migrant and Nonmigrant Households

Having discussed the model's implications for within-household migration decisions, we now ask which households are more likely to send migrants. Consider two households, A and B, which differ only in their members' risk aversion. Let Individual 2 be less risk averse than Individual 1 in both households. It follows from Equation 8 that each household evaluates whether household utility increases when individual 2 migrates compared to the non-migration option. Comparing the two households, the gain of sending a migrant will be larger for household B if

$$(9) \quad \Delta U^B - \Delta U^A = \Delta V\left(\tilde{y}^{NM}\right)\left(k_1^A - k_1^B\right) + \Delta V\left(\tilde{y}^{M}\right)\left(k_2^A - k_2^B\right) > 0$$

If both households have the same average risk aversion but differ in the within-household variance in risk attitudes, $k_1^A - k_2^B \neq k_1^B - k_2^A$, the expression simplifies to

$$(10) \quad \Delta U^B - \Delta U^A = \left(k_2^B - k_2^A\right)\left[\Delta V\left(\tilde{y}^{NM}\right) - \Delta V\left(\tilde{y}^{M}\right)\right],$$

which is positive for $\sigma_D^2 \geq \sigma_S^2$ and if $k_2^B < k_2^A$ (that is, if Household B's least risk-averse member is less risk averse than the least risk-averse member of Household A). This of course implies that the most risk-averse individual in Household B must be more risk averse than the most risk-averse individual in Household A, as both households have the same average risk aversion. Thus, Household B will benefit more from migration than Household A if its risk attitudes are more dispersed, conditional on average household risk aversion.

Our model therefore suggests that among two households with identical average risk aversion, the one with higher within-household risk variation is more likely to send a migrant. This is for two reasons. First, as migration reduces the income uncertainty of the nonmigrant household member, their utility gain from the other member migrating *increases* with their risk aversion. Second, as migration involves more exposure to uncertainty, the *migrant's* utility from migrating *decreases* with their risk aversion. Thus, the higher the dispersion of the within-household risk preference, the higher the household's gain from a migration. In our empirical analysis below, we will test this hypothesis.

IV. Data and Descriptives

A. The RUMiC Survey

Our primary data source is the Rural Household Survey (RHS) from the Rural–Urban Migration in China (RUMiC) project (henceforth RUMiC-RHS). RUMiC began in

2008 and conducts yearly longitudinal surveys of rural, urban, and migrant households. The RUMiC-RHS was conducted for four years and administered by China's National Bureau of Statistics. It covers 82 counties (around 800 villages) in nine provinces identified as either major migrant sending or receiving regions and is representative of the populations of these regions. The survey includes a rich set of individual- and household-level variables and includes not only the usual demographic, labor market, and educational data but also information on individual migration experience and subjective rating of willingness to take risks, both particularly relevant to this study. Unlike other surveys, it records information on all household members whose hukou are registered in the household. Thus, household members who had migrated to cities at the time of the survey were also included. Information on household members who were not present at the time of the survey was provided by the main respondent. However, questions related to subjective issues and opinions (for example, risk attitudes) are only answered by individuals who were present at the time of the survey. In this work, we use data from the 2009 RUMiC-RHS, conducted between March and June of that year, which was the first wave that reports information on risk aversion. In some analysis, we also use information from the 2010 and 2011 waves of the survey.

We define a labor migrant as an individual who spent three or more months away from home in the previous year for work or business purposes. In the 2009 wave of the RUMiC-RHS survey interviewees were asked to rate their attitudes towards risk. The question states: "In general, some people like to take risks, while others wish to avoid risk. If we rank people's willingness to take risks from 0 to 10, where 0 indicates 'never take risk' and 10 equals 'like to take risk very much,' which level do you think you belong to?" According to a recent literature, responses to direct questions on self-reported risk aversion are reasonable proxies of more objective measures of risk attitudes obtained from having respondents playing lotteries (Ding, Hartog, and Sun 2010; Dohmen et al. 2011). Moreover, Frijters, Kong, and Meng (2011) have experimentally validated the risk attitude question used in the RUMiC survey.[10]

B. Estimation Sample

In our empirical analysis, we study the relationship between risk attitudes and migration decisions and investigate individual as well as household migration probabilities (see Section V). For the individual-level analysis, we focus on individuals who belong to the working age population and who, therefore, are potential migrants. The 2009 RUMiC-RHS survey includes 17,658 individuals who are aged 16–60 (and not currently at school or disabled) and who provide information about age, gender, educational level, and migration status.[11] To be able to carry out our analysis we restrict the sample to individuals living in households where at least two members in the labor force have reported risk preference, which reduces the sample to 7,808 individuals. The sample of

10. Frijters, Kong, and Meng (2011) ask a random subsample of 1,633 rural–urban migrants from the Urban Survey to play a risk game similar to that used by Dohmen et al. (2011). They find that self-assessed risk and the risk measures revealed by the game are highly correlated, with a correlation coefficient of 0.7.

11. The 2009 RUMiC-RHS survey includes 32,249 individuals. We focus on those aged 16–60 because the probability of being a migrant drops below 1 percent for individuals older than 60. Shifting the upper bound of this age range by five years (in either direction) does not alter our empirical findings.

individuals in households we focus on is very similar in observables such as age, gender, and education to that of individuals in households in the overall sample (see Panel A in Online Appendix Table A1). Information on risk aversion is available for 81 percent of our working sample, leading to a final estimating sample of 6,332 individuals. For the household-level analysis, we use all households where at least two members reported their willingness to take risks, but we also include individuals older than 60 or disabled, as their risk aversion may also matter for decisions of the household whether or not to send a migrant, which results in a sample of 2,961 households.[12] These households are similar in observable characteristics to the overall sample (see Panel B in the Online Appendix Table A1).

The risk attitudes question can only be answered by respondents who are present at the time of the survey, which is a potential problem for migrants. In our data, the share of nonresponses is higher among migrants (55 percent) than among nonmigrants (10 percent).[13] This may be problematic if unobservables that affect the probability to be present at the time of the interview are correlated with individual risk aversion, conditional on observables. Risk aversion may influence the frequency of return trips and their duration. More risk-averse individuals, for instance, may be less willing to be away from their families for longer periods and may prefer to migrate to closer locations that allow for less sporadic visits back home.

To investigate possible selection issues, we make use of the fact that in the rural RUMiC survey individual characteristics other than attitudes towards risk for those who are absent at the time of the survey are reported by other family members. We estimate a sample selection model using death and illness events that occurred in the rural household in the months before or after the interview as instruments to identify presence at interview. While arguably uncorrelated with migrants' risk attitudes, these events are largely unanticipated. There is a strong first stage, with instruments being significant indicators for the individual's decision to return to the home village or to remain longer at home (and hence increasing the probability of survey participation). We then estimate an equation where willingness to take risk is the dependent variable, including the generalized residuals from the selection equation as the control function (see Heckman 1979), and conditioning in both equations on other observables that are used in the main analysis. A test of correlation between the unobservables determining survey participation and individual risk attitudes corresponds to a simple t-test of whether the coefficient of the generalized residual is significantly different from zero (see, for example, Wooldridge 2010). Despite our instruments being strong predictors for interview participation, we cannot reject the null hypothesis that the residual correlation in risk aversion and interview participation is zero for any of the specifications we estimate.[14]

12. Estimation results are robust to the exclusion of these individuals.

13. In comparison with similar surveys in other developing countries, the RUMiC-RHS survey has a much higher response rate for migrants, due to the special institutional settings of internal migration in China. As discussed earlier, most migrants are still subject to a rural hukou in their home village and leave their immediate family behind to go and work in cities. To look after their left-behind relatives, repeated short-term migration spells are common. Moreover, the majority of migrants return home for the Chinese New Year (or Spring Festival), celebrated between late January and early February, and stay on for some weeks or months (the 2009 RUMiC-RHS survey was conducted between March and June 2009). All this increases the chances of finding migrants in their home village at the time of the survey.

14. We provide details in Section A1 of the Online Appendix, reporting estimates in Appendix Table A2. In Appendix A1, we further assess the extent of sample selection in our data by comparing the distribution of risk

Table 1
Descriptive Statistics

Variable	Mean	SD	Min.	Max.	Obs.
Individuals					
Male	0.50	0.50	0	1	6,332
Age	43.82	10.65	16	60	6,332
Married	0.92	0.27	0	1	6,332
Years of education	7.15	2.83	0	13	6,332
Birth order	2.24	1.33	0	10	6,123
Number of siblings	3.15	1.64	0	11	6,250
Number of children	1.68	0.99	0	7	6,332
Willingness to take risks (wtRisk)	2.57	2.36	0	10	6,332
Migrated last year	0.11	0.31	0	1	6,332
Ever migrated	0.23	0.42	0	1	6,280
Households					
Household size	4.08	1.32	2	11	2,961
HH members aged <16	0.57	0.73	0	5	2,961
HH members in the work force	2.89	1.09	1	8	2,961
HH members aged >60	0.34	0.61	0	4	2,961
HH head's education (years)	7.25	2.58	0	12	2,961
Plot size (Mu, 15 Mu = 1 hectare)	4.12	4.08	0	75	2,961
House value per capita (yuan, in logs)	9.16	1.33	1.20	14.04	2,961
HH avg. willingness to take risks	2.46	2.03	0	10	2,961
At least one HH member migrated last year	0.16	0.36	0	1	2,961

Source: 2009 RUMiC-RHS Survey.
Notes: The sample includes all individuals in the labor force (that is, aged 16–60 and not currently in school or disabled) who live in a household (HH) in which more than one member in the labor force has reported risk attitudes.

