

**Risk Aversion and the Willingness
to Migrate in 30 Countries**

Peter Huber, Klaus Nowotny

Risk Aversion and the Willingness to Migrate in 30 Countries

Peter Huber, Klaus Nowotny

WIFO Working Papers, No. 569

October 2018

Abstract

We use individual level data covering 30 mostly post-communist and developing countries which account for over a fifth of the worldwide immigrant stock to assess the impact of risk aversion on the willingness to migrate. Consistent with theories of individual level migration decisions, risk aversion has a statistically significant negative impact on both the willingness to migrate within countries as well as abroad. This applies to virtually all countries considered and is robust across various specifications, to alternative measures of risk aversion and to different measures of the willingness to migrate. Differences in the impact of risk aversion on the willingness to migrate are also positively correlated to measures of sending country risks and the missing variable bias of omitting risk aversion from migration regressions is substantial.

E-mail addresses: peter.huber@wifo.ac.at, klaus.nowotny@wifo.ac.at
2018/255/W/0

© 2018 Österreichisches Institut für Wirtschaftsforschung
Medieninhaber (Verleger), Hersteller: Österreichisches Institut für Wirtschaftsforschung • 1030 Wien, Arsenal, Objekt 20 •
Tel. (43 1) 798 26 01-0 • Fax (43 1) 798 93 86 • <http://www.wifo.ac.at/> • Verlags- und Herstellungsort: Wien
Die Working Papers geben nicht notwendigerweise die Meinung des WIFO wieder
Kostenloser Download: <http://www.wifo.ac.at/wwa/pubid/61283>

Risk Aversion and the Willingness to Migrate in 30 Countries

Peter Huber¹

Austrian Institute of Economic Research (WIFO) and
Mendel University, Brno, Faculty of Business and Economics
peter.huber@wifo.ac.at

Klaus Nowotny

University of Salzburg and
Austrian Institute of Economic Research (WIFO)

Abstract

We use individual level data covering 30 mostly post-communist and developing countries that account for over a fifth of the worldwide immigrant stock to assess the impact of risk aversion on the willingness to migrate. Consistent with theories of individual level migration decisions, risk aversion has a statistically significant negative impact on both the willingness to migrate within countries as well as abroad. This applies to virtually all countries considered and is robust across various specifications, to alternative measures of risk aversion and to different measures of the willingness to migrate. Differences in the impact of risk aversion on the willingness to migrate are also positively correlated to measures of sending country risks and the missing variable bias of omitting risk aversion from migration regressions is substantial.

JEL-codes: J61, R23

Keywords: Migration intentions, Risk Aversion, Former Communist Countries

¹ The authors thank the participants of the 11th Geoff Hewings workshop at the Austrian Institute of Economic Research in Vienna for helpful comments. Peter Huber also gratefully acknowledges financial support from the Czech Science Foundation, grant no. 15-17810S.

Introduction

Ever since the seminal work of Sjaastad (1962) and Harris and Todaro (1970) economists have modeled migration as an investment decision under uncertainty. In this, decision makers pay the financial and psychological costs of immigration up front to reap the uncertain benefits of higher expected lifetime utility later. Theory thus implies a close link between risk attitudes and the propensity to migrate. If migration is an individual level decision and income in the prospective region of immigration is more uncertain than at home, more risk averse individuals will have a lower propensity to migrate (Heitmüller, 2005). Similarly, the most risk tolerant migrants should self-select to countries or regions with the highest risk (see e.g. Chiswick, 1978; Borjas, 1987). If, by contrast, migration is a household level decision, members of more risk averse households may be more willing to migrate to diversify income risks (Katz and Stark, 1986; Chen *et al.*, 2003; Dustmann *et al.* 2017).

So far, however, only few contributions have empirically analyzed the impact of risk aversion on the propensity to migrate. Those that do (Bonin *et al.*, 2006; Conroy, 2009; Jaeger *et al.*, 2010; Akgüc *et al.*, 2016; Dustmann *et al.*, 2017) predominantly focus on the risk attitudes of immigrants relative to the receiving country's (or region's) population and consider either exclusively migrants within a country or international migration. They also lead to contradictory results. Jaeger *et al.* (2010) find that individuals migrating between German regions are more risk loving than their immobile counterparts. Conroy (2009) finds similar evidence for emigrants from rural Mexico. By contrast, Bonin *et al.* (2006) find that – after controlling for other personal characteristics – immigrants from abroad in Germany are on average more risk averse than natives, and Akgüc *et al.* (2016) as well as Dustmann *et al.* (2017) show that the same applies migrants from rural to urban China.

Knowledge on the risk attitudes of migrants relative to their respective source country's (or region's) population and on the impact of risk attitudes on migration decisions in settings where decisions on internal and international migration are made simultaneously is much more limited. To the

best of our knowledge only Jaeger *et al.* (2010), in their robustness section, consider the impact of risk aversion relative to the sending region's population, while Nowotny (2014) analyses the effect of risk aversion on migration and cross-border commuting intentions. Both studies find that emigrants are more risk loving than persons who did not emigrate (or are unwilling to migrate or commute across borders) from their respective home regions. Also, to the best of our knowledge, no study has yet considered the decision to migrate within and across countries simultaneously.

The current paper uses a large-scale individual level data set (the Life in Transition Survey) to assess the impact of individual level risk aversion relative to the sending regions' population on both the propensity to migrate abroad and within a country. This data provides information on migration intentions for 30 developed European and formerly communist countries that according to estimates by Özden *et al.* (2011) account for 20% of worldwide migrant stocks. It also contains information on a measure of risk aversion, whose reliability has been experimentally validated in a study by Dohmen *et al.* (2011).

This allows us to extend the empirical literature on the impact of risk aversion on migration decisions in three directions. First, by using data on migration intentions, the current paper considers potential migrants relative to their sending country prior to migration. This has the advantage that issues related to the potential impact of migration experiences on risk attitudes, which may be a cause for the endogeneity of risk attitudes in data on actual migration (see Jaeger *et al.*, 2010), are of a lesser concern in our case. Furthermore, although not all intended migration is realized, previous research has shown that migration intentions are a predictor of actual migration (De Jong *et al.*, 1985; Lu, 1998; Kan, 1999; De Jong, 2000; Kley, 2011; van Dalen and Henkens, 2012; Docquier *et al.*, 2014) and are driven by the same determinants as actual migration decisions (Huber and Nowotny, 2012). Second, based on a simple model of self-selection of immigrants the paper considers migration intentions within and across countries in a unified framework. This allows us to test whether risk aversion has a stronger or weaker

impact on the willingness to migrate within a country or abroad. Third, we provide an analysis of the missing variable bias induced by failing to account for risk aversion in standard migration regressions on variables that have been shown to be robustly correlated with risk aversion in previous research (e.g. by Bonin *et al.*, 2006; Dohmen *et al.*, 2011). Here we focus on the impact of this bias on the impact of gender, age and education as these are included in most empirical investigations of the propensity to migrate. Of these, gender may be particularly relevant, as previous work has often found sizeable gender differences in migration intentions (see e.g. Madden, 1981; Faggian *et al.*, 2007).

We find a very robust and statistically significant negative impact of risk aversion on both the willingness to migrate within countries as well as to migrate abroad. This impact is also robustly larger for the willingness to migrate abroad than the willingness to migrate within a country. These findings apply to virtually all countries considered in the current analysis. They are also robust across various specifications and to using alternative measures of risk aversion as well as different measures of the willingness to migrate. We, however, also find some variance in the size of the impact of risk aversion on the willingness to migrate. Depending on the country a centered on standard deviation increase in risk aversion reduces the probability of being willing to migrate within a country by 2.6 to 13.6 percentage points and the willingness to migrate abroad by between 3.1 to 14.9 percentage points. Consistent with our theoretical model these differences are positively correlated to measures of source country risks. Finally, the omission of risk aversion in migration regressions has a strong impact on results for other variables included in the regression. In our baseline specification, including risk aversion reduces the marginal effect of gender and age by around one third each.

Theory, Method and Hypotheses

To motivate the empirical analysis, we consider a region that is populated by individuals that have constant absolute risk aversion (CARA) indirect utility functions $u(w_{ik}) = -e^{-\alpha_i w_{ik}} / \alpha_i$, with w_{ik} the (risky) income of individual i in location k and α_i the coefficient of absolute risk aversion.

