

# **Risk Attitudes and Migration \***

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## **Abstract**

To contribute to a scarce literature, in particular for developing and emerging economies, we study the nature of measured risk attitudes and their consequences for migration. We also investigate whether substantial changes in the risk environment influences risk tolerance. Using the 2009 RUMiC data for China, we find that rural-urban migrants and their family members are substantially less risk-averse than stayers. We further provide suggestive evidence that individual risk attitudes are unaffected by substantial changes in the environment and that risk tolerance is correlated across generations.

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## 1. Introduction

There is little doubt that economic migration contributes to “grease for the wheel of the labor market” (Borjas, 2001), implying that it plays a pivotal role in reallocating labor resources across countries and regions with, generally, improvements in productivity. There is also little doubt that understanding why individuals decide to migrate helps the design of effective migration and labor market policies, especially where migration is a new phenomenon.

Typically economists frame the decision to migrate as a comparison of uncertain costs and benefits of moving. Indeed, migration is a risky endeavor. Migrants have less information about opportunities and conditions in the destination labor market as well as opportunities to consume and use leisure time relative to the natives. Even after migrating they continue to face uncertainty not shared by locals, such as anti-immigration sentiments and discrimination from the native population, the possibility of being deported if migration is undocumented, or be unable to help family left behind at some critical times (e.g. sudden death of a family member). Given the additional uncertainty involved, and assuming rationality, one would expect migrants to be highly tolerant of risk for a given expected gain.

To date, there is only limited empirical evidence verifying this hypothesis, and such evidence is gathered from either laboratory experiments or data predominantly collected in high income countries with established institutions (Bonin et al., 2009 and 2012; Jaeger et al., 2010; Dohmen et al., 2011 and 2012; Williams and Baláž, 2014). Evidence from countries undergoing rapid economic and social transformations is minimal (Gibson and McKenzie, 2009; Hao et al., 2014; Dohmen et al., 2015). Yet it is precisely from economies in transitions that new insights on the link between risk and migration can emerge, as in such places people experience at once a wider set of choices about where to work and live and profound changes in the risk environment in which they take decisions. This paper focuses on the largest economy in transition, China, to study whether more risk-tolerant individuals in rural areas are more likely to migrate.

China is unique in that it has experienced the largest volume of internal migration (Zhao, 2005) but it operates an inflexible residence status system (“hukou”), which defines where individuals have rights to access local public goods. Residence was effectively fixed in the late 1950s and changes were permitted only in limited circumstances. Although one may not be able to change his or her residence status, internal migration in China is unrestricted. An individual with residence in A can move to B within the same or another province, but at the cost of losing access to local public goods at subsidized prices. This means that migrants have no access to

subsidized housing, healthcare, unemployment insurance or pension in the cities where they moved to. Perhaps more critical in today's China is that children often cannot acquire a place in school close to where their migrant parent(s) live; hence migrants' children may have to remain in the hometown, where left-behind family members look after them.

Given the restrictions imposed by the hukou system, are rural-urban migrants less risk-averse than stayers? Do they migrate as a result of their tolerance for risk or does migrating change their level of risk-aversion? Does a person's risk tolerance reflect that of his or her parents', and does it influence his/her migration decision? We are able to advance on these questions by using the 2009 rural sample of the Survey on Rural Urban Migration in China (RUMiC; see Akgüç et al., 2014a). This dataset has rich information about demographic, socio-economic and psychological characteristics of household members, including questions on risk aversion. We find that an individual's risk tolerance positively contributes to the decision to migrate. We also find suggestive evidence that causality runs from risk tolerance to migration, that risk tolerance correlates across generations but that parental risk tolerance does not affect an individual's probability to migrate.

The remainder of the paper is organized as follows: Section 2 provides a short summary of the literature on risk and migration. Section 3 describes the data and Section 4 discusses the methodology. Section 5 presents the results. Section 6 discusses additional results. Section 7 concludes.

## **2. Literature**

The traditional economic approach to migration is to view it as the result of an individual optimization decision comparing the present value of its benefits and costs (Sjaastad, 1962). Early models do not consider individual differences in risk tolerance, and introduce uncertainty as a disturbance affecting everyone in the same way. Perhaps the best-known example is when finding employment is subject to a probability (Todaro, 1969; Harris and Todaro, 1970), which leads would-be migrants to compare expected rather than certain benefits and costs of migration, and self-select into moving or staying (Borjas, 1987) or deciding for how long to migrate (Dustmann, 1997).

Lack of empirical support that rural-urban migration occurs as a result of differences in expected incomes resulted in the formulation of new hypotheses about risk and migration,

though still within the theoretical underpinning of expected utility maximization and no individual heterogeneity in risk aversion. Work in this literature has put forward the idea that risk tolerance amongst migrants may differ ‘structurally’ from that of natives. This could occur because migrants may simply be more risk-loving than natives (Sahota 1968). Bonin et al. (2009) found the reverse suggesting that selectivity issues and general ethnic differences in risk attitudes may be possible at work: if the receiving country is a welfare state, it may receive more of the risk-averse migrants. Or the more risk-loving migrants may move onward or return home. An alternative explanation could be that the attracted migrants are from source countries with more risk averse populations. A key question is then whether migrants are more or less risk tolerant than the populations they come from.