C. Descriptive Statistics

We provide descriptive statistics on individual characteristics in the upper panel of Table 1. The numbers show that males account for about half our sample, with an average age of 43.8 years and an average education of 7.15 years. About 92 percent of our respondents are married and have on average 3.1 siblings and 1.7 children. The average of our measure of willingness to take risks is 2.6 (with a standard deviation of 2.4). The lower panel of Table 1 shows the characteristics of the 2,961 households in our sample. The

attitudes among migrants surveyed in rural areas (that is, those in our sample) and migrants interviewed in urban areas, obtained from the urban module of the RUMiC Survey. We find that the former population is slightly more risk averse than the latter, with differences being very small (see Online Appendix Figure A1). These differences in risk attitudes suggest that we may be oversampling relatively more risk-averse individuals from the population of migrants. Any such oversampling, however, would reduce differences in risk attitudes between migrant and nonmigrant individuals and, if anything, would work against our main empirical findings.

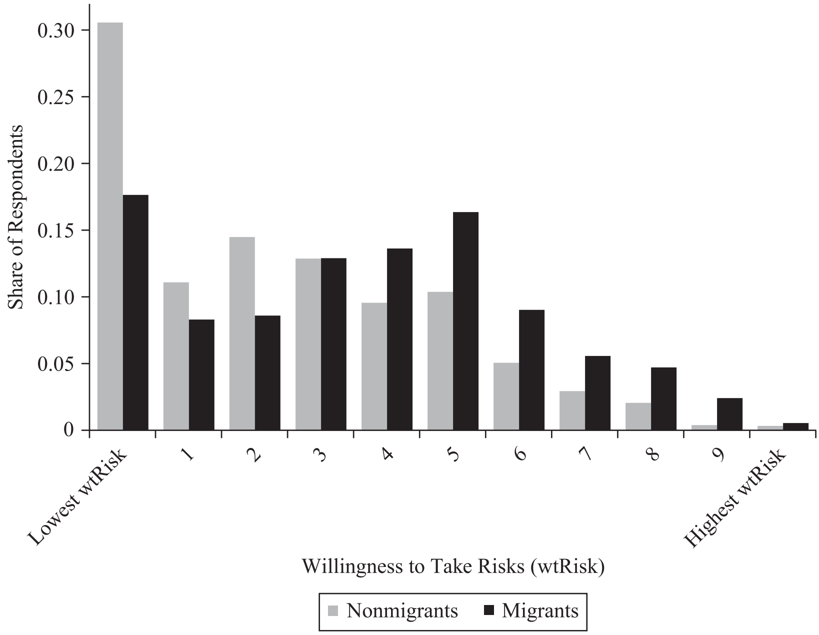

Figure 1

Distribution of Willingness to Take Risks, by Migrant Status

Source: RUMiC-RHS Survey

Notes: The measure (*wtRisk*) varies between zero (lowest level of willingness to take risk) and ten (highest level of willingness to take risk).

average household size is 4.1, with an average of 2.9 individuals of working age.[15] About 16 percent of the households in the sample have at least one member who migrated in the previous year, and 11 percent of the individuals in our sample can be classified as migrants, with the rate among males and females being 14 percent and 7.9 percent, respectively. Further, about 23 percent of the interviewees in our sample reported having migrated at least once in the past. In our empirical analysis, we will use this as a second measure for migration status to check the robustness of our findings.

The distribution by migrant status of our measure of willingness to take risk, which ranges between zero (highest level or risk aversion) and ten (lowest risk aversion), is plotted in Figure 1. For both groups of respondents, the distribution is skewed to the left: the mode value is zero for both migrants and nonmigrants, and the share of respondents categorizing themselves as being at the highest level of risk aversion is 18 percent and 31 percent, respectively. The unconditional mean of the measure is 2.4 and 3.6 for nonmigrant and migrants, respectively. Hence, the migrant distribution is clearly shifted more towards less risk aversion than the nonmigrant distribution.

15. The one-child policy introduced in 1979 was less restrictive in rural areas (allowing rural families to have a second child if the first one was a girl) and less strictly enforced (Zhang 2017). In our sample, individuals born before and after 1979 have an average of 3.3 and 2.1 siblings, respectively.

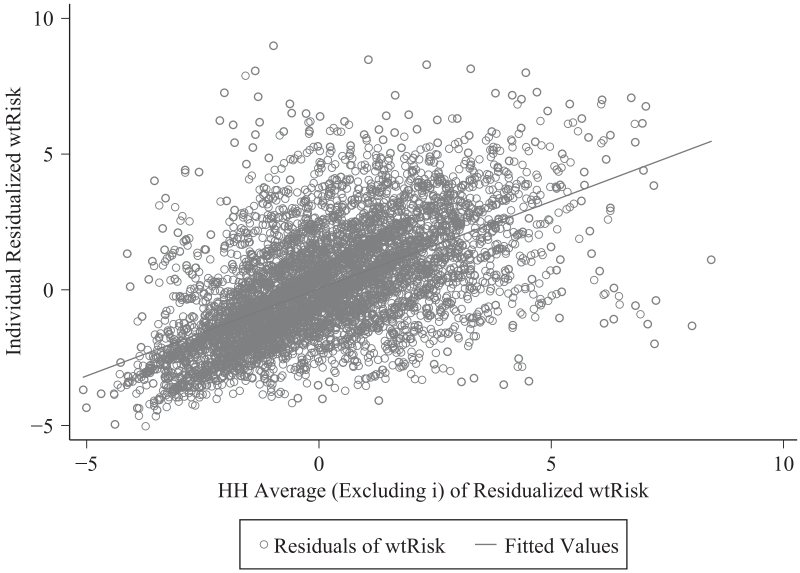

Figure 2

Individual Willingness to Take Risks and Household Average

Notes: The scatter plot shows residual willingness to take risks for each individual in our estimating sample (vertical axis) versus the average residual willingness to take risks of other members in the household (horizontal axis). Residuals are obtained by regressing individual willingness to take risks on basic demographic controls (gender, age, age-squared, and years of education) and a full set of county of residence dummies. The figure shows the regression fitted line (correlation = 0.59).

To illustrate the relation between household and individual risk aversion, we compute the residuals from regressing individual willingness to take risks on basic demographic controls (gender, age, age-squared, and years of education) and a full set of county of residence dummies. Figure 2 plots the residuals for each individual in our sample (on the vertical axis) versus the average residual of other household members (on the horizontal axis). The fitted line shows a clearly positive relation between individual and household residual risk attitudes, with a correlation of about 0.59. This within-household correlation in risk preferences can be explained by assortative matching of parents, intergenerational transmission to children, and exposure to common environmental factors (Dohmen et al. 2012). All these mechanisms can potentially be at work in our context. Still, Figure 2 displays considerable variation in (residual) risk attitudes of members of the same household,[16] a within-household heterogeneity we exploit in our regression analysis.[17]

16. This is in line, for instance, with evidence provided by Mazzocco (2004) of imperfect assortative matching on risk aversion in U.S. couples.

17. To understand better the determinants of risk preference variation across individuals and households, we performed a Shapley decomposition, which suggests that individual characteristics, household characteristics, and other family members' risk preferences explain, respectively, 4.9, 0.6, and 43.8 percent of the individual

V. Empirical Strategy and Results

A. Individual Risk Attitudes

We first assess the relation between individuals' risk aversion and their probability of migration, by estimating the following equation:

$$\text{(11)} \quad \Pr(M_{ihp} = 1) = \beta_0 + \beta_1 wtRisk_{ihp} + \mathbf{X}'_{ihp}\boldsymbol{\delta} + \mathbf{W}'_{hp}\boldsymbol{\theta} + \eta_p + \epsilon_{ihp},$$

where i indexes individuals, h households, and p counties. The variable M_{ihp} is an indicator of whether individuals have spent at least three months working outside their origin area during the previous year. Our main variable of interest is the willingness to take risks *wtRisk*, measured on a scale from zero (lowest risk tolerance) to ten (highest risk tolerance). The vector $\mathbf{X}'_{ihp}$ collects a set of individual-level covariates that are important determinants of the individual migration probability, including gender, age, age-squared, marital status, number of children, years of education, number of siblings, birth order, and the relation to the head of household. The vector $\mathbf{W}'_{hp}$ includes a set of family characteristics, such as household size and structure (number of family members under 16, in the labor force, or older than 60), and per capita house value (in logs). We also include county fixed effects η_p to capture any time-invariant observable and unobservable area characteristic that may be correlated with both attitudes towards risk and propensity to migrate.[18] Our model suggests that, no matter whether migration decisions are taken by the individual alone or at the household level, migrants are more risk tolerant than nonmigrants. We thus expect the coefficient β_1 in Equation 11 to be positive.