Individuals choose between staying in their region of current residence (denoted by h), moving to another region of their own country (denoted by e) or moving to another country (denoted by a). Individuals differ in their degree of risk aversion and in their migration costs for moving within the country and abroad (denoted by η_{ie} and η_{ia} , respectively). The former is known both to the individuals and the researcher; the later are bivariate normally distributed among the population, known to the individuals but unobserved by the researcher.

If individuals stay at home they earn an uncertain lifetime income of $w_{ih} = \mu_{ih} + \varepsilon_{ih}$, with μ_{ih} expected earnings and ε_h a normally distributed (with mean zero and variance σ_h^2) region-specific shock to wages. If they move to another region (either in their home country or abroad) they have to pay migration costs and earn a lifetime income $w_{ik} = \mu_{ik} + \rho_{hk}\varepsilon_{ih} + \varepsilon_{ik}$ (with $k \in \{a, e\}$) where ε_{ik} is also normally distributed with mean zero and variance σ_k^2 and uncorrelated to the costs of migration.² Under the assumption of a CARA utility function and normally distributed income shocks the Arrow-Pratt approximation is exact (see Eeckhoudt *et al.*, 2011). Therefore, after substituting the wage equations into the utility functions and taking expectations, the expected utility associated with staying in the region of residence is $E(u(w_{ih})) = e^{-\alpha_i(\mu_{ih} - \sigma_h^2 \alpha_i / 2)} / \alpha_i$, that of moving abroad $E(u(w_{ia})) = e^{-\alpha_i(\mu_{ia} - \eta_{ia} - \alpha_i(\rho_{ha}^2 \sigma_h^2 + \sigma_a^2) / 2)} / \alpha_i$ and that of moving to another region in the same country $E(u(w_{ie})) = e^{-\alpha_i(\mu_{ie} - \eta_{ie} - \alpha_i(\rho_{he}^2 \sigma_h^2 + \sigma_e^2) / 2)} / \alpha_i$.

An individual will prefer to move abroad rather than stay (i.e. be willing to move abroad) if $\mu_{ia} - \mu_{ih} - \alpha_i(\sigma_a^2 - (1 - \rho_{ha}^2)\sigma_h^2) / 2 > \eta_{ia}$ and prefer to move to another region of the same

² This definition of wage shocks abroad and in the other region of the same country ensures that wages at home are correlated to w_{ia} and w_{ie} with the coefficients of correlation equal to ρ_{he} and to ρ_{ha} , respectively. The model could easily be extended to allow for correlation between ε_{ih} , ε_{ik} , and η_{ik} . This would, however, add few insights but substantially increase notation.

country rather than stay (i.e. be willing to move within the country) if $\mu_{ie} - \mu_{ih} - \alpha_i(\sigma_e^2 - (1 - \rho_{he}^2)\sigma_h^2)/2 > \eta_{ie}$.³

Letting I^a be a dummy variable to indicate if a person is willing to migrate abroad and I^e an indicator of willingness to migrate within a country, the decision rule of the individual is given by:

$$I^a = \begin{cases} 1 & \text{if } \mu_{ia} - \mu_{ih} - \alpha_i(\sigma_a^2 - (1 - \rho_{ha}^2)\sigma_h^2)/2 > \eta_{ia} \\ 0 & \text{else} \end{cases} \quad (3)$$

and

$$I^e = \begin{cases} 1 & \text{if } \mu_{ie} - \mu_{ih} - \alpha_i(\sigma_e^2 - (1 - \rho_{he}^2)\sigma_h^2)/2 > \eta_{ie} \\ 0 & \text{else} \end{cases} \quad (4)$$

If η_{ia} and η_{ie} follow a bivariate normal distribution with zero mean and correlation coefficient ρ this gives the standard bivariate probit model. The parameters of equations (3) and (4) can therefore be jointly estimated through maximum likelihood estimation of a bivariate probit model (see Greene, 2011, p. 738 or Cameron and Trivedi, 2005, p. 522 for details). In this model, the correlation coefficient ρ can be estimated along with the parameter vectors. If $\rho = 0$, the bivariate probit collapses to two separate probits; whether this is the case can be tested empirically using a LR or Wald test. In addition, the probability of observing an individual to be willing to migrate abroad rather than staying at home is $P(I^a = 1) = \Phi(\mu_{ia} - \mu_{ih} - \alpha_i\beta_a)$ and to be willing to migrate within in the country is $P(I^e = 1) = \Phi(\mu_{ie} - \mu_{ih} - \alpha_i\beta_e)$, with $\Phi(\cdot)$ the normal distributions functions and $\beta_a = [(1 - \rho_{ha}^2)\sigma_h^2 - \sigma_a^2]/2$ and $\beta_e = [(1 - \rho_{he}^2)\sigma_h^2 - \sigma_e^2]/2$ the coefficients to be estimated.

As long as income risks in the other regions of the country and abroad are larger than at home (i.e. $\sigma_a^2 > \sigma_h^2$ and $\sigma_e^2 > \sigma_h^2$), therefore the estimated coefficients on the risk aversion variable ($\hat{\beta}_e$

³ Additionally, individuals prefer moving abroad over moving to another region in the same country if $\mu_{ia} - \mu_{ie} - \alpha_i(\sigma_a^2 - \sigma_e^2 + (\rho_{ha}^2 - \rho_{he}^2)\sigma_h^2)/2 > \eta_{ia} - \eta_{ie}$. This equation is necessary to fully describe the actual choices of individuals in a data set on actual migration decisions. As will become apparent below it is, however, not necessary to describe the stated preferences of potential migrants in the current context.

and $\hat{\beta}_a$) are negative and the probability of an individual to be willing to migrate abroad and within the country decreases with increasing risk aversion. Similarly, under this assumption the coefficients will be less negative the higher the region-specific risk in the sending region (σ_h^2) and will also be smaller for the willingness to migrate within the country than for the willingness to migrate abroad if $\sigma_a^2 - \sigma_e^2 > \sigma_h^2(\rho_{he}^2 - \rho_{ha}^2)$. Consequently, this theoretical framework suggests that the coefficient of risk aversion on the willingness to migrate abroad is more negative than that on the willingness to migrate within the country if the variance of wages in the other region of the country is smaller than the variance of wages abroad (i.e. whether $(1 - \rho_{ha}^2)\sigma_h^2 - \sigma_a^2 > (1 - \rho_{he}^2)\sigma_h^2 - \sigma_e^2$). In addition, it yields two testable hypotheses: The first of these states that the marginal effects of risk aversion on the marginal probability to migrate within the country and abroad are negative. The second states that these marginal effects are increasing (i.e. less negative) in σ_h^2 .

Data

To test these hypotheses, we use data from the second wave of the European Bank for Reconstruction and Development's Life in Transition Survey (LiTS) conducted in 2010. This is one of the standard datasets for the analysis of social developments in formerly communist economies and has amongst others been used by Nikolova and Sanfey (2016), Cojocaru (2014) and Broulíková *et al.* (2017).⁴ It collected information on 29 post-communist countries as well as on six comparator countries (France, Germany, Italy, Sweden, the United Kingdom and Turkey) that never experienced transition from a planned to a market economy. Of these countries we had to drop 5 (Georgia, Kazakhstan, Moldova, Russia and the Ukraine) because of a failure of our models to converge. In sum therefore, the current paper considers 30 countries. These accounted for over 20% of the worldwide stock of foreign born according to the recent estimates by Özden *et al.* (2011). For each of these countries the survey

⁴ We focus on the second wave of this survey as its' first and third wave contain no or incomparable questions on mobility intentions. We will, however, also consider the third wave in some of our robustness checks below.

randomly selected 75 (in Uzbekistan, Serbia, Poland, and the UK) or 50 (in all other countries) local electoral units and subsequently randomly choose 20 households within each local electoral unit and one person within each household as a respondent.

The questionnaire included two separate questions on respondents' willingness to migrate abroad and within the country.⁵ In these respondents were asked, whether they would be willing to move abroad or to another region of the same country for job related reasons. Persons who answered the first question affirmatively were encoded as willing to migrate abroad and those that answered the second question positively were encoded as willing to migrate within the country. Furthermore, persons were asked to rate their general willingness to take risks on a scale from 1 to 10, where 1 implied unwillingness to take risks at all and 10 a high willingness to take risks. This question is almost a word by word translation of a similar question in the German socio-economic panel, which has also been used by Jaeger *et al.* (2010) and was shown to have a high behavioral validity by Dohmen *et al.* (2011). It was therefore used to construct the preferred risk aversion indicator in the analysis by inverting the scale of this measure such that 10 indicates the highest possible risk aversion and 1 the least risk averse response.