Alternatively, the decisions of migrants may be affected by bounded rationality, which limits their ability to undertake several decisions at once, especially when information is incomplete (Simon 1983). Migration may also occur when individuals trade-off risk inter-temporally, preferring immediate higher risks for subsequent lower risks, or when capital markets are imperfect (Katz and Stark 1986; Stark, 1981). Migration can also arise as the result of a household’s, rather than an individual’s, optimization to diversify earning risk amongst its members (Stark and Levhari 1982; Rosenzweig, 1988; Stark and Lucas, 1988; Rosenzweig and Stark, 1989; Jalan and Ravallion, 2001; Chen et al., 2003).

The idea that individuals differ in risk tolerance is at the core of the theory of choice under uncertainty and the development of operational measures of risk aversion (Arrow, 1965; Pratt, 1964). The underlying hypothesis is that the attitude an individual has towards risk determines relevant outcomes in a variety of contexts like career decisions or the choice of a portfolio of risky investments. There is some evidence supporting that risk aversion is individual-specific (Williams and Baláž, 2014; Guiso and Paiella, 2006). Models developed outside the expected utility theory also support this hypothesis and provide additional evidence (Czaika, 2012).

Notwithstanding the literature viewing migration as a risky decision, empirical evidence of the relationship between the migration decision and the migrating individual’s risk tolerance is scarce, especially in the case of economies in transition (Heitmuller, 2005; Conroy, 2009; Gibson and McKenzie, 2009; Hao et al., 2014). Jaeger et al. (2010) find that risk tolerance and migration in Germany are positively related. More risk-loving individuals are more likely to migrate after controlling for conventional migration determinants such as age, family background, and geographical measures. They argue that, at least for the German internal migration case, “general uncertainty about other locations is an important channel through which risk attitudes determine intra-German geographic mobility and that the average mover is

relatively more willing to take risks.” Using the same German survey data, but focusing on international migrants in Germany, Bonin et al. (2009) find that first generation immigrants are more risk averse than their native counterparts, while second-generation immigrants exhibit higher risk preferences similar to natives. Bonin et al. (2012) find that in this adjustment process ethnic persistence preserves the immigrant-native gap in risk proclivity, while assimilation closes it.

We extend the migration and risk tolerance analysis to the most important economy in transition, China, using survey data (Hao et al, 2014, use experimental data)<sup>1</sup>. In particular we study the effect of risk tolerance and other determinants on the probability to migrate paying particular attention to the direction of causality. As part of the analysis carried out, we also document whether migrants come from more risk-loving families.

### **3. Data**

Our analysis is based on data extracted from the Rural Household Survey, or RHS, of the RUMiC database (Akgüç et al., 2014a), as it contains information on both stayers and migrants. Although the RHS public file has to date published data covering 2008 and 2009, we use only the 2009 cross-sectional information as no question on risk attitude was asked in 2008. The RHS covers 51,136 individuals from around 8,000 households in rural areas. It provides comprehensive and rich information on household and personal characteristics. To identify a migrant, we restrict our focus to rural hukou holders and use the responses to whether or not the individual surveyed has ever migrated for work in the past. The identifying answer for having done so includes respondents who migrated from their rural villages to take up employment of various durations. We do not differentiate between those migrating for shorter or longer periods of time, as the majority of internal migration in China is temporary.

The subjective measure of risk comes from a general risk attitude question, which asks all household members aged 16 and above who are present at the interview:

*“Generally, some people prefer to take risk, and others try to avoid any risk. If it is to rank the risk from low to high as 0 to 10 (as shown by the following chart), 0 is “never*

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<sup>1</sup> Dustmann et al. (2015) also study the link between risk tolerance and migration in China. Although this study is not yet available in the public domain, the analysis focuses on the link between an individual’s probability of migrating of the distribution of risk tolerance amongst family members. We became aware of this paper after a hardcopy was available at the 17th IZA/CEPR European Summer Symposium in Labor Economics on September 9, 2015.

*take risk,” 10 is “like to take risk,” which level do you belong to? (choose a number from 0 to 10).”*

This question closely follows the risk attitude measure provided by the German Socio-economic Panel (GSOEP), and used among others such as Bonin et al. (2009) and Jaeger et al. (2010). The Ukrainian Longitudinal Migrant Survey has made a comparable variable available (see Lehmann et al., 2012), which Dohmen et al. (2015) have studied. This measure has been proven to serve as a good measure of general risk tolerance (Dohmen et al, 2011; Jaeger et al., 2010; Frijters, et al. 2011). For example, Dohmen et al (2011, 2012) find that simply asking people for a general self-assessment of their willingness to take risks in fact generates a useful all-around measure of risk tolerance. When facing uncertainty, this measure captures a more comprehensive concept of an individual’s risk attitude compared to strict measures of risk tolerance towards a particular action or scenario. Therefore this self-reported information is viewed as more relevant when looking at broad decisions such as migration, as migration triggers multiple dimensions of uncertainty.