Table 2 summarizes the results from our estimation of a linear probability model of Equation 11.[19] We use two alternative measures of migration status: whether the individual migrated for work during the year before the survey (Columns 1–5) and whether the individual had ever migrated in the past (Columns 6–10). In all regressions, we include a full set of 82 county dummies and cluster the standard errors at the household level to allow for within-household correlation in the error terms. We report the results of regressing individual migration status on our measure of willingness to take risk and county fixed effects only (Column 1) and add further individual and household controls (Columns 2–4). All estimates show a strong positive association between individual risk tolerance and the probability of being a migrant, which suggests that individual risk attitudes play an important role in determining individual propensities to migrate. The estimated coefficient on the *wtRisk* variable reduces in magnitude when basic individual controls are included (from 0.014 in Column 1 to 0.005 in Column 2) but remains stable when additional individual controls and household characteristics are added (Columns 3–4). This pattern is consistent with basic demographic characteristics, such as gender and age, being correlated with individual risk attitudes (see among others, Barsky et al.

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variation in willingness to take risk, while 50.6 percent of the variation remains unexplained. As far as household measures of risk preferences are concerned, household characteristics explain approximately 1.3 percent of the overall across-household variation in average risk preference and 1.7 percent of the variation in within-household range.

18. Dohmen et al. (2012) provide evidence of correlation in risk aversion among individuals residing in the same area.

19. The marginal effects based on probit or logit estimators, reported in Online Appendix Table A3, are almost identical to those reported in Table 2.

Table 2
Individual Migration Decision

	Migrated Last Year					Ever Migrated				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
wtRisk	0.014*** (0.0018)	0.005*** (0.0019)	0.005*** (0.0019)	0.005*** (0.0019)		0.030*** (0.0025)	0.014*** (0.0027)	0.014*** (0.0028)	0.014*** (0.0028)	
wtRisk * male					0.006** (0.002)					0.014*** (0.003)
wtRisk * female					0.005** (0.002)					0.013*** (0.003)
Basic individual controls		X	X	X	X		X	X	X	X
Additional individual controls			X	X	X			X	X	X
Household controls				X	X				X	X
County fixed effects	X	X	X	X	X	X	X	X	X	X
Observations	6,332	6,332	6,103	5,992	5,992	6,280	6,280	6,052	5,946	5,946
R-squared	0.187	0.288	0.305	0.310	0.310	0.148	0.273	0.288	0.292	0.292

Notes: The table reports estimates from LPM regressions of a dummy for individual migration status on individual willingness to take risk (*wtRisk*) and other controls. The migration status dummy equals one if the individual migrated for work in the year before the interview (Columns 1–5) or had ever migrated for work (Columns 6–10). The *wtRisk* variable measures individual willingness to take risks (decreasing with risk aversion) and has a mean of 2.57 and a standard deviation of 2.36. In Columns 5 and 10, the variable *wtRisk* is interacted with a male and a female dummy. The basic individual controls are age, age-squared, a dummy for male, and years of education; the additional individual controls are a dummy for married, a dummy for relation to head of household, order of birth, number of siblings, and number of children. Household controls are household size and structure (number of family members under 16, in the labor force, and older than 60) and per capita house value (in logs). All regressions include 82 county fixed effects. The sample includes all individuals in the labor force (that is, aged 16–60 and not currently in school or disabled) who live in households in which more than one member in the labor force has reported risk attitudes. Robust standard errors are clustered at the household level and reported in brackets. $*p<0.1$, $**p<0.05$, $***p<0.01$.

1997; Borghans et al. 2009). The estimated effect is economically relevant—in our most restrictive specification (Column 4), a one standard deviation increase in the willingness to take risk is associated with a 1.2 percentage point increase in the migration probability, corresponding to an 11 percent increase with respect to the baseline migration probability in the estimating sample.[20]

In Columns 6–10 of Table 2, we report estimates for whether the individual has ever migrated for work. As before, willingness to take risk is a strong predictor of migration status. In the most general specification (Column 9), a decrease of one standard deviation in the willingness to take risk is associated with a 3.3 percentage points increase in migration probability, corresponding to about 14 percent of the baseline sample probability, which is similar to the estimate obtained before.

These estimates are in line with previous findings. Jaeger et al. (2010), using a specification similar to that reported in Column 2 of Table 2, report that a one standard deviation increase in risk tolerance leads to a 12 percent increase in the baseline migration probability in Germany. Gibson and McKenzie (2011) find for three Pacific countries that the same increase in risk tolerance is associated with a six to eight percentage point higher likelihood of having ever migrated.[21]

In Column 5 and 10 of Table 2, we investigate gender heterogeneity in the relations between risk tolerance and migration probability by interacting the $wtRisk_{ihk}$ variable with dummies for male and female respondents. Estimated coefficients are very similar across genders. We further relax the linearity assumption in the relation between migration propensity and risk attitudes and estimate Equation 1 with a set of five dummies for different levels of willingness to take risks (the excluded dummy corresponds to a zero willingness to take risks). Estimates show that there is an almost linear relation between the migration probability and individual willingness to take risks above values of about two. This is illustrated in Panels A and B of Figure 3, based on the specifications in Columns 4 and 9 of Table 2.

As a robustness check, we condition on physical and health characteristics—body mass index, self-reported health status—that are likely to affect the migrants' productivity in the manual jobs they usually hold in cities. As Table 3 shows, the probability of migrating is higher for healthier individuals, but the inclusion of these additional controls does not affect our estimates of the coefficient on the willingness to take risk.

In Online Appendix Table A5, we investigate the potential role of village characteristics and networks in shaping migration decisions. We find that individual migration is positively associated with the village migration rate, but there is no association between willingness to take risks and any village level controls, such as village migration rates or village fixed effects.

B. Reverse Causality and Robustness

As attitudes towards risk are measured after the migration decision, one concern may be that the migration experience itself affects the risk attitudes reported during interview.

20. In Online Appendix Table A4, we report estimated coefficients on the other controls. As expected, male, unmarried, and younger individuals are more likely to migrate, while education does not seem to predict migration status.

21. Qualitatively similar findings are reported in Akgüç et al. (2016), who also use RUMiC data but focus solely on analysis of migration probabilities as a function of individual risk preferences.

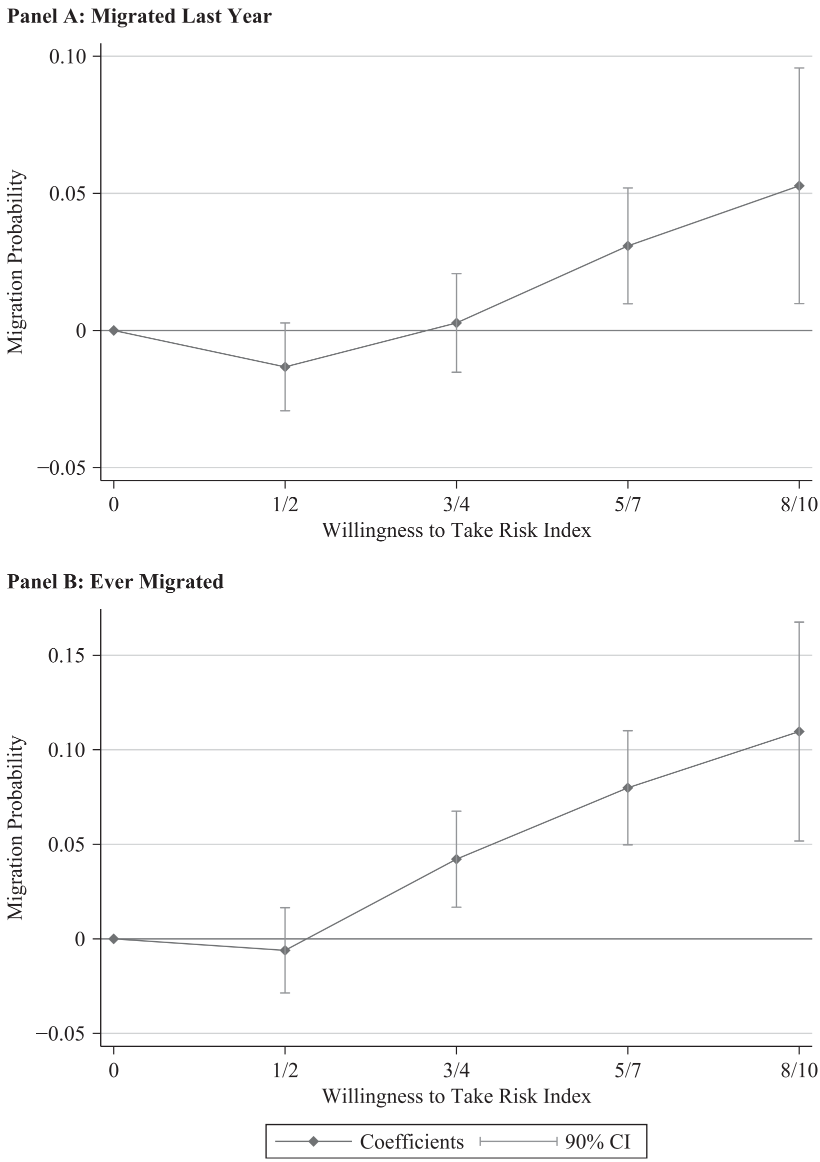

Figure 3

Risk Attitudes and Individual Probability of Migrating, by Level of Willingness to Take Risks

Notes: In Panel A, individuals are defined as migrant if they migrated for work during the year before the survey, and in Panel B, if they ever migrated for work in the past. Individual probabilities of being a migrant are regressed on five dummy variables identifying different levels of willingness to take risks in which the excluded category corresponds to a willingness to take risks equal to zero. The graph plots the estimated coefficients on these dummies together with their 90 percent confidence intervals. Included in the regressions are individual controls (age, age-squared, a dummy for male, years of education, a dummy for married relation with household (HH) head dummies, order of birth, number of siblings, and number of children), household controls (number of family members under 16, in the labor force, and older than 60; per capita house value in logs), and 82 county dummies.