As the questions for the dependent variable survey job related mobility intentions we focus on the working age population (between 16 and 65 years old). After excluding persons with missing information, we end up with 23.480 observations in total and between 585 (Estonia) and 1124 (Poland) individual level observations from each country. Figure 1 shows scatterplots of the share of respondents willing to migrate abroad and within the country and the average willingness to take risks at the country level. The shares of respondents willing to migrate abroad and within a country exhibit substantial variation across countries: On the one extreme, in Tajikistan only 9.5% of the respondents stated that

⁵ The wording of the questions and coding of the key dependent and independent variables is explained in detail in the data annex to this paper.

they would be willing to migrate to another region of their country for job related reasons. At the other extreme, the same applied to 53.8% of the respondents in France. The willingness to migrate abroad was also lowest in Tajikistan, where only 14.7% of the respondents stated that they would be willing to move abroad for job related reasons, but highest in Macedonia where this applied to 49.6% of the respondents. In general, the share of respondents willing to migrate abroad is strongly correlated with the share of those willing to migrate within their respective countries (coefficient of correlation: 0.74) at the country level (see the top panel of Figure 1). In accordance with the findings of previous literature (see e.g. Fidrmuc, 2004; Andrienko and Guriev, 2004; Fouarge and Ester, 2009; Paci *et al.*, 2009, Huber and Mikula, 2018), the willingness to migrate abroad as well as within the country as a rule is higher in the developed Western European than in the post-communist countries and lowest among the former Soviet Union countries.

The average risk aversion by country varies slightly less across countries: the highest average risk aversion (of 7.6 on a ten-point scale) is reported among respondents in Tajikistan, the lowest in Montenegro (5.2). Nevertheless, the average risk aversion at the country level is significantly (at the 5% confidence level) and negatively correlated with both the willingness to migrate within the country as well as abroad (with correlation coefficients of -0.39 and -0.49, respectively): countries whose respondents exhibit higher average risk aversion also tend to have lower shares of respondents willing to migrate within their respective country and abroad (see the middle and bottom panels of Figure 1).

While these between-country results provide preliminary evidence for a significant relationship between risk aversion and mobility intentions, this paper analyzes the question whether such patterns can also be found at the individual level within countries while controlling for other individual characteristics. We therefore estimate the bivariate probit model defined in equations (3) and (4) using two different sets of control variables. The first of these includes only age, gender and household size as well as a set of dummy variables for educational attainment levels (secondary and tertiary with

compulsory as a base category), married persons and households with children as controls. The second specification further controls for the number of years a respondent has lived in the same town or village, homeownership and being unemployed, self-assessed wealth (in quartiles) as well as social capital (proxied by generalized trust and the number of memberships in clubs and civil society organizations) which were also collected in the LiTS and have been shown to be correlated with both risk aversion and the willingness to migrate in previous literature (see e.g. Faggian *et al.*, 2007; Bonin *et al.*, 2006; Dohmen *et al.*, 2011). This additional specification thus assesses the impact of potential missing variable bias on our estimates.

{Figure 1 Around here}

{Table 1 around here}

Table 1 reports the means and standard deviations of the dependent and control variables separately for individuals with risk aversion levels above and below the median risk aversion across all 30 countries in the sample (6 on a 10-point scale). As can be seen the share of respondents who are willing to migrate both within their country of residence and abroad is substantially lower among those with above-median risk aversion. Further, in accordance with previous literature (e.g. Bonin *et al.*, 2006; Dohmen *et al.*, 2011) among males, singles, and renters are overrepresented among the less risk averse and people with low risk aversion are younger and better educated. Persons with low risk aversion are also more likely to have resided in the same town and village for a shorter time, to participate in more clubs and civil society organizations and to consider themselves as very wealthy. Having children or being unemployed, by contrast, are not strongly correlated with risk aversion.

Results

According to the estimation results higher risk aversion reduces the willingness to migrate both within a country and abroad in virtually all countries (see Table 2).⁶ In the baseline estimation (reported in the left-hand panel of table 2), the marginal effect on the willingness to migrate abroad are mostly negative. Positive (but statistically insignificant) marginal effects are only found in Kosovo. The negative marginal effects are also statistically significant (at least at the 10% level) in almost all countries. The few exceptions (Kosovo and Kyrgyzstan in the case of the willingness to migrate within the country and Albania and Kosovo in the case of the willingness to migrate across borders) may also be due to Type II errors. In addition, the marginal effects of risk aversion on the willingness to migrate within the country are mostly (in 21 of 30 cases) weaker than on the willingness to migrate abroad,⁷ although they differ statistically significantly from each other (at the 5% level) in only five countries (Bosnia, Hungary, Montenegro, Tajikistan and Turkey). Furthermore, the estimated coefficients ρ of the bivariate probit model range between 0.605 and 0.946 and are statistically significant at the 1% level in all countries. This suggests a strong positive relationship between the unobserved factors that affect both the willingness to migrate within a country and abroad. This thus supports the use of the bivariate probit model over separate probit regressions and suggests that, as predicted by our theoretical model, stochastic migration costs within the country and abroad are highly correlated on an individual level.

Results hardly change when increasing the list of control variables. The marginal effects in the extended version of the model (in the right-hand side of Table 2) are hardly affected by the increased model size in most countries considered. The only relevant change is that the marginal effect of the willingness to migrate within a country, which was previously significant at the 10% level for Romania

⁶ Full regression outputs for all specifications shown in this paper are available from the authors upon request.

⁷ This applies both when considering the absolute coefficient size as well as when considering the coefficient size relative to the share of persons willing to migrate abroad and within the country.

and Turkey, is now insignificant in these 2 countries. For Romania, this also applies to the marginal effect on the willingness to migrate abroad. Again, the marginal effects on the willingness to migrate abroad are larger than the marginal effects on the willingness to migrate internally for 21 out of 30 countries, but they differ significantly in only six countries (Bosnia, Hungary, Montenegro, Sweden, Tajikistan and Turkey). Also, the coefficients ρ are significant in all estimations. The estimated values vary between 0.600 and 0.951, which once more suggests a strongly positive correlation in the error terms of the two equations that make up the bivariate probit and supports the use of this model.

The size of the estimated marginal effects, however, differs substantially between countries. Focusing on those countries where the estimated marginal effects are statistically significant at the 5% level in our baseline specification a centered, country-specific one standard deviation increase in risk aversion reduces the probability of being willing to migrate within a country by between 2.6 (Tajikistan) and 13.6 percentage points (Germany) and the willingness to migrate abroad between 3.1 (in Kyrgyzstan) and 14.9 percentage points (in Hungary). In the extended specification the centered effect of a country-specific one standard deviation change in risk aversion varies between -3.1 (Tajikistan) and -15.4 (Poland) percentage points for internal and -3.6 (Romania) and -16.6 (Hungary) percentage points for external mobility intentions.

Explaining country differences

Theory suggests that these differences may be correlated to the sending country specific risks, as sending countries with a higher country risk (σ_h) should also have a less negative coefficient estimate for impact of risk aversion on the willingness to migrate (see section 2). Therefore, table 3 reports the coefficient of correlation between the statistically significant country-level marginal effects of risk aversion on the willingness to migrate and country level risk measures published by the Economist

Intelligence Unit (2017) as well as with GDP per capita.⁸ As can be seen from this table the correlation between the marginal effect of risk aversion and GDP per capita is negative: risk aversion is less detrimental to the willingness to migrate both internally and abroad in poorer than in richer countries (see also Figure A1). This may, however, be due to poorer countries also being riskier as - consistent with theoretical predictions - the statistically significant marginal effects of risk aversion are positively and statistically significantly correlated with both the overall risk assessment as well as with most of the measures of country risk (see also Figure A2 in the annex) and the coefficients of correlation with these risk measures are higher in absolute terms than those with GDP per capita. Surprisingly, the only exception is the assessment of macro-economic risks. One possible explanation for this is that this measure mostly focuses on short-term risks (such as the risk that the economy will experience recession in the next two years or price instability in the same period) which are less relevant to long-term mobility decisions than the more long-term risks assessed in the other measured dimensions.