Table 1 summarizes the main variables used in the analysis. Among the 5,475 rural households in our final sample, about 69% have sent migrants out of village to work. The sample contains 8,638 individuals from rural households (1,670 movers and 6,968 stayers), among which 19% had migrated for work sometime before the survey was conducted. Relative to rural stayers, on average migrant workers are younger (43 vs. 51 years of age) and more likely to be male (71% vs. 51%). Migrant workers are more likely to have completed junior middle school relative to comparable stayers (76% vs. 64%). They are also more likely to be the household head (57% vs. 49%). The migrant household head’s spouse is less likely to have ever migrated for work (19% vs. 42%). With respect to risk tolerance, the unconditional mean of the self-assessed risk level is significantly higher among migrants (3.19 out of 10) than stayers (2.33) - this is a whopping difference of about 37%.

#### **4. Empirical strategy**

To analyze the relationship between risk tolerance and migration, we estimate a micro-econometric model of the decision to migrate augmented by the variable measuring risk tolerance. This approach follows Jaeger et al. (2010) and relies on the finding that risk tolerance is a stable trait, as found by Dohmen et al. (2012 and 2015). In particular, we estimate the probit specification:

$$\Pr(M_i = 1) = \Phi(\alpha_0 + Z_1\alpha_1 + Z_2\alpha_2 + \alpha_3 * Risk_i) \quad (1)$$

where  $M$  represents the decision to migrate (a dummy variable);  $\Phi$  is the cumulative probability distribution function of the standard normal,  $Z_1$  is a vector of individual characteristics that includes age, age squared, marital status, gender, educational level, weight, and height;  $Z_2$  is a vector of household characteristics, which includes the number of children, number of siblings, the average age in the household, its size, the average land size owned by the household at the time of the survey, and the household income level. The parameter of interest in equation (1) is  $\alpha_3$  since that captures the effect of risk tolerance on the migration decision. We estimate model (1) for the household head and repeat the same analysis for spouses in order to document this relationship within the household.

We then consider the possibility that the migration decision may affect self-assessed risk tolerance. Unfortunately we cannot apply the technique suggested by Jaeger et al. (2010) consisting in regressing the change in risk tolerance between two different points in time on a dummy variable that equals one if the individual migrated during the period because we only have cross-sectional data. While no instrumental variable is present, the literature suggests that this possibility is unlikely as risk preferences are stable over time (Dohmen et al, 2011 and 2012). To corroborate this argument, in the second part of the paper, we also show that in China risk preferences do not seem to react to changes in risk environment, hence suggesting that the key relationship studied is not driven by reverse causality. In particular, we exploit unique information contained in the RUMiC about an exogenous shock (a change in hukou status due to expropriation) to verify the stability of self-assessed risk tolerance. Gaining urban hukou status in any Chinese city  $j$  grants access to that city's range of social benefits and services, and to a more uniform labor market with no barriers to enter secure jobs in state-owned enterprises. We claim that expropriation with hukou change can be seen as a positive exogenous shock to the risk environment, as China's residence status does not allow locational choice: people had no choice but to reside where they were originally registered in the late 1950s (whilst expropriations with changes in hukou recorded by RUMiC occur much later).

The empirical strategy used to verify the stability of self-assessed risk is based on the linear regression model:

$$Risk_i = \beta_0 + X_i\beta_1 + \beta_2 E_i + \beta_3 P_i + \varepsilon_i \quad (2)$$

where the dependent variable is individual  $i$ 's subjective risk tolerance level and  $X$  includes demographic and family background characteristics.  $E$  is a dummy variable equal to 1 if the

individual has changed hukou due to expropriation<sup>2</sup> whereas  $P_i$  is a vector of provincial fixed effects and  $\varepsilon$  is an error term. The coefficient of interest in equation (2) is  $\beta_2$ , which is the estimated effect of a large shock following a hukou change on risk tolerance. Estimates are performed by OLS using robust standard errors.

Finally, following Dohmen et al. (2012), Bonin et al. (2009), Brown et al. (2015) amongst others, we examine a possible mechanism determining risk preference, and explore whether there is a link between a parent's risk tolerance and the children's. To do so we restrict the sample to cases where both parent and child are present at the time of the survey, reducing substantially the number of observations. We perform the regression:

$$ChldRisk_i = \gamma_0 + H_i\gamma_1 + \gamma_2 * ParRisk_i + \gamma_3 P_i + \eta_i \quad (3)$$

where  $H_i$  is a vector of personal characteristics that includes age, age squared, education, number of children, marital status, number of siblings, height, and weight, whereas  $P_i$  is a vector of provincial fixed effects. Finally, we re-apply model (1) to the reduced sub-set of observations to explore whether parental risk tolerance affects a child's decision to migrate.

## 5. Results

Existing work has established some of the main determinants of risk aversion, purporting that risk tolerance is a stable trait that is inherited rather than a momentary behavior. For instance, through an experimentally validated survey in Germany, Dohmen et al. (2011 and 2012) show that one's willingness to take risk is a function of gender, age, height, and parental background. In particular, Dohmen et al. (2012) find that risk attitudes are fairly stable across different contexts, implying that the individuals tend to display stable risk tolerance even when the risk landscape in which they live changes dramatically, as is in the case of migration. Evidence of positive assortative mating regarding risk attitudes also exists, as well as evidence that risk tolerance is transmitted intergenerationally from parents to children (Bonin et al, 2009; Dohmen et al., 2012).