Table 3
Individual Migration Decision, Including Physical and Health Characteristics

	Migrated Last Year			Ever Migrated		
	(1)	(2)	(3)	(4)	(5)	(6)
wtRisk	0.006***	0.005***	0.006***	0.014***	0.014***	0.014***
	(0.0019)	(0.0019)	(0.0019)	(0.0028)	(0.0028)	(0.0028)
BMI	0.004**	0.004**	0.004**	0.001	0.001	0.001
	(0.0018)	(0.0018)	(0.0018)	(0.0023)	(0.0023)	(0.0023)
BMI-squared	–0.000**	–0.000**	–0.000**	–0.000	–0.000	–0.000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Good health		0.032**	0.024*		0.059***	0.051**
		(0.0134)	(0.0142)		(0.0219)	(0.0224)
Mental distress (GHQ-12)			–0.002**			–0.002*
			(0.0009)			(0.0012)
Individual and HH controls	X	X	X	X	X	X
County fixed effects	X	X	X	X	X	X
Observations	5,983	5,970	5,970	5,937	5,924	5,924
R-squared	0.311	0.312	0.312	0.292	0.293	0.293

Notes: The table tests the robustness of *wtRisk* coefficient to the inclusion of further individual health-related characteristics: body mass index (BMI = weight in kilograms over squared height in meters), BMI-squared, a dummy for good health (self-reported health status being average, good or very good, as opposed to poor or very poor), and a measure of mental distress (obtained from a 12-item General Health Questionnaire, GHQ-12, using a Likert scoring method; the variable ranges from 0 (no mental distress) to 36 (highest mental distress). The migration dummy equals one if the individual migrated for work in the year before the interview (Columns 1–3) or had ever migrated for work (Columns 4–6). Individual and household (HH) controls: age, age-squared, a dummy for male, years of education, a dummy for married, relation with HH head dummies, order of birth, number of siblings, and number of children; household size and structure (number of family members under 16, in the labor force, and older than 60); and per capita house value (in logs). All regressions include 82 county fixed effects. The sample includes all individuals in the labor force (that is, aged 16–60 and not currently in school or disabled) who live in households in which more than one member in the labor force has reported risk attitudes. Robust standard errors are clustered at the household level and reported in brackets. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

Findings by Jaeger et al. (2010) show that internal migration in Germany does not affect risk tolerance of individuals. Further, Gibson et al. (2019) exploit a migration lottery program and convincingly illustrate that having migrated internationally (from Tonga to New Zealand) has no significant impact on risk (and time) preferences, although it implies a dramatic increase in lifetime earnings and exposure to a profoundly different economic and social environment. These findings are in line with other evidence about risk preference stability (see Schildberg-Hörisch 2018, for a survey). Chuang and Schechter (2015), reviewing the existing evidence, argue that, even in the case of extreme negative events (for example, natural disasters, war and violence), there is no conclusive evidence that risk preferences respond to shocks.

We investigate whether reverse causality might be driving some of our results by exploiting the panel dimension of the data. We test whether willingness to take risk predicts migrations occurred *for the first time* in 2009, 2010, or 2011, that is, all those cases where migration decisions were taken *after* risk aversion was measured. Because the incidence of a first-time migration declines sharply with age, we now focus on individuals aged 16–36 years. Table 4 shows that the willingness to take risks (measured in early 2009) is positively associated with the probability that the individual will migrate for the first time (in 2009, 2010. or 2011; Columns 1–4). Estimates are remarkably similar to those reported in Columns 5–8 of Table 4, obtained using our main measure of migration in 2008, hence before risk preferences were measured. Estimates from Table 4 suggest that our main results are not affected by the timing of risk attitudes measurement.

To further explore the stability of risk preferences, we compare the distribution of changes in self-reported risk attitudes between 2009 and 2011, which suggest that interviewees report their risk preferences consistently over time (see Online Appendix Figure A2), in line with the evidence in other papers.[22] Further, we regress the change in self-reported willingness to take risks between 2009 and 2011 on a dummy variable indicating migration status in year 2010 (analogous to Jaeger et al. 2010) to test whether the migration experience itself affects individuals' risk preference. The estimated coefficients are never statistically significant (Table 5, Panel A, Columns 1–4). We find similar results when we regress the willingness to take risk as reported in 2011 on a dummy for migration in 2010 while controlling for the willingness to take risks reported in 2009 (see Columns 5–8 of Table 5, Panel A). Further, in Panel B of Table 5 we report estimates of the same regressions as in Panel A, but we distinguish between individuals who were migrants *only* in 2010 and individuals who were migrants in both 2008 and 2010. Again, estimates are small for both measures and not significantly different from zero.[23]

22. Approximately 4,000 individuals in our estimation sample reported risk attitudes in both the 2009 and 2010 RUMiC-RHS waves and 2,500 further reported risk attitudes in the 2011 wave. About 40 percent of the respondents reported exactly the same value in both the 2009 and 2010 surveys, while 62 percent reported changes smaller than or equal to plus or minus one, and about 77 percent showing changes ranging between zero and two (Online Appendix Figure A2, gray bars). When considering changes between 2009 and 2011, about one-fourth of individuals display zero change in willingness to take risks and almost 50 percent had changes smaller or equal to plus and minus one (black bars).

23. To further investigate a possible relation between our measure of risk aversion and the migration experience, we use data from various waves of the Urban Migrant Survey (UMS) of the RUMiC project and test whether risk preferences vary across migrations of different durations. In particular, we regress risk attitudes of

Table 4
Risk Attitudes and Future Migration Decisions

	First Migration in 2009 or Later (After Risk Measurement)				Migration Last Year (2008) (Before Risk Measurement)			
	16–32 (1)	16–34 (2)	16–36 (3)	16–60 (4)	16–32 (5)	16–34 (6)	16–36 (7)	16–60 (8)
wtRisk	0.014**	0.016***	0.014***	0.003**	0.015**	0.012**	0.010**	0.005***
	(0.007)	(0.006)	(0.005)	(0.002)	(0.007)	(0.006)	(0.005)	(0.002)
Individual & HH controls	X	X	X	X	X	X	X	X
County fixed effects	X	X	X	X	X	X	X	X
Observations	395	509	665	3,979	924	1,117	1,370	5,992
R-squared	0.58	0.50	0.43	0.15	0.48	0.46	0.44	0.31

Notes: This table tests whether self-reported risk attitudes measured at the beginning of year 2009 predict successive first-time migration decisions. In Columns 1–4 the dependent variable is an indicator for the individual having migrated for the first time in year 2009, 2010, or 2011, while in Columns 5–8 the dependent variable is the usual indicator for having migrated last year, that is, in year 2008. Individual controls are age, age-squared, a dummy for male, years of education, a dummy for married, relation with household (HH) head dummies, order of birth, number of siblings, and number of children. The household controls are household size and structure (number of family members under 16, in the labor force, and older than 60) and per capita house value (in logs). All regressions include 82 county fixed effects. The sample includes all individuals in our estimating sample who also reported information about the year of first migration, and whose age is within the indicated range. Robust standard errors are clustered at the household level and reported in brackets. $*p<0.1$, $**p<0.05$, $***p<0.01$.

Table 5
Changes in Self-Reported Willingness to Take Risks (2009–2011 RUMiC-RHS Waves)

	Change in wtRisk 2009–2011				wtRisk 2011			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A								
Migration in 2010	0.037	0.120	0.106	0.108	0.151	–0.059	–0.088	–0.093
	(0.232)	(0.239)	(0.245)	(0.244)	(0.192)	(0.196)	(0.201)	(0.201)
Panel B								
Migration only in 2010	0.195	0.267	0.242	0.227	0.246	0.045	0.015	0.011
	(0.319)	(0.325)	(0.333)	(0.331)	(0.257)	(0.255)	(0.261)	(0.261)
Migration in 2008 and 2010	–0.121	–0.027	–0.032	–0.013	0.056	–0.164	–0.192	–0.199
	(0.303)	(0.307)	(0.316)	(0.315)	(0.261)	(0.263)	(0.270)	(0.269)
Observations	2,906	2,906	2,813	2,791	2,906	2,906	2,813	2,791
wtRisk 2009					X	X	X	X
Basic individual controls		X	X	X		X	X	X
Additional individual controls			X	X			X	X
Household controls				X				X
County fixed effects	X	X	X	X	X	X	X	X