Particularly strong correlations can be found between the marginal effect of risk aversion on the willingness to migrate within a country and risks to political stability (which include for example the risk of social unrest or the risk that international disputes and tensions will affect the country negatively, see Economist Intelligence Unit 2017) as well as infrastructure risks. Concerning the marginal effect of risk aversion on the willingness to migrate abroad the strongest correlations can be found with government effectiveness risks (which considers among other factors also the quality of the bureaucracy,

⁸ The risk assessments used in Table 3 were published by the Economist Intelligence Unit (EIU) on the EIU website and consist of expert assessments of various risk dimensions based on 70 quantitative and qualitative indicators as well as an overall risk score. The derived risk measures vary between 0 and 100, with higher numbers indicating a riskier environment. Although the risk assessments are made with a focus on risks to business profitability, the issues addressed in the ten risk categories are also relevant for individuals (see Economist Intelligence Unit, 2017 for details).

the prevalence of red tape, cronyism or corruption, and human rights abuses, see Economist Intelligence Unit 2017 for details) and political stability.

The correlation of country level risks with the estimated marginal effects is also higher for the willingness to migrate within the country than for the willingness to migrate abroad. While this is a little surprising, one potential explanation for this would be that wage shocks are more strongly correlated across countries than within countries if for example wage shocks are related to unmeasured skill attributes of individuals and the prospective receiving countries have higher returns to skills than the sending countries analyzed here (see e.g. Borjas, 1999). Alternatively, this could be due to a high localization of certain risks in particular regions of a country. This would drive up the average riskiness of a country and may lead to a high willingness of risk averse individuals to move from the high to the low risk region within a country.

{Table 3 Around Here}

Robustness

To gauge the robustness of these results, table 4 reports two additional estimates. In the first one, we use an alternative measure of risk aversion provided in the 2010 LiTS data. This is derived from a question in which respondents were asked whether they would prefer a safe job with an average salary and few chances of promotion to an unsafe job with an above average salary and good chances of promotion. This question is a less reliable measure of risk aversion than our preferred one on account the two jobs also differing in average wages and the reference to future job stability also linking risk aversion and time preferences. Nonetheless persons preferring a safe job with an average salary and few chances of promotion should be more risk averse than persons choosing the unsafe job with an above average salary and good chances of promotion. We therefore replace the measure of risk aversion

reported in table 2 by a dummy variable taking on the value of 1 if the person preferred the first over the second job (and zero else).

The results (in the left-hand side panel of table 4) corroborate the previous finding of a negative impact of risk aversion on the willingness to migrate. This applies even more strongly to the willingness to migrate abroad than to the willingness to migrate within a country. In the case of the willingness to migrate within the country, the measure of risk aversion is statistically significant (at the 5% level) and of the expected sign in 19 of the 30 countries, while in for the willingness to migrate abroad this applies to 22 countries. When significant, the marginal effects are negative throughout. The only exception is the marginal effect of the alternative risk aversion measure on the willingness to migrate internally in Turkey, which turns out to be positive and statistically significant.

In the second robustness check we use alternative measures of the willingness to migrate. These are derived from questions in which respondents were first asked whether they planned to move abroad in the next 12 months. Subsequently, those that answered no to this were asked whether they planned to move within the country in the next 12 months. One advantage of this question is that it was asked both in the 2010 and 2016 wave of the LiTS. Thus, we can extend the analysis to include both these waves and augment the baseline specification by wave fixed effects to control for any time varying country specific impact on the willingness to migrate. There are, however, also severe drawbacks to the use of this indicator relative to the question analyzed above. One of these is that in most countries there are only rather few people (mostly less than 8% of the respondents) who plan to migrate in the next year. This implies that the response to this question offers only very little variance to be explained by the independent variables. This also implies that the chances to identify the effects of risk aversion on migration intentions are somewhat lower when using this question relative to the alternative used above.

Another drawback is that this question also only allows for an alternative measurement of the willingness to migrate abroad (i.e. $P(I^a = 1)$) that is consistent with the one used in the baseline

specification. The measure of the willingness to migrate within the country, by contrast, is conditional on being unwilling to migrate abroad (i.e. is given by $P(I^e = 1|I^a = 0)$). It is thus not directly comparable to the marginal probability $P(I^e = 1)$ of the bivariate probit model analyzed above. As a result, the responses to these questions were modelled by a multinomial probit model. In this the dependent variable was 0 if the respondent answered that he/she was neither willing to migrate abroad nor within the country, 1 if he/she was willing to migrate abroad (and maybe also within the country) and 2 if he/she was willing to migrate within the country (but unwilling to migrate abroad). Furthermore, the marginal effect of risk aversion on the willingness to migrate internally were compared to the willingness to migrate within the country conditional on being unwilling to migrate abroad ($P(I^e = 1|I^a = 0)$) that can also be calculated from the bivariate normal estimation results.

{Table 4 around here}

As can be seen in the right-hand side panel of table 4, because of the low variability of the dependent variable, the multinomial probit models estimated on a country by country basis do not converge for all countries in this specification, and fewer of the estimated marginal effects are statistically significant. This applies especially to the willingness to migrate within the country, where only two marginal effects are significant at the 5% level (and a further three are on the verge of significance). In part this is due to the focus on the conditional probability (given unwillingness to migrate abroad), as many marginal effects on this conditional probability from the binomial probit model (reported last column of table 4) are equally insignificant (and statistically significant at the 5% level for only 8 of the countries analyzed). In part this is, however, also due to the low variance of the conditional willingness to migrate within the country in this question, as the number of negative significant parameters on the conditional migration probability is much lower in this analysis than in the

previous one. Irrespective of this, however, the estimated marginal effects, even when not significant, are negative in most countries considered (all but Albania, Bosnia, Croatia, Tajikistan and Turkey). For the willingness to migrate abroad, by contrast, the results of this robustness check are statistically significant more often and once more suggest a negative impact of risk aversion. Increased risk aversion significantly reduces the willingness to migrate abroad (at the 5% level) in 8 of the 21 countries considered and is on the verge of significance in another 4 countries. Furthermore, irrespective of their significance the estimated marginal effects are negative for all countries but Bosnia (where it is essentially zero).

The Impact of omitting risk aversion on other variables

Finally, to assess the potential missing variable bias arising in migration regressions in which risk attitudes are not included, we compared the benchmark estimates of equations (3) and (4) which include and exclude the risk aversion measure. In this analysis we focus on a comparison of the marginal effects on the marginal probability to be willing to migrate within the country or abroad for gender, age and education as these are included in most empirical investigations of the propensity to migrate and have also been shown to be robustly correlated with risk aversion in previous research (e.g. by Bonin *et al.*, 2006; Dohmen *et al.*, 2011). A summary of these results is reported in table 5. In this table the first column of each panel reports the mean marginal effect across countries for each of the listed variables while the second column reports the number of significant estimates for these marginal effects. Furthermore, the left-hand side panel reports these statistics for specifications including the risk aversion variable, while the right-hand side panel focuses on specifications excluding this measure and the last panel reports the relative change in the average marginal effects between the two estimates when the risk variable is excluded.

The exclusion of the risk aversion measure increases the marginal effect of gender on the willingness to migrate within the country by 1.7 percentage points or around a third (31%) in average,

compared to the benchmark estimate. The marginal effect of gender on the willingness to migrate abroad increases by around 2.0 percentage points (31%). In addition, although gender remains to be a significant determinant of the willingness to migrate abroad and within the country in 9 countries, the inclusion of this variable renders gender insignificant in almost half of all countries where it is significant when risk aversion is not included. This shows that risk aversion and gender are highly correlated, and that there are distinct gender differences in risk aversion with men being less risk averse.

The effects of the exclusion of risk aversion on the parameter estimates for the education variables is also pronounced. The marginal effect of the dummy variables for a completed tertiary or upper secondary education on both the willingness to migrate within the country and abroad are 28% to 36% (or 1.1 to 2.8 percentage points) higher when risk aversion is excluded. The impact of excluding risk aversion on the marginal effect of age is, by contrast, weaker as its exclusion reduces the estimated marginal effect of age on the willingness to migrate within the country or abroad only 14%.

{Table 5 Around Here}

Conclusions

The results of the current paper corroborate standard migration theories which predict that, all else equal, more risk averse individuals are less likely to be willing to migrate, and that risk aversion should have a lower impact on intentions to migrate in riskier countries. Using a large-scale individual level data set covering 30 countries that account for more than 20% of worldwide migrant stocks (the Life in Transition Survey), we find a statistically significant negative impact of risk aversion on the willingness to migrate both within countries as well as abroad in virtually all countries considered. This negative impact is also robust across various specifications and to using alternative measures of risk aversion as well as different measures of the willingness to migrate. Furthermore, consistent with such

theories the strength of this impact is also larger in riskier countries and robustly larger for the willingness to migrate abroad than the willingness to migrate within a country.