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<sup>2</sup> The RUMiC includes a question asking whether a respondent's hukou has changed and if so why. Most expropriated households with hukou change (85%) are drawn from the urban sample, which covers medium- and large-sized cities. The remaining observations are sourced from the rural sample, which covers rural areas as well as small-sized urban centers.

We estimate the effect of self-assessed risk tolerance on the probability to migrate on RUMiC's rural sample data using equation (1) with robust standard errors and province fixed effects. The marginal effects are reported in Table 2. The first row shows that risk tolerance positively affects the decision to migrate, in line with Jaeger et al. (2010), Bonin et al. (2009), Gibson and McKenzie (2009), Hao et al. (2014), Williams and Baláž (2014). This result holds for the household as a whole (everyone at home) as well as for household heads and their spouses analyzed separately.<sup>3</sup> The effect is always statistically significantly different from zero at the 1% level of significance. Its magnitude is in the order of 1% for the household head and 0.5% for the spouse, which is about as large as that of age or education, though opposite in sign. The last column analyzes the effect for other members of the household, which has received a larger size but only a smaller significance level (5%) probably because of the much smaller sample size. Although driven only by a few variables, McFadden's Pseudo  $R^2$  suggests quite a good fit according to the standards expected (Veall and Zimmermann, 1992).

Besides risk tolerance, the main migration predictor is gender (male). This is in line with Hao et al (2014) and the literature cited in Williams and Baláž (2014), but contrasts with Jaeger et al (2010), in which gender had no statistically significant effect on migration. This difference is not easily explained, though it may reflect the different nature of migration captured in this study (temporary migration, predominantly carried out by males) and in theirs (permanent migration, mostly for work or family reasons). Having siblings has a positive effect on the probability to migrate, especially on the spouse's probability to migrate, since in China siblings commonly take care of the family/household when an individual migrates. Indeed, when model (1) is run separately on sub-groups of observations arranged according to the number of siblings (0, 1, more than 1), the self-assessed risk measure makes no contribution to the probability to migrate in the case of no siblings while it is positive and statistically significant as the number of siblings grows.

Perhaps more surprising in Table 2 is the extent of characteristics that do not seem to matter in the decision to migrate (this also arises in the incremental regressions reported in Table A2), including physical, demographic, and employment characteristics. With reference to demographics, age does not emerge as a key migration determinant and neither does marital status, unlike in Jaeger et al. (2010), or the number of children. We also do not find any effect from height and weight, against existing evidence that these features matter for labor market

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<sup>3</sup> The coefficient in model (1) performed on children aged 16 and above is positive and significant when monthly income (not statistically significant) is omitted from the analysis. When included, the marginal effect of risk tolerance on the migration decision is positive but no longer significant due to the severe reduction in the number of observations where children report their monthly income and the likely presence of high measurement error.

outcomes, as they are often considered as signals of good health and productivity (Case and Paxons, 2008). The different results emerged from our analysis perhaps reflect that the decision to migrate that we captured using the RHS includes individuals who do so only temporarily on a seasonal or ad hoc basis, and possibly to not too distant places, while most other studies focus on permanent or long-term migration (Jaeger et al., 2010; Gibson and McKenzie, 2009).

Education beyond mandatory schooling appears to reduce the probability of migration for the household head, though the estimate is statistically no different from zero. The negative sign is possibly a reflection of job sorting in China's rural villages where higher education is likely to be uncommon within the local population and thus a fundamental quality to secure positions of responsibility in the community's administration. In contrast, the coefficient for education at junior high school is statistically significant but only in the regression performed on the household as a whole. This result supports that the decision to migrate occurs in a household context rather than just the household head and spouse. It also highlights that migrants are likely to possess more than basic literacy levels, as was also found in Jaeger et al. (2010). The estimate for land tenure holding has the expected negative sign but it is statistically not different from zero, while that of income has a positive sign, supporting that migration is not an activity restricted to the poorest social groups.

## **6. Additional evidence**

Thus far we have highlighted the main determinants of the probability to migrate, as well as the positive contribution to it attributable to the migrant's tolerance for risk. To exclude the possibility that there is reverse causality between migration and risk tolerance, whereby migrating triggers a change in risk preferences, we investigate risk tolerance stability when there is a significant shock to an individual's risk environment. The idea behind this part of the analysis is that the migration decision is unlikely to influence a stable risk tolerance measure, thus keeping intact the causal interpretation of the results discussed so far. Our evidence is based on model (2) and exploits a unique quasi-natural experiment that has occurred in China: the change of hukou status from rural to urban hukou due to land expropriation (for details see Akgüç et al., 2014b).

The hukou system was introduced in 1958 as a measure to foster the Big Push industrialization strategy of the regime at that time. To quickly accumulate capital in the newly nationalized manufacturing sector, which was mostly located in cities, the government collectivized the rural population as well as directed the food and raw materials production. It then elected to become

the sole and mandatory buyer and seller of rural produce in order to set the prices at which agricultural inputs were sold. The regime also registered each person as rural or urban in 1955; therefore implementing the hukou system three years later, it has prevented rural hukou holders to become urban hukou holders without the prior approval of the destination. These measures capped the annual quota of conversions to about 0.15%-0.2% of the non-agricultural population (Chan, 2009).