Notes: This table tests the relationship between changes in self-reported risk attitudes between 2009 and 2011 and migration experience in 2010. In Columns 1–4, the dependent variable is the change in self-reported willingness to take risks between the 2009 and the 2011 waves, while in Columns 5–8 the dependent variable is self-reported willingness to take risks in 2011. In Panel A, the main regressor of interest is an indicator for the individual being recorded as migrant in year 2010. In Panel B, the main regressors of interest are an indicator for the individual having migrated only in 2010 and an indicator for having migrated in both 2008 and 2010. In Panel B, willingness to take risks reported in 2009 is always included in the controls. The basic individual controls are age, age-squared, a dummy for male, and years of education. The additional individual controls are a dummy for married, a dummy for relation to head of household, order of birth, number of siblings, and number of children. The household controls are household size and structure (number of family members under 16, in the labor force, and older than 60) and per capita house value (in logs). All regressions include 82 county fixed effects. The sample includes all individuals in our estimating sample who also reported risk attitudes in the 2011 wave. Robust standard errors are clustered at the household level and reported in brackets. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

C. The Migration Decision and Within-Household Risk Attitudes

The finding that individual risk tolerance determines migration choices is compatible with migration decisions taken either at the individual (corresponding to $\alpha = 0$) or the household level ($0 > \alpha > 1$). In the latter case, risk attitudes of other household members should play a role in determining individual migration probabilities (see Section III.C). To investigate this further, we reestimate Equation 11 including both respondents' own willingness to take risk (*wtRisk*) *and* the average willingness to take risk of the other household members in the labor force (*wtRisk_oth*). Thus, we compare individuals with the same risk aversion but belonging to households in which the other members have different average risk attitudes. If migration decisions are purely individual choices, the average risk aversion of the other household members should not matter. If, however, decisions are made at household level, we expect individuals from more risk-averse households to have a higher probability to migrate, conditional on their own risk attitude.

Table 6 reports estimates where specifications include county fixed effects, as well as individual and household controls, and clusters standard errors at the household level. For convenience, Column 1 replicates Column 4 of Table 2. While the estimated coefficient on *wtRisk_oth* is zero when included on its own (Column 2 of Table 6), as should be expected, it becomes significant and negative once we condition on individual willingness to take risks (Column 3). Thus, conditional on individuals' own risk aversion, the lower the willingness to take risk among other household members, the higher the likelihood that the individual will migrate.

As an alternative specification, we estimate individual-level regressions as in Equation 11 and include both the individual's willingness to take risk (*wtRisk*) and their position in the household ranking of willingness to take risk (*wtRisk_rel*) among household members. The coefficient on this latter variable is identified from individuals who have the same level of risk tolerance (*wtRisk*) but who hold different positions in the risk tolerance ranking within their respective households. In a model of individual migration choices, two individuals with the same risk aversion should have the same probability to be a migrant (other things equal), and the coefficient on the *wtRisk_rel* variable should thus be zero. However, if decisions are taken at the household level, we would expect the ordinal measure of risk preferences (*wtRisk_rel*) to be positively associated with the migration decision, meaning that, keeping own willingness to take risk constant, a higher rank in the household's risk tolerance distribution increases the probability of migrating.

We use two alternative measures for the individual's ranking, denoted by *wtRisk_rel*. First, we rank household members according to their willingness to take risks and assign a value of one to the least risk tolerant and a value of n to the most risk-tolerant individual (where n is the number of household members in the labor force reporting risk preferences) and normalize this measure by n. Second, we define a dummy variable that takes the value one if the respective individual has the highest risk tolerance in their households and zero otherwise.[24] Both these variables increase with the focal

migrants on the years since first migration, while controlling for individual characteristics as well as for city and year fixed effects. We report estimates in Online Appendix Table A6, where Columns 1 and 2 report results unconditional and conditional on individual fixed effects, respectively. Estimated coefficients of migration duration are very small in magnitude and never significantly different from zero.

24. In constructing these variables, we need to decide how to treat cases in which some household members reported identical values of risk attitudes. For the ranking measure, we assign an average ranking to individuals

Table 6

Within-Household Migration Decision: Relative Measures and Risk Preferences of Other Household Members

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
wtRisk	0.005***		0.009***		0.003*		0.005***	0.009***	0.003*	0.005***
	(0.002)		(0.002)		(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
wtRisk_oth: avg wtRisk of other HH members		–0.000	–0.006***					–0.006***		
		(0.002)	(0.002)					(0.002)		
wtRisk_rel: ranking in HH normalized				0.070***	0.055***				0.053***	
				(0.018)	(0.020)				(0.020)	
wtRisk_rel: dummy for highest wtRisk in HH						0.016**	0.014*			0.011
						(0.008)	(0.008)			(0.008)
Individual and HH controls	X	X	X	X	X	X	X	X	X	X
HH wtRisk measures	Only HH Members in Labor Force							All HH Members		
Observations	5,992	5,992	5,992	5,992	5,992	5,992	5,992	5,992	5,992	5,992
R-squared	0.310	0.310	0.311	0.309	0.310	0.309	0.311	0.311	0.311	0.310

Notes: The table reports the estimates from LPM regressions of a dummy for individual migration status (in the previous year) on different measures of willingness to take risks (at both the individual and household level) and other controls. In Columns 2–3 and 8, we include the average risk preferences of the other household members (*wtRisk_oth*). In Columns 4–7 and 9–10, we include two alternative measures of the individual's position in the household ranking of willingness to take risk (*wtRisk_rel*): (i) individual ranking in risk attitudes within the household, obtained by ranking household members by their willingness to take risks, assigning a value of one to the most risk-averse person and progressively higher values to the other members, and then normalizing this measure by the number of members reporting risk preferences (Columns 4–5 and 9); (ii) an indicator for the individual having the highest willingness to take risks in the household (Columns 6–7 and 10). The measures of willingness to take risks relative to the household (*wtRisk_oth* and *wtRisk_rel*) are computed using only household members in the labor force (that is, aged between 16 and 60 and not currently in school or disabled) in Columns 1–7, and all household members in Columns 8–10. Individual and HH controls: age, age-squared, a dummy for male, years of education, a dummy for married, relation with HH head dummies, order of birth, number of siblings, and number of children; household size and structure (number of family members under 16, in the labor force, and older than 60); and per capita house value (in logs). All specifications include county fixed effects. The sample includes all individuals in the labor force (that is, aged 16–60 and not currently in school or disabled) who live in households in which more than one member in the labor force has reported risk attitudes. Robust standard errors are clustered at the household level and reported in brackets. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

Table 7
Within-Household Migration Decision: HH Fixed Effects

	(1)	(2)	(3)
wtRisk	0.040***	0.016***	0.016***
	(0.005)	(0.005)	(0.005)
Basic individual controls		X	X
Additional individual controls			X
Household fixed effects	X	X	X
Observations	5,992	5,992	5,992
R-squared	0.602	0.672	0.679

Notes: The table reports the estimates from LPM regressions of a dummy for individual migration status (in the previous year) on willingness to take risks, other controls, and household (HH) fixed effects. Basic individual controls: age, age-squared, a dummy for male, and years of education. Additional individual controls: dummy for married, a dummy for relation to head of household, order of birth, number of siblings, and number of children. The sample includes all individuals in the labor force (that is, aged 16–60 and not currently in school or disabled) who live in households in which more than one member in the labor force has reported risk attitudes. Robust standard errors are clustered at the household level and reported in brackets. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

individual's willingness to take risks. Columns 4–7 of Table 6 report results for our two alternative measures of relative risk attitudes, where we include only the relative measure for each variable in even columns and both the relative and absolute willingness to take risks in odd columns. The estimates show that relative measures of risk attitudes affect the individuals' probability of migration over and above the individual's own risk preference in the direction we would expect if migration decisions are taken on the household level and risk attitudes of other household members matter. Considering, for instance, estimates in Column 7, being the least risk-averse individual in a household implies a 1.4 percentage point higher likelihood of migrating (around 13 percent at baseline), compared to having the same individual risk attitude, but not being the least risk-averse in the household.

Note that in Columns 2–7 of Table 6, the *wtRisk_oth* and *wtRisk_rel* variables are computed using only household members who are in the labor force. We impose this restriction because we are interested in studying how the probability of an individual to migrate depends on the risk preferences of other members who are also potential candidates for migration. Alternatively, in Columns 8–10 we include all household members in the computation of those measures, which hardly affects estimates. In Table 7, as a further robustness check, we regress the individual migration probability on the *wtRisk*

with the same willingness to take risks (for example, if two individuals are ranked second in the household, we assign a ranking of 2.5 to each and a ranking of 4 to the next household member, if any). In our second procedure, we assign the value 1 if the individual has the lowest risk aversion in the household, irrespective of other household members possibly reporting the same level of willingness to take risks. We have experimented with alternative methods for dealing with ties in other unreported regressions, but our empirical results do not change. These estimates are available upon request.

variable and include household fixed effects to condition on all unobservable characteristics common to all household members, including average risk preferences. Our estimates show that individuals with values of willingness to take risks above the household average are significantly more likely to migrate, confirming our previous results.

Thus, our findings show that the risk attitudes of other household members are an important determinant for migration decisions in the context that we study. Next, we assess whether such differences in the distribution of risk preferences within households also help predict the household's probability of having migrant members.