The results, however, also point to some stylized facts that cannot easily be accounted for by these standard migration theories and that could be the focus of future research. In particular the strength of the impact of risk aversion on migration intentions is more strongly linked to, for example, political stability, government effectiveness and security risks than economic risks. This may suggest that such long-term security risks are more important for the overall risk assessment of potential immigrants than are the more short-term economic risks. Furthermore, the strength of the impact of risk aversion is also more closely correlated to country risks for intentions to migrate within a country than for intentions to migrate abroad.

Finally, from a methodological perspective the results indicate that the omission of risk aversion in migration regressions has a strong impact on results for other variables included in the regression. This applies mainly to the marginal effect of gender and education on the willingness to migrate abroad and within a country. This may be of relevance for future research on the gender differences in migration intentions as it suggests that a substantial part of the gender differences (but not all of them) can be explained by differences in risk aversion between men and women.

Literature

- Akgüç, M., Liu, X., Tani, M., Zimmermann, K. F. (2016). Risk attitudes and migration. *China Economic Review*, 37:166-176.
- Andrienko, Y., Guriev, S. (2004). Determinants of interregional mobility in Russia. *Economics of Transition*, 12(1):1-27.
- Bonin, H., Constant, A., Tatsiramos K, Zimmermann, K.F. (2009). Native-migrant differences in risk attitudes, *Applied Economics Letters*, 16(15), 1581-1586.
- Brouliková, H.M., Huber, P., Montag, J., & Sunega, P. (2017). *Homeownership, Mobility, and Unemployment: Evidence from Housing Privatization*, Working paper, Mendel University, Brno, Czech Republic. URL: <https://ssrn.com/abstract=2896765>.
- Borjas, G.J. (1987). Self-Selection and the Earnings of Immigrants, *American Economic Review*, 77(4):531-553.
- Cameron, A.C., Trivedi, P.K. (2005). *Microeconometrics. Methods and Applications*, Cambridge University Press.

- Chen, K.-P., Shin-Hwan, C., Leung, S.F. (2003). Migration, family, and risk diversification. *Journal of Labor Economics* 21(2):353-380.
- Chiswick, B.R. (1978). The effect of Americanization on the earnings of foreign-born men, *Journal of Political Economy*, 86(5): 897-921.
- Conroy, H.V. (2009). *Risk aversion, income variability, and migration in rural Mexico*. California Center for Population Research, UCLA, working draft.
- De Jong, G.F., Davis Root, B., Gardner R.W, Fawcett, J.T., Ricardo, G., Abad, R.G (1985). Migration intentions and behavior: decision making in a rural Philippine province., *Population and Environment*, 8(1/2):41-62.
- De Jong, G.F. (2000). Expectations, gender, and norms in migration decision-making, *Population Studies*, 54(3):307-319.
- Docquier, F., Peri, G., Ruysen, I. (2014). The cross-country determinants of potential and actual migration, *International Migration Review* 48(1):S37-S99.
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., Wagner, G.G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association*, 9(3):522-550.
- Dustmann, C., Fasani, F., Meng, X., Minale, L. (2017). *Risk attitudes and household migration decisions*, Centro Studi Luca D'Agliano Development Studies Working Papers No 423.
- Economist Intelligence Unit (2017). Guide to Risk Briefing Methodology, http://viewswire.eiu.com/index.asp?layout=RKArticleVW3&article_id=485802032 (accessed August 6, 2018).
- Eeckhoudt, L., Gollier, C., Schlesinger, H. (2011). *Economic and Financial Decisions under Risk*, Princeton University Press, Princeton
- Faggian, A., McCann, P., Sheppard, S. (2007). Some evidence that women are more mobile than men: Gender differences in UK graduate migration behavior. *Journal of Regional Science* 47.3:517-539.
- Fanning Madden, J. (1981). Why women work closer to home. *Urban Studies* 18(2):181-194.
- Fidrmuc, J (2004). Migration and Regional Adjustment to Asymmetric Shocks in Transition Economies. *Journal of Comparative Economics* 32(2):230-47
- Fouarge, D., Ester, P. (2008). How willing are Europeans to migrate? A comparison of migration intentions in Western and Eastern Europe. In Ester, P., Muffels, R., Schippers, J., Wilthagen, T. (eds) *Innovating European Labour Markets Dynamics and Perspectives*, Edward Elgar, Cheltenham, pp 49-72
- Greene, W. H. (2011) *Econometric Analysis*, seventh Edition, Prentice Hall.
- Harris, J.R., Todaro M.P. (1970). Migration, unemployment and development: a two-sector analysis. *The American Economic Review*, 60.1:126-142.
- Heitmueller, A. (2005). Unemployment benefits, risk aversion, and migration incentives. *Journal of Population Economics* 18(1): 93-112.

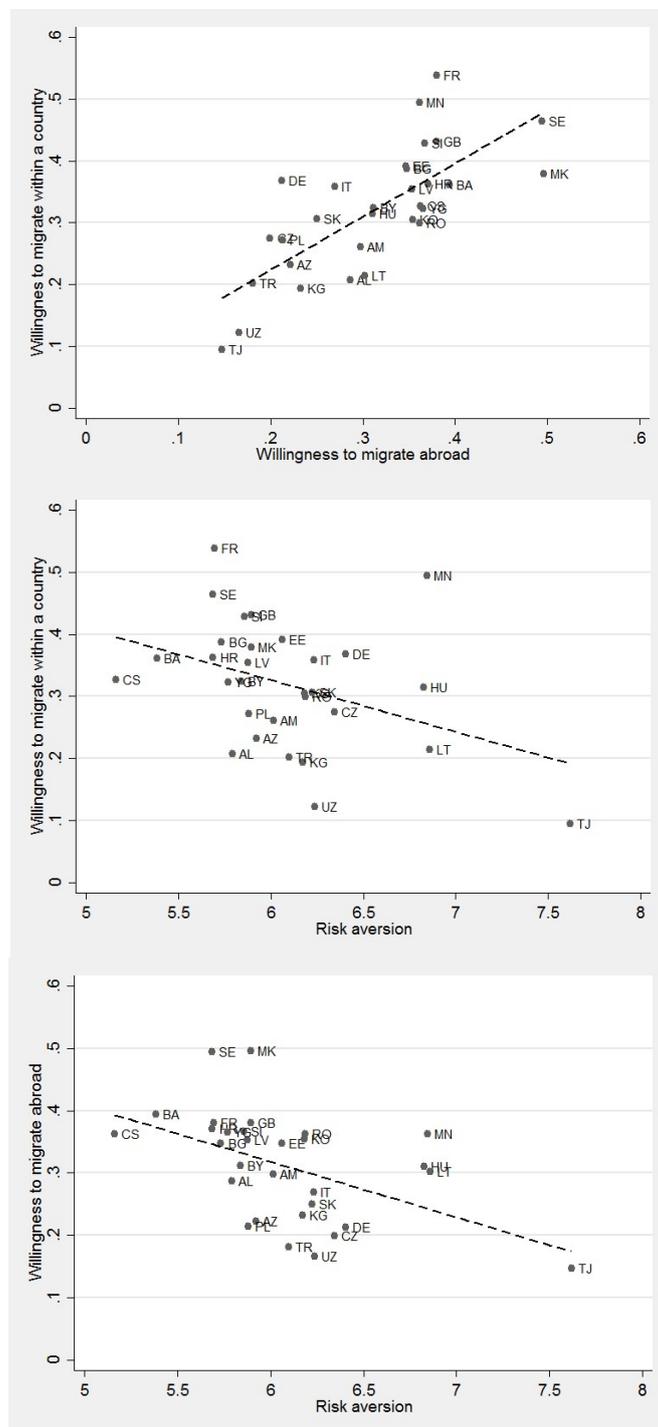
- Huber, P., Mikluta S. (2018). Social Capital and Migration Intentions in Post-Communist Countries, *Empirica*, forthcoming.
- Huber, P., Nowotny, K. (2013). Moving Across Borders: Who is Willing to Migrate or to Commute? *Regional Studies* 47(9):1462-1481.
- Jaeger, D.A., Dohmen, T., Falk, A., Huffman, D., Sunde, U., Bonin, H. (2010). Direct evidence on risk attitudes and migration. *The Review of Economics and Statistics*, 92(3):684-689.
- Kan, K. (1999). Expected and unexpected residential mobility. *Journal of Urban Economics* 45(1):72-96.
- Katz, E., Stark O. (1986). Labor migration and risk aversion in less developed countries. *Journal of Labor Economics* 4(1): 134-149.
- Kley, S. (2011). Explaining the stages of migration within a life-course framework. *European Sociological Review* 27(4):469-486.
- Lu, M. (1998). Analyzing migration decision making: relationships between residential satisfaction, mobility intentions, and moving behavior. *Environment and Planning A*, 30(8):1473-1495.
- Nowotny, K. (2014). Cross-Border Commuting and Migration Intentions: The Roles of Risk Aversion and Time Preference. *Contemporary Economics* 8(2): 137-156.
- Özden, Ç., Parsons, C., Schiff M., Walmsley, T.L. (2011) Where on Earth is Everybody? The Evolution of Global Bilateral Migration, 1960-2000. *World Bank Economic Review* 25(1):12-56
- Paci, P., Tiongson, E.R., Walewski, M., Liwiński, J. (2010) Internal labour mobility in Central Europe and the Baltic Region: Evidence from labour force surveys. In Caroleo F.E., Pastore F. (eds.) *The Labour Market Impact of the EU Enlargement: A New Regional Geography of Europe?*, Springer, pp 197-225.
- Sjaastad, L.A. (1962). The costs and returns of human migration. *Journal of Political Economy* 70(5):80-93.
- Van Dalen, H.P., Henkens, K. (2013). Explaining emigration intentions and behaviour in the Netherlands, 2005-10. *Population Studies* 67.2: 225-241.