Although economic reforms post-1978 have enabled people to relocate from rural to urban areas, the hukou system still prevents a rural hukou holder living in an urban center to enjoy the same rights, privileges, and prices as their urban counterparts. Expropriated farmers compensated with rural-urban hukou status change can then access public welfare rights that include, for example, better healthcare facilities and pension rights as well as access to local schools for their children. Since the Chinese population is classified as rural or urban on the basis of residence in 1958, this particular form of expropriation can be viewed as exogenous.

Table 3 shows the unconditional means of risk attitudes by expropriation group. These data are extracted from the 2009 cross-sections of RUMiC's urban, migrant, and rural household surveys. For the RHS this is the same sample previously examined, but restricted to observations containing wage data. In general, migrants who chose to move have a higher risk tolerance than expropriated individuals gaining urban hukou rights who "move" involuntarily as a result of an administrative decision. The data suggest that the majority of expropriated households received their urban hukou in the early 2000s, specifically 2003 and 2004. As the survey question about subjective risk attitudes was asked in 2009, we only capture the subjective risk level after the treated individuals had been exposed to the "quasi-experiment." To compensate for the lack of a natural counterfactual, we obtain alternative reference groups. Each of these takes the value of zero in the dummy variable  $E$  appearing in model (2). These five reference groups differ in changing and non-changing their residence or hukou status, or both. We hence measure the risk tolerance of a change in hukou status following expropriation relative to (i) non-changers of both hukou and residence (urbanites and rural stayers), (ii) changers of both hukou and residence (those obtaining an urban hukou because of their skills), and (iii) hukou non-changers but residence changers (migrants from the same or another province). We then perform separate regressions of model (2) on household heads and their spouses using each of the five reference groups.

Table 4 summarizes the estimates of the several  $\beta_2$  obtained from performing separate OLS regressions on household heads and spouses. The coefficients obtained on demographic and

labor market controls as well as the provincial fixed effects are not reported, but their signs and significance support the results in the literature. Namely, risk tolerance is higher for males and married household heads, and increases with income. Education positively affects risk tolerance but only when the expropriated are compared to native urban hukou holders, while it is statistically not significant in every other case. Risk tolerance is not affected by age in any of the regressions performed, suggesting a stable nature of risk tolerance over the life-cycle.

As evidenced in the table, the estimates of  $\beta_2$  are not statistically different from zero, with only one exception<sup>4</sup>. Similar results arise when the regression is performed on other household members (not reported), albeit on a much reduced number of observations. Given that obtaining the rights to access a city welfare system appears to be a sufficiently large shock to trigger a change in risk tolerance, the lack of an effect for household heads and their spouses across the five reference groups supports the robustness of risk tolerance as a stable measure and its role in determining migration decisions rather than vice-versa. This interpretation complements what has been found in laboratory experiments (Dohmen et al., 2011) and in the field, including in transition economies (Dohmen et al., 2015).

As a final piece of suggestive evidence, we explore whether the link between risk tolerance and migration arises systematically within the household. In other words, we look at whether individuals deciding to migrate not only have a higher tolerance for risk but also if they come from families with an above-average risk tolerance level (shown in Table 5). To do so we first apply model (3), which links the household head's risk tolerance to that of his or her parents, and, separately, that of his or her children. We then relate the probability to migrate to parental risk tolerance.

This analysis is to be considered purely explorative, as it is performed on a much smaller number of observations relative to previous analyses, reflecting that subjective questions are asked only when both parents and children are present at the interview. There seems to be no systematic variation between the means of the observed variables for households where intergenerational information on subjective risk tolerance is available vis-à-vis those missing that information (Table A1 in the Appendix). Key observable variables covering demographic, family, human capital and labor market characteristics are similar between households with and without complete information on risk tolerance. Detectable differences only emerge with

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<sup>4</sup> The only exception is the case of highly skilled migrant household heads, where the effect of expropriation is negative and statistically significant. Nonetheless this result illustrates the high risk tolerance of individuals choosing to migrate to a city to acquire tertiary education and subsequently obtaining a job there by virtue of their newly acquired skills. This group has the highest average risk tolerance, as evidenced in Table 3.

reference to the regional composition of the place of residence, and especially for the cases of Henan, Chongqing, and Sichuan, for which unfortunately we cannot provide an explanation.

The results reported in Table 6 suggest that parental risk tolerance positively and strongly affects that of children's. There is hence evidence of intergenerational transmission of risk preferences, as supported in the literature. Children appear to acquire their tolerance for risk from both parents, though slightly more so from their fathers, which aligns with evidence presented amongst others by Dohmen et al. (2012), Bonin et al. (2009), Brown and van del Pol (2015), and Kimball et al. (2009). However, as shown in Table 7, children's decision to migrate does not seem affected by their parents' risk tolerance.

## **7. Conclusions**

The origins and consequences of risk attitudes are understudied, in particular in transition and emerging economies. Therefore, this paper investigates an important field using the 2009 RUMiC cross-sectional data for China.