D. Which Households Are More Likely to Send a Migrant?

Our model suggests that, for the same average risk aversion, households with more dispersed risk preference should be more likely to send migrants, as the gain in household utility from sending a migrant increases in the risk aversion of the most risk-averse member and decreases in the risk aversion of the least risk-averse member. To test this hypothesis, we first analyze whether among households with the same average willingness to take risk, those where risk attitudes are more dispersed are more likely to send migrants, by estimating the following household-level regression:

$$(12)\quad \Pr(M_{hp}=1)= \delta_0+\delta_1 HH\_avg\_wtRisk_{hp}+\delta_2 HH\_range\_wtRisk_{hp}+\mathbf{W}'_{hp}\boldsymbol{\theta}+\eta_p+u_{hp},$$

where the probability that household h in county p sends a migrant depends on the average risk aversion of the household (*HH_avg_wtRisk*), the within-household range in risk attitudes (*HH_range_wtRisk*), other household controls, and county fixed effects.[25]

Estimation results in Table 8 show that the coefficient on the average risk aversion is positive and strongly significant (Columns 1 and 3), meaning that households that are on average more risk tolerant are more likely to engage in a migration. As the correlation in risk attitudes within households is sizeable in our sample (see Section IV.C), this could reflect that more risk-tolerant individuals are more likely to migrate and are more likely to belong to households whose members are also more risk tolerant. When adding the within-household range in risk attitudes (defined as the difference between the highest and lowest values of willingness to take risks reported in each household, Columns 2 and 4), estimates show that households with a higher dispersion in risk preference across members are more likely to send migrants *conditional* on the average household risk aversion.[26] We test the robustness of our estimates by including further controls for household wealth (total value of productive assets and total debt, if any; Column 5) and by excluding from the sample individuals older than 60 and 70 years (Columns 6 and 7) when computing our household-level measures of risk preferences. Estimates are robust to these sample restrictions.

25. The household controls are number of family members under 16, being in the labor force, and being older than 60; per capita house value; size of the family plot; and years of education and age of the head of the household.

26. In these specifications, the mean of household risk preference is insignificant. We show in Online Appendix Section A2 that the sign of the average risk aversion (conditional on dispersion) is undetermined and depends on the relative size of earnings variance at source and destination regions.

Table 8
Across-Household Migration Decision

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
HH_avg_wtRisk	0.010***	0.004	0.009***	0.003	0.002	0.003	0.003
	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
HH_range_wtRisk		0.017***		0.016***	0.017***	0.015***	0.014***
		(0.004)		(0.004)	(0.004)	(0.004)	(0.004)
HH controls			X	X	X	X	X
Additional HH wealth controls					X		
Excluding individuals aged above 70						X	
Excluding individuals aged above 60							X
Observations	2,961	2,961	2,961	2,961	2,605	2,908	2,662
R-squared	0.31	0.31	0.31	0.32	0.32	0.32	0.33

Notes: The table reports estimates from LPM regressions of a dummy that equals one if the household (HH) has at least one migrant member in the labor force (that is, aged 16–60 and not currently in school or disabled) on different household-level measures of willingness to take risks and other controls. The variables *HH_avg_wtRisk* and *HH_range_wtRisk* measure the average and the range of willingness to take risks in the household, respectively. HH controls: household size and structure (number of family members under 16, in the labor force, and older than 60), per capita house value (in logs), size of the family plot, and the years of education and age of the head of household. Additional HH wealth controls: value of productive assets and household debt (in logs). All specifications include 82 county fixed effects. The sample includes all households in which at least two individuals have reported risk attitudes, and at least one of these is in the labor force (that is, aged 16–60 and not currently in school or disabled). In Columns 6 and 7, we exclude individuals older than 70 and 60 years, respectively, when computing household-level measures of risk preferences. Robust standard errors are reported in brackets. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

Another way to test the hypothesis that households with a more dispersed distribution of risk attitudes are more likely to have migrant members is to test directly whether the probability of sending a migrant *increases* with the presence of a more risk-tolerant individual and *decreases* with the willingness to take risk of the other (nonmigrant) members. We thus estimate the following household-level equation:

$$(13) \quad \Pr(M_{hp}=1)= \gamma_0+\gamma_1 HH\_max\_wtRisk_{hp}+\gamma_2 HH\_oth\_wtRisk_{hp}+\mathbf{W}'_{hp}\boldsymbol{\theta}+\eta_p+u_{hp},$$

where *HH_max_wtRisk* is the risk preferences of the most risk-tolerant member among those in the labor force, and *HH_oth_wtRisk* is the average risk tolerance among all other household members. If households that have a more polarized distribution of risk attitudes are more likely to have migrant members, we would expect the coefficients on these two risk measures to have opposite signs.

Table 9 reports our estimates, where all regressions include county fixed effects. We add household controls in Columns 3–11 and further household wealth controls in Columns 5 and 9. When only the willingness to take risks of the most risk-tolerant individual in the household ($HH\_max\_wtRisk_{hk}$) is included in the regression (Columns 1 and 3), we find a positive and strongly significant coefficient. This coefficient remains positive and significant when we add the average risk tolerance of the other household members ($HH\_oth\_wtRisk_{hk}$). The coefficient on this latter variable turns out to be negative, as expected (Columns 2 and 4–7).[27] As in Table 8, we test the robustness of our estimates to the inclusion of additional household controls (Column 5) and to the exclusion of elderly individuals from the sample when computing the risk tolerance of the other household members (Column 6–7). In Columns 8–11, we further check the robustness of our findings to reducing the age limit of the working age population from 60–50 years. Our estimates remain unaffected, becoming if anything more significant in spite of a 25 percent reduction in sample size.[28] These results indicate that the probability of sending a migrant increases with the risk tolerance of the most risk-tolerant individual ($HH\_max\_wtRisk_{hk}$), while it decreases with the average risk tolerance among other individuals in the household (*HH_oth_wtRisk*), conditional on the risk tolerance of the least risk-averse member.

Our findings suggest that the distribution of risk attitudes within the household plays an important role in the household's decision to send a migrant. Households with a high demand for risk diversification from some of their members and with sufficiently risk-tolerant individuals prepared to migrate are more likely to send a migrant.

27. According to the estimates in Column 4 of Table 9, a one unit decrease in the willingness to take risks of the least risk-averse household member implies a 1.5 percentage point increase in the household's probability of sending a migrant, corresponding to a 9 percent increase over the baseline household migration probability (see Table 1). At the same time, a one unit increase in the average risk aversion among all other household members, conditional on the most risk-tolerant member's risk attitudes, is associated with a 0.8 percentage points increase in the household's probability of sending a migrant (or a 5 percent increase), although the coefficient is not precisely estimated.

28. Approximately 40 percent of the households with migrant members have more than one migrant. In Online Appendix Table A7, we replicate our estimates in Tables 8 and 9 using as outcome in the regressions the share of migrant household members rather than the probability of having a migrant member. All our results are robust to this alternative definition of the dependent variable.

Table 9
Across-Household Migration Decision

	Labor Force Age Range										
	16–60							16–50			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
HH_max_wtRisk	0.012***	0.017***	0.011***	0.015***	0.016***	0.015***	0.013***	0.017***	0.017***	0.017***	0.018***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
HH_oth_wtRisk		–0.009*		–0.008	–0.009	–0.009*	–0.007	–0.012**	–0.014**	–0.014**	–0.015***
		(0.005)		(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
HH controls			X	X	X	X	X	X	X	X	X
Additional HH wealth controls					X				X		
Excluding individuals aged above 70						X				X	
Excluding individuals aged above 60							X				X
Observations	2,961	2,961	2,961	2,961	2,605	2,908	2,662	2,189	1,904	2,154	2,083
R-squared	0.31	0.31	0.32	0.32	0.32	0.32	0.33	0.36	0.35	0.36	0.36

Notes: The table reports estimates from LPM regressions of a dummy that equals one if the household (HH) has at least one migrant member in the labor force (that is, aged 16–60 and not currently in school or disabled) on the risk preferences of the individual with the highest willingness to take risks in the household among those in the labor force ($HH\_max\_wtRisk_{hk}$), the average risk attitudes among all other household members ($HH\_oth\_wtRisk_{hk}$), and other controls. HH controls: household size and structure (number of family members under 16, in the labor force, and older than 60), per capita house value (in logs), size of the family plot, and years of education and age of the head of household. Additional HH wealth controls: value of productive assets and household debt (in logs). All specifications include 82 county fixed effects. In Columns 1–7, the age bracket for workers to be considered part of the labor force is 16–60 years; in Columns 8–11 it is 16–50 years. The sample includes all households in which at least two individuals have reported risk attitudes, and at least one of these is in the labor force (that is, within the defined age bracket and not currently in school or disabled). In Columns 6 and 10, we exclude individuals older than 70 years, when computing the risk tolerance of other household members (*HH_oth_wtRisk*), while in Columns 7 and 11 we exclude those older than 60. Robust standard errors are reported in brackets. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

VI. An Illustration of Individual and Household Decisions

Our empirical analysis provides evidence that, in the context of rural China, migration decisions are taken at the household level and that heterogeneity in risk aversion within the household plays an important part in shaping these decisions. We now illustrate the implications for migration decisions and migrant flows if migration decisions are taken at the household level, rather than at the individual level.

We base our simulation on an extension of the model we develop in Section III. We generate a population of 10,000 individuals with mean-variance utility functions who are randomly assigned a value of willingness to take risks (varying between zero and ten) and where the distribution of the risk preference mimics the one we observe in our data. We assign individuals to households so that the within-household correlation in risk aversion roughly resembles that in our data. Each household has four members, the average household size in our data, which results in 2,500 households in the simulation. Further, we set expected earnings in the source region (S) equal to 5,000 yuan (with a standard deviation of 3,000) and expected earnings in destination region (D) as twice as large as in the source region S (see Section II).[29] We then let the earnings variance at destination $V(y_D)$ vary over the interval $[0.1 \times V(y_D) \leq V(y_S) \leq 4 \times V(y_D)]$ to study how migration choices react to relative changes in the earnings variance in the two regions.