Annex 1: Coding of dependent and key independent variable

This annex describes the coding of the main dependent and independent variables.

- Willingness to migrate – the dependent variables are constructed from two questions that read: “Would you be willing to move elsewhere in our country for employment reasons?” and “Would you be willing to move abroad for employment reasons?” Respondents could reply “yes” or “no”. Respondents that answered the first question positively are considered to be willing to migrate within the country and those that responded positively to the second question are encoded as being willing to migrate abroad.
- Years of residence – is based on the question “How long have you lived in this city / town / village?”. Respondents could either provide the number of years or state that they had lived in the city/town/village for their whole life. For persons who responded that they had lived in the city/town/village for their whole life, their age was entered as the years of residence.
- Risk – is based on a question that reads “Please rate your willingness to take risks in general on a scale from 1 to 10, where 1 means that you are not willing to take risks at all and 10 means that you are very much willing to take risks”. The scale of this question was inverted such that 10 indicates the highest possible risk aversion and one the lowest.
- Job Risk – is based on a question asking “I am now going to ask you a hypothetical question. Imagine you could choose between two jobs, Job A and Job B. Job A offers an average salary, and not much chance for promotion, but it is a safe long-term job, Job B offers a high salary, and a lot of chance for promotion, but significantly less job security. Which job would you choose?” Persons choosing job A were encoded as more risk averse.
- Memberships in clubs and civil society organizations – is based on a question that reads as “Here is a list of voluntary organizations. For each one, please indicate, whether you are an active member, an inactive member, or not a member of that type of organization”. The list of organizations was a) churches and religious organizations, b) sport and recreational organizations and associations, c) art, music and educational organizations, d) labor unions, e) environmental organizations, f) professional associations, g) humanitarian and charitable organizations, h) youth organization and i) parties. The variable was formed by taking the count of organizations of which the respondent was at least an inactive member.
- Trust – this is based on a question asking respondents “Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please answer on a scale of 1 to 5, where 1 means that you have complete distrust and 5 means that you have complete trust.”

Figure 1: Scatterplots of mean willingness to migrate within a country and abroad and average risk aversion by country



Source: LiTS 2010, Notes: Willingness to migrate: Share of respondents willing to migrate within country or abroad, risk aversion: 1=very willing to take risks; 10=unwilling to take any risk (country level means). Country codes see table A1 in the appendix

Table 1: Summary statistics for dependent and independent variables by risk aversion

Variable	Risk aversion			Total Mean	S.D.
	≤ median Mean	> median Mean	Diff.		
Willingness to migrate within country	0.386	0.221	0.165 ***	0.316	0.465
Willingness to migrate abroad	0.387	0.199	0.188 ***	0.307	0.461
Age	39.115	43.142	-4.027 ***	40.819	13.360
Male	0.464	0.355	0.109 ***	0.418	0.493
Primary education	0.092	0.146	-0.055 ***	0.115	0.319
Secondary education	0.536	0.557	-0.021 ***	0.545	0.498
Tertiary education	0.372	0.297	0.075 ***	0.340	0.474
Married	0.596	0.665	-0.068 ***	0.625	0.484
Child	0.418	0.428	-0.010	0.422	0.494
Household size	3.267	3.319	-0.052 **	3.289	1.704
Unemployed	0.142	0.133	0.009 *	0.138	0.345
Owns home	0.809	0.837	-0.028 ***	0.821	0.384
First Quartile Wealth	0.214	0.319	-0.105 ***	0.259	0.438
Second Quartile Wealth	0.476	0.485	-0.009	0.480	0.500
Third Quartile Wealth	0.258	0.167	0.091 ***	0.219	0.414
Fourth Quartile Wealth	0.052	0.029	0.023 ***	0.042	0.201
Years of residence	29.919	33.221	-3.302 ***	31.316	16.820
Trust	2.957	2.861	0.096 ***	2.916	1.047
No. of memberships in clubs and civ. soc. org.	0.937	0.710	0.227 ***	0.841	1.393
Observations	13,546	9,934		23,480	

Source: LiTS 2010.

Table 2: Country by country estimation results (Marginal effects)

	Baseline Specification						Extended Specification					
	Obs.	Willing to mig. internally		Willing to mig. externally		rho	Willing to mig. internally	Willing to mig. externally		rho		
		Marginal effect	S.E.	Marginal effect	S.E.			Marginal effect	S.E.			
Albania	809	-0.014 **	0.006	-0.002	0.008	0.790 ***	-0.070 ***	0.025	-0.022	0.024	0.793 ***	
Armenia	773	-0.027 ***	0.007	-0.039 ***	0.007	0.686 ***	-0.078 ***	0.020	-0.103 ***	0.020	0.686 ***	
Azerbaijan	843	-0.022 ***	0.005	-0.018 ***	0.005	0.849 ***	-0.067 ***	0.017	-0.053 ***	0.017	0.858 ***	
Belarus	652	-0.044 ***	0.010	-0.052 ***	0.010	0.810 ***	-0.133 ***	0.027	-0.172 ***	0.028	0.824 ***	
Bosnia	782	-0.035 ***	0.008	-0.052 ***	0.008	0.904 ***	-0.087 ***	0.022	-0.137 ***	0.022	0.906 ***	
Bulgaria	599	-0.038 ***	0.009	-0.032 ***	0.009	0.764 ***	-0.087 ***	0.023	-0.076 ***	0.024	0.743 ***	
Croatia	699	-0.036 ***	0.007	-0.039 ***	0.007	0.914 ***	-0.108 ***	0.020	-0.108 ***	0.020	0.914 ***	
Czech Republic	756	-0.047 ***	0.008	-0.053 ***	0.008	0.865 ***	-0.157 ***	0.028	-0.221 ***	0.031	0.866 ***	
Estonia	585	-0.021 **	0.010	-0.026 ***	0.010	0.750 ***	-0.059 **	0.026	-0.067 ***	0.027	0.754 ***	
France	758	-0.044 ***	0.008	-0.053 ***	0.008	0.788 ***	-0.104 ***	0.021	-0.135 ***	0.022	0.793 ***	
Germany	795	-0.059 ***	0.008	-0.048 ***	0.008	0.800 ***	-0.175 ***	0.024	-0.171 ***	0.026	0.816 ***	
Great Britain	1,061	-0.039 ***	0.007	-0.047 ***	0.007	0.824 ***	-0.090 ***	0.018	-0.116 ***	0.018	0.821 ***	
Hungary	692	-0.044 ***	0.010	-0.066 ***	0.010	0.757 ***	-0.136 ***	0.026	-0.194 ***	0.027	0.750 ***	
Italy	849	-0.039 ***	0.008	-0.045 ***	0.007	0.946 ***	-0.130 ***	0.023	-0.165 ***	0.024	0.951 ***	
Kosovo	780	-0.009	0.006	0.003	0.006	0.789 ***	-0.017	0.020	0.003	0.020	0.772 ***	
Kyrgyzstan	865	-0.007	0.006	-0.013 **	0.006	0.870 ***	-0.039 *	0.024	-0.057 **	0.023	0.891 ***	
Latvia	637	-0.044 ***	0.009	-0.038 ***	0.008	0.605 ***	-0.129 ***	0.024	-0.113 ***	0.024	0.600 ***	
Lithuania	625	-0.032 ***	0.008	-0.044 ***	0.009	0.617 ***	-0.117 ***	0.026	-0.143 ***	0.024	0.621 ***	
Macedonia	893	-0.023 ***	0.007	-0.028 ***	0.007	0.816 ***	-0.058 ***	0.018	-0.075 ***	0.018	0.814 ***	
Mongolia	785	-0.024 ***	0.006	-0.036 ***	0.006	0.708 ***	-0.061 ***	0.016	-0.102 ***	0.017	0.709 ***	
Montenegro	634	-0.035 ***	0.007	-0.054 ***	0.008	0.892 ***	-0.125 ***	0.024	-0.169 ***	0.025	0.896 ***	
Poland	1,124	-0.053 ***	0.006	-0.050 ***	0.006	0.903 ***	-0.182 ***	0.019	-0.198 ***	0.021	0.902 ***	
Romania	644	-0.013 *	0.007	-0.015 **	0.008	0.814 ***	-0.032	0.021	-0.035	0.022	0.819 ***	
Serbia	1,065	-0.027 ***	0.006	-0.036 ***	0.006	0.799 ***	-0.071 ***	0.016	-0.094 ***	0.017	0.796 ***	
Slovakia	699	-0.044 ***	0.008	-0.037 ***	0.008	0.827 ***	-0.155 ***	0.026	-0.151 ***	0.027	0.808 ***	
Slovenia	755	-0.042 ***	0.008	-0.041 ***	0.007	0.870 ***	-0.113 ***	0.022	-0.127 ***	0.022	0.866 ***	
Sweden	656	-0.039 ***	0.009	-0.055 ***	0.010	0.780 ***	-0.091 ***	0.025	-0.137 ***	0.025	0.786 ***	
Tajikistan	809	-0.010 **	0.004	-0.030 ***	0.006	0.775 ***	-0.062 ***	0.023	-0.125 ***	0.022	0.770 ***	
Turkey	911	-0.009 *	0.006	-0.022 ***	0.005	0.919 ***	-0.028	0.021	-0.087 ***	0.022	0.924 ***	
Uzbekistan	945	-0.009 *	0.005	-0.016 ***	0.005	0.810 ***	-0.041 **	0.021	-0.067 ***	0.019	0.813 ***	