We find strong support that risk proclivity and migration are positively related. This finding aligns with those obtained in more economically developed countries. We also find that rural stayers are substantially more risk-averse than migrants and migrants' family members. Our analysis supports that risk tolerance is correlated within families across generations, though parents do not appear to influence the migration decision of their children.

It is often argued that families in rural areas may use out-migration of certain family members to alleviate the effect of unsteady income. In the context of rural-urban Chinese migration, the urban-rural income gap is so high that risk attitude may not serve as a channel to deal with income shocks in rural areas, as had been assumed in early models of income uncertainty and migration.<sup>5</sup> This is especially true given that migrant workers often face very low unemployment rates in Chinese cities thanks to their job searching through networks and the huge demand for low-skilled labor in the country's urban labor markets. Against the hypothesis of migration as a reaction to mitigate a negative income shock, we find that people with higher

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<sup>5</sup> According to Sicular et al. (2007), the urban-rural income ratio was 2.38 in 2002 and tended to increase after adjusting for living cost. Meng et al. (2010) also show that earning gaps are quite high between rural and urban labor markets in China.

risk tolerance may embrace migration to take advantage of opportunities and higher expected wages available in the urban labor markets following China's rapid economic development.

**Table 1 - Characteristics of individuals in rural estimation sample**

<b>Variable name</b>	<b>Mover</b>		<b>Stayer</b>	
	<i>Mean</i>	<i>St.Dev</i>	<i>Mean</i>	<i>St.Dev</i>
Risk level	3.19	2.45	2.33	2.23
Male	0.71	0.45	0.51	0.50
Age	42.65	9.98	50.86	10.69
Age <sup>2</sup> /100	19.19	8.85	27.01	11.22
Elementary or no school	0.24	0.43	0.36	0.38
Junior middle school	0.58	0.49	0.47	0.50
Senior middle or above	0.18	0.38	0.17	0.38
No. of children	1.74	0.92	2.18	1.07
Married	0.98	0.15	0.96	0.21
Height (in cm)	165.68	6.65	163.94	6.80
Weight (in kg)	62.21	8.44	60.25	8.44
No. of siblings	3.27	2.19	3.36	1.86
Household head	0.57	0.50	0.49	0.50
Spouse of the household head	0.19	0.39	0.42	0.49
Family size	4.33	1.29	4.29	1.39
Household land (in Mu)	4.21	4.20	4.29	4.78
Household age	35.90	8.18	38.49	9.27
Household income	1.76	1.68	1.81	2.03

Notes: Movers (N = 1,670) are rural household members who migrated for work at least once before 2008.

Stayers (N = 6,968) are rural household members who never migrated for work before 2008. Data are cross-section extractions for the year 2009 obtained from the Rural household RUMiC sample. Mu is the Chinese measurement of land: 1 Hectare (10,000 square meters) = 15 Mu. The measure of risk level varies between zero (never take risk) and 10 (like to take risk).

Source: 2009 Rural Household Survey of RUMiC.

**Table 2 - Risk and migration (marginal effects)**

<b>Decision to move</b>	<b>Everyone at home</b>	<b>Household head</b>	<b>Spouse</b>	<b>Other members</b>
Risk level	0.009*** (0.002)	0.009*** (0.003)	0.005*** (0.002)	0.019** (.008)
Male	0.153*** (0.009)	0.127*** (0.019)	0.158*** (0.044)	0.152*** (0.039)
Age	-0.013*** (0.003)	-0.002 (0.007)	-0.008 (0.005)	0.002 (0.013)
Age <sup>2</sup> /100	0.001 (0.003)	-0.009 (0.006)	0.000 (0.006)	-0.020 (0.144)
Junior middle school	0.017** (0.010)	0.009 (0.015)	0.009 (0.010)	-0.005 (0.053)
Senior middle school	-0.018 (0.013)	-0.0234 (0.019)	0.020 (0.018)	-0.148*** (0.-52)
No. of children	-0.009 (0.006)	-0.010 (0.008)	-0.004 (0.007)	-0.032 (0.026)
Marital status	0.015 (0.025)	0.032 (0.035)	Omitted	0.076 (0.075)
Household size	0.009** (0.004)	-0.001 (0.006)	0.000 (0.004)	0.000 (.020)
Land size	0.000 (0.001)	-0.001 (0.002)	0.001 (0.001)	-0.002 (.005)
No. siblings	0.006*** (0.002)	0.005 (0.003)	0.005** (0.002)	0.033** (.015)
Height (in cm)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	-0.003 (0.003)
Weight (in kg)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.008*** (0.003)
Household mean age	0.003*** (0.001)	0.000 (0.001)	0.002** (0.001)	0.004 (0.003)
Household income	0.001 (0.003)	0.002 (0.003)	-0.001 (0.003)	-0.003 (0.010)
Province fixed effects	YES	YES	YES	YES
Observations	8,638	4,344	3,273	1,021
McFadden's Pseudo R <sup>2</sup>	0.178	0.097	0.116	0.362

Notes: This table documents marginal effects from a probit model of migration decisions. Education level is categorized into three groups: elementary and lower (6 years of school and below); junior middle school (9 years of school); senior middle school and higher (at least 12 years of school). The reference educational group is elementary and lower. The obligatory/subsidized educational level imposed by the Chinese government is junior middle school. Household income is the highest level of monthly income among all household members, in thousands of Yuan in 2009. The estimated standard errors are robust, and \*\*\*, \*\*, and \*, respectively, refer to significance at the 1%, 5% and 10% level (two-sided test). The inclusion of the marital status variable results in 15 observations perfectly predicting non-migration and being omitted. As most spouses are married, we decided to omit this control and keep the working sample of 8,638 observations. Veall and Zimmermann (1992) discuss Pseudo-R<sup>2</sup> measures for probit models.