We simulate migration decisions for two scenarios. First, migration decisions are taken at the individual level, which corresponds to the case with no income pooling ($\alpha = 0$). We assume that all individuals face the same expected income and income variance but differ in their migration costs.[30] Second, we allow for within-household income pooling and risk sharing ($0 < \alpha < 1$), and household members pool income and take joint decisions on the migration of their members. In this scenario, we assume that $\alpha = 0.25$, so that migrants pool about a fourth of their income with their family. This value corresponds to observed remittances (see Footnote 2). We maintain our assumption that at most one individual can migrate from each household.[31]

Figure 4 plots the predicted migration rates and the average willingness to take risks among migrants and nonmigrants for the two scenarios. The horizontal axis carries the earnings variance in the destination region D relative to the source region S, while the vertical axis carries the migration rate on the left-hand side and the average willingness to take risks on the right-hand side. For both scenarios, the trend of the simulated migration rates is similar: when the earnings variance at destination is lower than at source, the migration rates (solid line) are close to 100 percent, but they gradually decline as uncertainty in the destination region increases relative to the source region. Similarly, both

29. These numbers correspond to what we report in Section II: 5,000 yuan is the average net income in rural areas, earnings in cities are approximately twice those in the countryside, and the coefficient of variation in rural areas is 0.58 (hence 3,000/5,000 = 0.6).

30. We assume migration costs are uncorrelated with risk attitudes. In our simulations, individuals are assigned a (pseudo) random value of migration cost drawn from a chi-squared distribution so that the mean value of migration costs is approximately equal to 30 percent of the expected earnings in the source region.

31. In the household decision model, the cost of migration does not differ across household members. Once households are formed, we randomly reassign migration costs to the household using the same distribution as above.

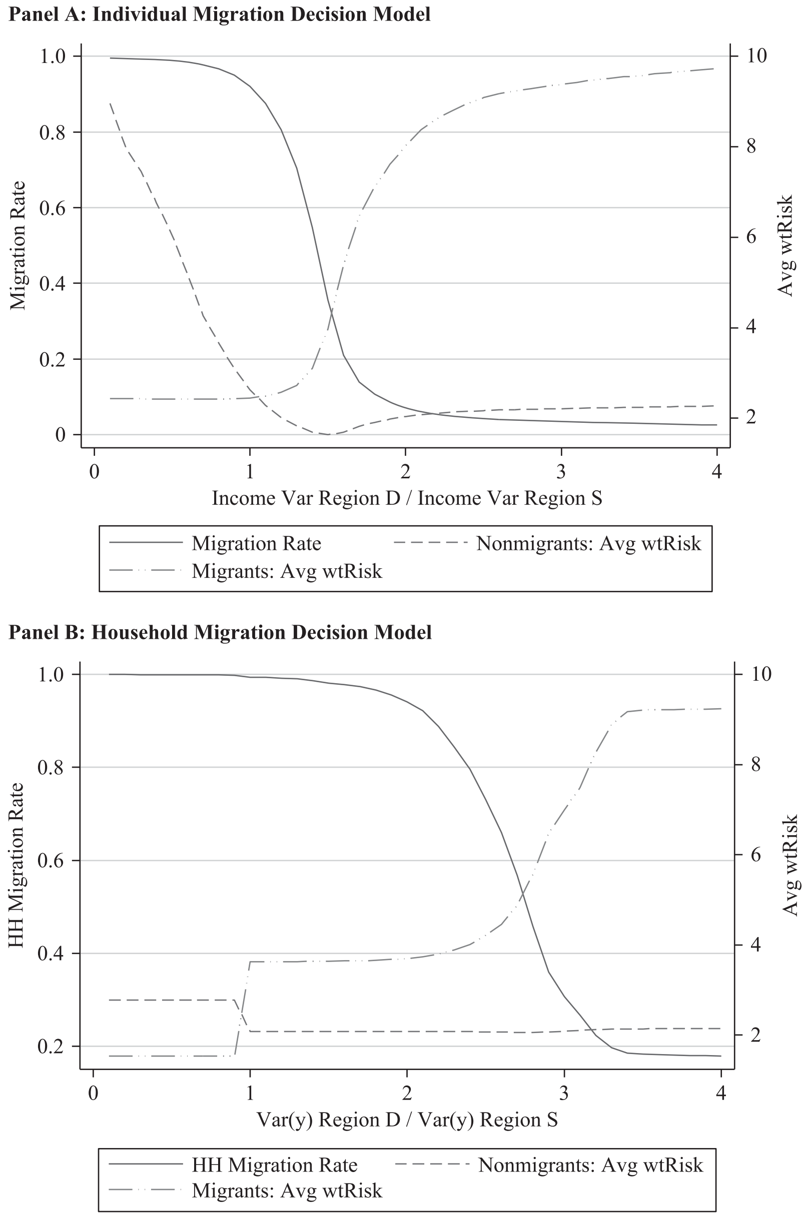

Figure 4

Individual and Household Migration Decision Models

Notes: These figures are obtained from the simulation described in Section VI.

the individual and the household decision models imply selection of more risk-tolerant individuals into migration, so that the average willingness to take risk for migrants (dash-dotted line) is higher than for nonmigrants (dashed line) when there is lower uncertainty in the source region than in the destination. The two scenarios diverge, however, in their quantitative predictions of the migration rate for any given level of relative earnings variance in the two regions. Whereas without income pooling and risk sharing ($\alpha = 0$) there is a rapid decline in the share of migrants with increasing uncertainty in the destination region, this decline is substantially less pronounced when migration decisions are taken at the household level, and individuals pool income and risk. This is so for two reasons: other household members benefit from risk diversification even if the earnings variance in the destination region is high, and the migrant is partially insured against risks in the destination region by household members who stay at home.

VII. Discussion and Conclusions

We analyze the relation between migration decisions and the distribution of risk attitudes within and across households. We provide evidence that, in the context of China, heterogeneity in risk aversion within the household plays an important part in determining whether a migration takes place, who emigrates, and which households send migrants.

Acknowledging the role of households in making migration decisions, as well as the relevance of heterogeneity in risk preference within and across households has important policy implications. For instance, the implementation of a policy that creates possibilities to insure against risk—such as the introduction of social safety nets—may increase migrations if decisions are taken at the individual level. However, when the migration decision is taken at the household level, it may work in the opposite direction because it allows risk-averse household members to diversify risk in other ways.

In demonstrating that the distribution of other household members' risk attitudes affects decisions to migrate, our analysis suggests that risk attitudes within the household may also affect other choices that are determined on a household level. Examples are the adoption of innovative farming practices, the selection of new crops, or the investment in a new family business, where decisions may be influenced by the distribution of risk attitudes within households and by the possible benefits of risk reduction to members other than the individuals directly concerned. Understanding direction and magnitude of the interactions between the effects of such decisions on different household members and their risk preferences should be an interesting avenue for future research, with the potential to contribute significantly to a better understanding of key economic decisions, particularly in developing countries.

References

Akgüç, Methap, Xingfei Liu, Massimiliano Tani, and Klaus F. Zimmermann. 2016. "Risk Attitudes and Migration." *China Economic Review* 37(C):166–76.

Angelucci, Manuela. 2015. "Migration and Financial Constraints: Evidence from Mexico." *Review of Economics and Statistics* 97(1):224–28.

Barsky, Robert B., F. Thomas Juster, Miles S. Kimball, and Matthew Shapiro. 1997. "Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study." *Quarterly Journal of Economics* 112(2):537–79.

Batista, Catia, and Janis Umblijs. 2014. "Migration, Risk Attitudes, and Entrepreneurship: Evidence from a Representative Immigrant Survey." *IZA Journal of Migration* 3(1):17.

Borghans, Lex, Bart Golsteyn, James J. Heckman, and Huub Meijers. 2009. "Gender Differences in Risk Aversion and Ambiguity Aversion." *Journal of the European Economic Association* 7(2–3):649–58.

Borjas, George J. 1987. "Self-Selection and the Earnings of Immigrants." *American Economic Review* 77(4):531–53.

Borjas, George J., and Bernt Bratsberg. 1996. "Who Leaves? The Outmigration of the Foreign-Born." *Review of Economics and Statistics* 78(1):165–76.

Borjas, George, Ilpo Kauppinen, and Panu Poutvaara. 2019. "Self-Selection of Emigrants: Theory and Evidence on Stochastic Dominance in Observable and Unobservable Characteristics." *Economic Journal* 129(617):143–71.

Bryan, Gharad, Shyamal Chowdhury, and Ahmed Mushfiq Mobarak. 2014. "Underinvestment in a Profitable Technology: The Case of Seasonal Migration in Bangladesh." *Econometrica* 82(5):1671–748.

Chen, Kong-Pin, Shin-Hwan Chiang, and Siu Fai Leung. 2003. "Migration, Family, and Risk Diversification." *Journal of Labor Economics* 21(2):353–80.