Notes: Table reports marginal effects of risk aversion on the marginal probability to be willing to migrate within the country and abroad. In the baseline specification the unreported control variables are age, gender, household size as well as the dummy variables for educational attainment levels (secondary and tertiary with compulsory as a base category), married persons and households with children. The extended specification additionally controls for the number of years of residence, homeownership, unemployment, self-assessed wealth, generalized trust and the number of memberships in clubs and civil society organizations. These effects are also not reported. S.E. = Heteroscedasticity robust standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1. Data source: Life in Transition Survey 2010.

Table 3: Correlation of significant country level marginal effects of risk aversion on the willingness to migrate with various risk measures of the respective countries

	Willing to migrate within country	Willing to migrate abroad
GDP per capita	-0.545 ***	-0.489 ***
Overall risk	0.664 ***	0.538 ***
Security risk	0.639 ***	0.490 ***
Political stability risk	0.698 ***	0.553 ***
Government effectiveness risk	0.604 ***	0.604 ***
Legal & regulatory risk	0.585 ***	0.511 ***
Macroeconomic risk	-0.011	- 0.110
Financial risk	0.646 ***	0.510 ***
Foreign trade and payment risk	0.578 ***	0.429 **
Tax policy risk	0.455 **	0.393 **
Labour market risk	0.554 ***	0.479 ***
Infrastructure risk	0.662 ***	0.522 ***

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Only marginal effects that are significant at the 5% level are considered when calculating the coefficient of correlation. Data source: Life in Transition Survey 2010, Economist Intelligence Unit. Marginal effects calculated from baseline specification reported in Table 2.

Table 4: Country by country estimation results for alternative risk measure and alternative measure of willingness to migrate (marginal effects)

	Alternative risk measure		Alternative mobility measure		Original model	
	willing to migrate internally	willing to migrate abroad	willing to migrate internally ¹⁾	willing to migrate abroad	willing to migrate internally ¹⁾	willing to migrate abroad
	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.
Albania	0.001	0.034	0.010	0.043	-0.007	0.003
Armenia	0.038	0.041	-0.074	0.046	-0.008	0.005
Azerbaijan	-0.111	0.051	-0.109	0.050	-0.009	0.004
Belarus	-0.247	0.046	-0.239	0.045	-0.013	0.008
Bosnia	-0.002	0.040	-0.041	0.041	0.000	0.005
Bulgaria	-0.080	0.048	-0.067	0.049	-0.020	0.008
Croatia	-0.098	0.045	-0.203	0.046	-0.006	0.003
Czech Republic	-0.164	0.037	-0.183	0.035	-0.013	0.007
Estonia	-0.116	0.050	-0.166	0.051	-0.007	0.007
France	-0.124	0.038	-0.182	0.038	-0.019	0.008
Germany	-0.152	0.041	-0.114	0.036	-0.032	0.008
Great Britain	-0.144	0.036	-0.227	0.035	-0.011	0.006
Hungary	-0.148	0.049	-0.197	0.049	-0.009	0.008
Italy	-0.103	0.042	-0.122	0.039	-0.006	0.006
Kosovo	-0.148	0.045	-0.121	0.045	-0.008	0.004
Kyrgyzstan	-0.057	0.031	-0.125	0.033	0.000	0.003
Latvia	-0.045	0.047	-0.216	0.047	-0.028	0.008
Lithuania	-0.112	0.047	-0.150	0.050	-0.013	0.006
Macedonia	0.040	0.043	-0.083	0.040	-0.003	0.004
Mongolia	-0.037	0.051	-0.054	0.047	-0.008	0.006
Montenegro	-0.184	0.044	-0.250	0.045	0.000	0.004
Poland	-0.174	0.033	-0.151	0.032	-0.017	0.004
Romania	-0.052	0.046	-0.102	0.050	-0.003	0.004
Serbia	0.016	0.036	-0.023	0.039	-0.005	0.004
Slovakia	-0.120	0.037	-0.137	0.034	-0.019	0.006
Slovenia	-0.118	0.039	-0.152	0.037	-0.017	0.007
Sweden	-0.201	0.039	-0.223	0.040	-0.007	0.007
Tajikistan	-0.001	0.024	-0.061	0.034	0.000	0.002
Turkey	0.094	0.033	0.037	0.032	0.005	0.004
Uzbekistan	-0.095	0.033	-0.140	0.036	-0.001	0.003

Notes: Specification controls for age, gender, educational attainment and marital status, having children and household size. Heteroscedasticity robust standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Data source: Life in Transition Survey 2010 (all regressions) and 2016 (regression on alternative mobility measure only). 1) willingness to migrate internally is the probability to be willing to migrate internally conditional on not being willing to migrate externally. Number of observations see Table 2.