Source: 2009 Rural Household Survey of RUMiC.

**Table 3 - Risk level**

	Mean	St.Dev	N
<b>Expropriated</b>	2.80	2.35	296
<b>Non-expropriated movers</b>			
Changers of both hukou and residence	3.73	2.40	216
Changers of residence but not hukou (near)	3.70	2.55	449
Changers of residence but not hukou (far)	3.60	2.62	1,769
<b>Non-expropriated stayers</b>			
Urban non-changers of either hukou or residence	2.84	2.45	2,677
Rural non-changers of either hukou or residence	2.63	2.36	2,070

Note: Data refer to the year 2009.

Source: Data are extracted from the Urban (Urban stayers and Highly skilled), Migrant (Migrants from close by and Migrants from far away), and Rural (Rural stayers) Household Surveys of RUMiC. The number of observations is the sum of observations covering household heads and their spouses only. Regressions based on equation (2) use the sum of the expropriated category from the above table and one of the five relevant subgroups identified. The rural stayers subgroup is restricted to those who answered that they did not migrate in the previous year. The unrestricted subgroup has 3032 observations with a mean risk level of 2.76 and a standard deviation of 2.39.

**Table 4 - Expropriation and risk level**

Dependent variable		
Risk level	Household head	Spouse
<b>Expropriated and non-expropriated movers</b>		
(a) Changers of both hukou and residence	-1.25*** (.41)	-.70 (.48)
(b) Changers of residence but not hukou (near)	-.10 (.32)	-.21 (.38)
(c) Changers of residence but not hukou (far)	-.28 (.23)	-.31 (.33)
<b>Expropriated and non-expropriated stayers</b>		
(d) Urban non-changers of either hukou or residence	-.04 (.22)	.01 (.25)
(e) Rural non-changers of either hukou or residence	-.02 (.30)	.02 (.27)

Notes: Data refer to the year 2009. Each coefficient is derived from separate regressions on each type of expropriated reference group and household member, where the dependent variable is the level of risk tolerance and the explanatory variables include demographic characteristics (gender, age, age squared, the interaction between age and age squared and whether expropriated, whether married, height, weight, and the number of children), human capital and employment characteristics (years of education, monthly income), a dummy variable for the expropriated with change in hukou status, and provincial fixed effects. Robust standard errors are in parentheses. The number of observations in each regression is as follows: Household head: (a): 301; (b): 496; (c): 1611; (d): 1753 (e): 1441. Spouse: (a): 211; (b): 249; (c): 454; (d): 1220; (e): 768. The symbol \*\*\* indicates statistically significantly different from zero at the 1% level (two-sided test).

Source: Data are extracted from the 2009 Urban, Migrant, and Rural Household RUMiC samples.

**Table 5 - Risk level across generations**

	Child migration status		Difference
	Mover	Stayer	
<b>Mean risk level of parents:</b>			
i) child is household head	1.66 (2.03)	1.39 (1.91)	.27
N	61	76	
ii) child is not household head	2.52 (2.09)	2.18 (2.31)	.34*
N	249	119	

Notes: subjective questions in RUMiC are asked only to household members who are present at the interview. The means displayed above refer to such families where members from at least two generations were present at the interview. Standard deviations are given in parentheses. The difference between mover and stayer groups also report the t-statistics of the Kruskal-Wallis test of differences in means. Statistically significant differences at the 1%, 5%, and 10% level are noted with the symbols \*, \*\*, and \*\*\*, respectively.  
Source: 2009 Rural Household Survey of RUMiC.

**Table 6 - Risk level between children and parents**

<b>Dependent variable risk level</b>	<b>Risk level household head</b>	<b>Risk level children</b>
Parental risk level	0.607*** (0.118)	0.446*** (0.080)
Parent spousal risk level		0.336*** (0.085)
Male	0.837 (0.943)	0.967*** (0.331)
Age	0.016 (0.232)	0.271* (0.160)
Age <sup>2</sup>	-0.000 (0.003)	-0.004 (0.002)
Junior middle school and below	-0.254 (0.626)	0.283 (0.437)
Senior middle school and higher	-0.278 (0.799)	0.330 (0.477)
No. of children	-0.244 (0.390)	0.480*** (0.165)
Married	0.331 (0.351)	0.079 (0.132)
Monthly income	0.0004*** (0.0001)	0.000 (0.000)
No. siblings	0.038 (0.165)	-0.183 (0.117)
Height (in cm)	0.004 (0.049)	-0.027 (0.026)
Weight (in kg)	-0.021 (0.025)	-0.007 (0.017)
Observations	137	318
Province	YES	YES
R <sup>2</sup>	0.342	0.459

Notes: Estimates obtained by OLS with robust standard errors (in parentheses) performed on equation (3). Education level is categorized into three groups: elementary and lower (6 years of school and below); junior middle school (9 years of school); senior middle school and higher (at least 12 years of school). The reference educational group is elementary and lower. Note that the obligatory/subsidized educational level imposed by the Chinese government is junior middle school. Monthly income documents average of monthly income for each individual in Yuan in 2009. Age squared is not divided by 100. \*\*\*, and \*, respectively, refer to significance at the 1% and 10% level (two-sided test). Relative to Table 5, information on partner's risk level is missing in 40 observations.