Chiquiar, Daniel, and Gordon H. Hanson. 2005. "International Migration, Self-Selection, and the Distribution of Wages: Evidence from Mexico and the United States." *Journal of Political Economy* 113(2):239–81.

Chuang, Yating, and Laura Schechter. 2015. "Stability of Experimental and Survey Measures of Risk, Time, and Social Preferences: A Review and Some New Results." *Journal of Development Economics* 117(C):151–70.

Ding, Xiaohao, Joop Hartog, and Yuze Sun. 2010. "Can We Measure Individual Risk Attitudes in a Survey?" IZA Discussion Paper 4807. Bonn, Germany: IZA.

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde. 2010. "Are Risk Aversion and Impatience Related to Cognitive Ability?" *American Economic Review* 100:1238–60.

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde. 2012. "The Intergenerational Transmission of Risk and Trust Attitudes." *Review of Economic Studies* 79(2):645–77.

Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Jürgen Schupp, and Gert G. Wagner. 2011. "Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences." *Journal of the European Economic Association* 9(3):522–50.

Du, Yang, Albert Park, and Sangui Wang. 2005. "Migration and Rural Poverty in China." *Journal of Comparative Economics* 33(4):688–709.

Dustmann, Christian. 1997. "Return Migration, Uncertainty and Precautionary Savings." *Journal of Development Economics* 52(2):295–316.

Dustmann, Christian, Itzhak Fadlon, and Yoram Weiss. 2011. "Return Migration, Human Capital Accumulation and the Brain Drain." *Journal of Development Economics* 95(1):58–67.

Ekelund, Jesper, Edvard Johansson, Marjo-Riitta Jarvelin, and Dirk Lichtermann. 2005. "Self-Employment and Risk Aversion: Evidence from Psychological Test Data." *Labour Economics* 12(5):649–59.

Fernandez-Huertas Moraga, Jesus. 2011. "New Evidence on Emigrant Selection." *Review of Economics and Statistics* 93(1):72–96.

Frijters, Paul, Robert G. Gregory, and Xin Meng. 2015. "The Role of Rural Migrants in the Chinese Urban Economy." In *Migration*: *Economic Change, Social Challenge*, ed. Christian Dustmann, 33–67. Oxford: Oxford University Press.

Frijters, Paul, Tao Kong, and Xin Meng. 2011. "Migrant Entrepreneurs and Credit Constraints under Labour Market Discrimination." IZA Discussion Paper 5967. Bonn, Germany: IZA.

Frijters, Paul, Xin Meng, and Resosudarmo. 2011. “The Effects of Institutions on Migrant Wages in China and Indonesia.” In *Rising China: Global Challenges and Opportunities*, ed. Jane Golley and Ligang Song, 245–84. Canberra, Australia: ANU ePress.

Gibson, John, and David McKenzie. 2011. “The Microeconomic Determinants of Emigration and Return Migration of the Best and Brightest: Evidence from the Pacific.” *Journal of Development Economics* 95:18–29.

Gibson, John, David McKenzie, Halahingano Rohorua, and Steven Stillman. 2019. “The Long-Term Impact of International Migration on Economic Decision-Making: Evidence from a Migration Lottery and Lab-in-the-Field Experiments.” *Journal of Development Economics* 138:99–115.

Giles, John. 2006. “Is Life More Risky in the Open? Household Risk-Coping and the Opening of China’s Labor Markets.” *Journal of Development Economics* 81(1):25–60.

Giles, John T., and Ren Mu. 2007. “Elderly Parent Health and the Migration Decisions of Adult Children: Evidence from Rural China.” *Demography* 44:265–88.

———. 2014. “Village Political Economy, Land Tenure Insecurity, and the Rural to Urban Migration Decision: Evidence from China.” IZA Discussion Paper 8630. Bonn, Germany: IZA.

Giles John, and Kyeongwon Yoo. 2007. “Precautionary Behavior, Migrant Networks, and Household Consumption Decisions: An Empirical Analysis Using Household Panel Data from Rural China.” *Review of Economics and Statistics* 89(3):534–51.

Gröger, André, and Yanos Zylberberg. 2016. “Internal Labor Migration as a Shock Coping Strategy: Evidence from a Typhoon.” *American Economic Journal: Applied Economics* 8(2):123–53.

Heckman, James. 1979. “Sample Selection Bias as a Specification Error.” *Econometrica* 47 (1):153–161.

Hoddinott, John. 1994. “A Model of Migration and Remittances Applied to Western Kenya.” *Oxford Economic Papers* 46(3):459–76.

Jaeger, David A., Thomas Dohmen, Armin Falk, David Huffman, Uwe Sunde, and Holger Bonin. 2010. “Direct Evidence on Risk Attitudes and Migration.” *Review of Economics and Statistics* 92(3):684–89.

Jalan, Jyotsna, and Martin Ravallion. 1999. “Are the Poor Less Well Insured? Evidence on Vulnerability to Income Risk in Rural China.” *Journal of Development Economics* 58(1):61–81.

Kinnan, Cynthia, Shing-Yi Wang, and Yongxiang Wang. 2018. “Access to Migration for Rural Households.” *American Economic Journal: Applied Economics* 10(4):79–119.

Kong, Sherry Tao, Xin Meng and Dandan Zhang. 2009. “Impact of Economic Slowdown on Migrant Workers.” In *China’s New Place in a World in Crisis: Economic, Geopolitical and Environmental Dimensions*, ed. R. Garnaut, Ligang Song and Wing Thye Woo, 233–60. Canberra and Washington, DC: ANU E. Press and Brookings Institution Press.

Levine, R., and Yona Rubinstein. 2017. “Smart and Illicit: Who Becomes an Entrepreneur and Do They Earn More?” *Quarterly Journal of Economics* 132(2):963–1018.

Mazzocco, Maurizio. 2004. “Savings, Risk Sharing and Preferences for Risk.” *American Economic Review* 94(4):1169–82.

McKenzie, David, and Hillel Rapoport. 2010. “Self-Selection Patterns in Mexico–U.S. Migration: The Role of Migration Networks.” *Review of Economics and Statistics* 92(4):811–21.

Meng, Xin. 2012. “Labor Market Outcomes and Reforms in China.” *Journal of Economic Perspectives* 26(4):75–102.

Meng, Xin, and Chris Manning. 2010. “The Great Migration in China and Indonesia—Trend and Institutions.” In *The Great Migration: Rural–Urban Migration in China and Indonesia*, ed. X. Meng and C. Manning, with S. Li, and T. Effendi, 1–20. Cheltenham, UK: Edward Elgar Publishing.

Meng, Xin, Sen Xue, and Jinjun Xue. 2016. “Consumption and Savings of Migrant Households: 2008–2014.” In *China’s New Sources of Economic Growth*, ed. Ligang Song, Ross Garnaut, Cai Fang, and Lauren Johnston, 159–95. Canberra, Australia: ANU Press, the Australian National University.

Meng, Xin, and Junsen Zhang. 2001. “The Two-Tier Labor Market in Urban China: Occupational Segregation and Wage Differentials between Urban Residents and Rural Migrants in Shanghai.” *Journal of Comparative Economics* 29(3):485–504.

Morten, Melanie. 2019. “Temporary Migration and Endogenous Risk Sharing in Village India.” *Journal of Political Economy* 127(1):1–46.

Munshi, Kaivan, and Mark Rosenzweig. 2016. “Networks and Misallocation: Insurance, Migration, and the Rural–Urban Wage Gap.” *American Economic Review* 106(1):46–98.

Rosenzweig, Mark R., and Oded Stark. 1989. “Consumption Smoothing, Migration, and Marriage: Evidence from Rural India.” *Journal of Political Economy* 97(4):905–26.

Rozelle, Scott, J. Edward Taylor, and Alan deBrauw. 1999. “Migration, Remittances, and Agricultural Productivity in China.” *American Economic Review* 89(2):287–91.

Schildberg-Hörisch, Hannah. 2018. “Are Risk Preferences Stable?” *Journal of Economic Perspectives* 32(2):135–54.

Stark, Oded, and David Levhari. 1982. “On Migration and Risk in LDCs.” *Economic Development and Cultural Change* 31(1):191–96.

Taylor, J. Edward, Scott Rozelle, and Alan de Brauw. 2003. “Migration and Incomes in Source Communities: A New Economics of Migration Perspective from China.” *Economic Development and Cultural Change* 52(1):75–101

Wooldridge Jeffrey, M. 2010. *Econometric Analysis of Cross Section and Panel Data*. 2nd edition. Cambridge, MA: MIT Press.

Yang, Dean. 2008. “International Migration, Remittances and Household Investment: Evidence from Philippine Migrants’ Exchange Rate Shocks.” *Economic Journal* 118(528):591–630.

Yang, Dean, and HwaJung Choi. 2007. “Are Remittances Insurance? Evidence from Rainfall Shocks in the Philippines.” *World Bank Economic Review* 21(2):219–48.

Zhang, Junsen. 2017. “The Evolution of China’s One-Child Policy and Its Effects on Family Outcomes.” *Journal of Economic Perspectives* 31(1):141–60.

Zhao, Jiaying, Edward Jow-Ching Tu, Christine McMurray and Adrian Sleigh. 2012. “Rising Mortality from Injury in Urban China: Demographic Burden, Underlying Causes and Policy Implications.” *Bulletin of the World Health Organization* 90:461–67.