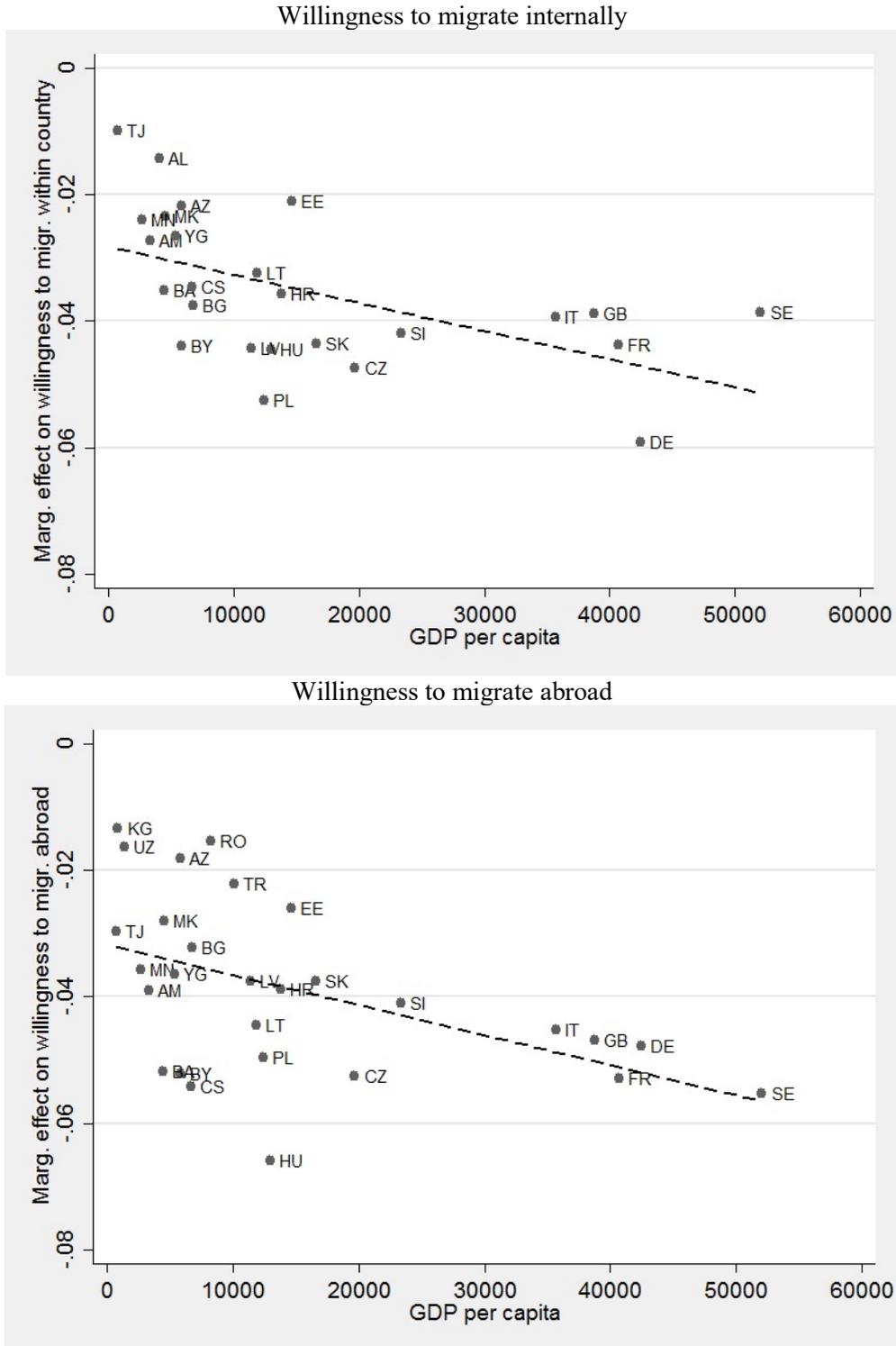
Table 5: The impact of omitting risk aversion on the marginal effects of gender education and age

		Including risk		Excluding risk		Relative change
		Mean marginal effect	Number significant (at 5% level)	Mean marginal effect	Number significant (at 5% level)	
Gender	Willing to migrate within the country	0.054	9	0.071	16	0.31
	Willing to migrate abroad	0.064	10	0.084	19	0.31
Medium education	Willing to migrate within the country	0.039	6	0.050	8	0.28
	Willing to migrate abroad	0.038	5	0.053	7	0.39
High education	Willing to migrate within the country	0.070	7	0.095	12	0.36
	Willing to migrate abroad	0.084	10	0.112	14	0.33
Age	Willing to migrate within the country	-0.007	27	-0.008	28	0.14
	Willing to migrate abroad	-0.007	27	-0.008	28	0.14

Notes: Specifications control for age, gender, educational attainment and marital status, children and household size. Data source: Life in Transition Survey 2010.

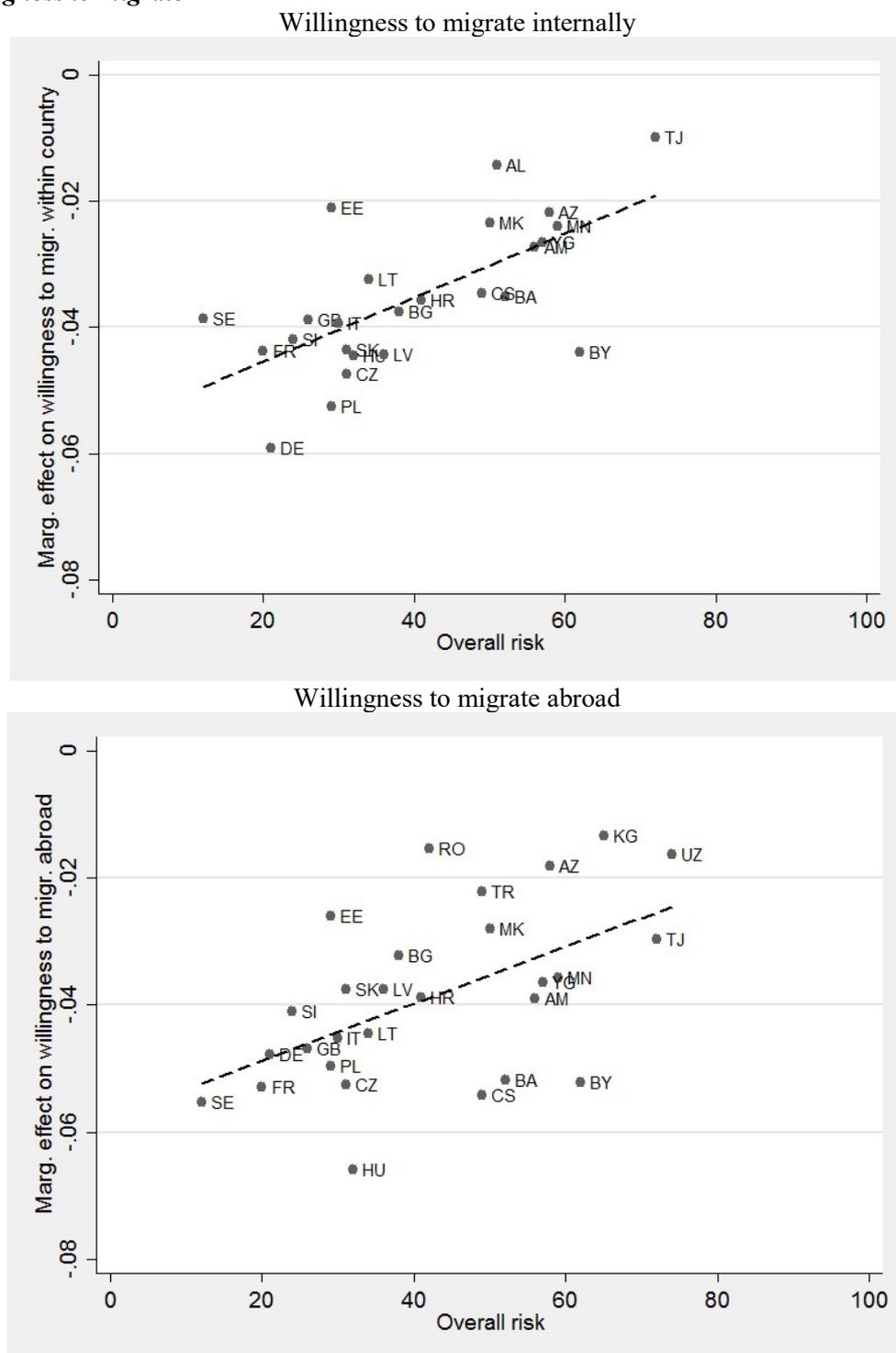
Appendix not for Publication

Figure A1: Scatterplot of GDP per capita and marginal effect of risk aversion on the willingness to migrate



Data source: Life in Transition Survey 2010, World Bank. Marginal effects calculated from baseline specification in Table 2. For country codes see table A1 in the appendix.

Figure A2: Scatterplot of overall risk assessment by country and marginal effect of risk aversion on the willingness to migrate



Data source: Life in Transition Survey 2010, Economist Intelligence Unit. Marginal effects calculated from baseline specification in Table 2. For country codes see table A1 in the appendix.

Table A1: List of country codes

Country name	Country code
Albania	AL
Armenia	AM
Azerbaijan	AZ
Belarus	BY
Bosnia	BA
Bulgaria	BG
Croatia	HR
Czech Republic	CZ
Estonia	EE
France	FR
Germany	DE
Great Britain	GB
Hungary	HU
Italy	IT
Kosovo	KO
Kyrgyzstan	KG
Latvia	LV
Lithuania	LT
Macedonia	MK
Mongolia	MN
Montenegro	CS
Poland	PL
Romania	RO
Serbia	YG
Slovakia	SK
Slovenia	SI
Sweden	SE
Tajikistan	TJ
Turkey	TR
Uzbekistan	UZ