Source: 2009 Rural Household Survey of RUMiC.

**Table 7 - Risk level across generations and migration (marginal effects)**

<b>Dependent variable: probability to migrate</b>	<b>Household head</b>	<b>Children</b>
Own risk level	.013 (.021)	.036** (.015)
Parental risk level	.041 (.028)	
Father risk level		-.009 (.020)
Mother risk level		-.028 (.022)
<b>N</b>	<b>134</b>	<b>312</b>

Notes: This table documents marginal effects from a probit model of migration decisions augmented by parents risk tolerance. Controls include gender, age, age square, marital status, number of children, number of siblings, weight, height, monthly income, education, and provincial fixed effects. The estimated standard errors are robust, and \*\*\*, \*\*, and \*, respectively, refer to significance at the 1%, 5% and 10% level (two-sided test). The model perfectly predicts the outcome in a number of cases, which are automatically dropped (3 in the case of household heads, and 6 in the case of their children).

Source: 2009 Rural Household Survey of RUMiC.

## Appendix

**Table A1 - Means of observed variables in samples with complete and incomplete information on risk level**

	<b>Households with complete information</b>	<b>Households with incomplete information</b>
<b>Demographics</b>		
Male (%)	63.5	68.7
Age	43.75	45.25
Age <sup>2</sup> /100	19.97	21.48
<b>Family characteristics</b>		
No. children	1.44	1.80
Married (%)	94.0	98.0
No. siblings	3.0	3.3
Height (in cm)	165.6	166.0
Weight (in kg)	62.5	62.9
<b>Human capital and labor market</b>		
Years of education	3.1	3.0
Monthly income (Yuan)	1,501.0	1,472.0
<b>Province of residence (%)</b>		
Jiangsu	14.8	16.4
Zhejiang	29.1	23.5
Anhui	4.5	9.9
Henan	1.6	10.0
Hubei	7.8	6.7
Guangdong	7.4	10.4
Chongqing	1.6	2.2
Sichuan	32.0	16.7

Source: Authors' own calculations based on 2009 Rural Household Survey of RUMiC.

**Table A2 - Risk and migration of household head (marginal effects)**

<b>Decision to move</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>
Risk level	0.018*** (0.002)	0.011*** (0.003)	0.011*** (0.03)	0.011*** (0.003)	0.009*** (0.003)
Male		0.121*** (0.019)	0.124*** (0.020)	0.123*** (0.020)	0.127*** (0.019)
Age		-0.004 (0.006)	-0.004 (0.006)	-0.004 (0.006)	-0.002 (0.007)
Age <sup>2</sup> /100		-0.000 (0.000)	-0.000 (0.000)	-0.006 (0.006)	-0.009 (0.006)
Junior middle school		0.004 (0.015)	0.005 (0.015)	0.006 (0.015)	0.009 (0.015)
Senior middle school		-0.031* (0.018)	-0.030* (0.018)	-0.029 (0.018)	-0.0234 (0.019)
No. of children			-0.011 (0.007)	-0.012* (0.007)	-0.010 (0.008)
Marital status			0.021 (0.035)	0.024 (0.033)	0.032 (0.035)
Household size				-0.000 (0.006)	-0.001 (0.006)
Land size				0.000 (0.001)	-0.001 (0.002)
No. siblings			0.002 (0.003)	0.002 (0.003)	0.005 (0.003)
Height (in cm)			-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)
Weight (in kg)			-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)
Household mean age				-0.000 (0.001)	0.000 (0.001)
Household income				-0.001 (0.003)	0.002 (0.003)
Province FE		NO	NO	NO	YES
Observations: 4,344					
McFadden's Pseudo R <sup>2</sup>	0.0106	0.0775	0.0785	0.0786	0.0970

Notes: This table documents marginal effects from a probit model of migration decisions increasingly adding control terms. Education level is categorized into three groups: elementary and lower (6 years of school and below); junior middle school (9 years of school); senior middle school and higher (at least 12 years of school). The reference educational group is elementary and lower. Note that the obligatory/subsidized educational level imposed by the Chinese government is junior middle school. Household income is the highest level of monthly income among all household members, in thousands of Yuan in 2009. Note that the estimated standard errors are robust, and \*\*\*, \*\*, and \*, respectively, refer to significance at the 1%, 5% and 10% level (two-sided test). Veall and Zimmermann (1992) discuss Pseudo-R<sup>2</sup> measures for probit models. Source: 2009 Rural Household Survey of RUMiC.

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