

The impact of non-cognitive skills and risk preferences on rural-to-urban migration in Ukraine

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Abstract

This paper provides evidence on the impact of non-cognitive skills and attitudes towards risk on the decision to migrate from rural to urban areas. Our analysis is based on a unique four-wave panel of the Ukrainian Longitudinal Monitoring Survey for the period between 2003 and 2012. Adopting the Five Factor Model of personality structure, and using it in the evaluation of non-cognitive skills, our results suggest that the personality trait *openness to new experience* increases the probability of migration. On the other hand, the non-cognitive skills *conscientiousness*, *agreeableness* and *neuroticism* are found to be negatively associated with the propensity to migrate. The impact of an increased willingness to take risks is more complex in that it increases the proclivity to move from rural areas to cities but lowers the migration intention from rural areas to towns. The effects are quantitatively significant and are robust to several sensitivity checks, including tests of reverse causality.

JEL classifications: J61, D03, D81, R23.

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1 Introduction

A growing body of economics literature has been investigating the role of non-cognitive skills, often referred to as soft skills or personality traits, in predicting micro-economic behavior. In this literature non-cognitive skills, besides cognitive abilities, are documented as important determinants of labor productivity, wages, occupational choices and job search behavior (see Kautz et al., 2014 for a summary). Conceivably, geographic mobility is among those life outcomes which non-cognitive skills might predict. Yet only little is known about the role of non-cognitive skills for individual migration decisions (e.g., Bütikofer and Peri, 2016, Caliendo et al., 2016). The current study contributes to this scarce literature by providing evidence on the impact of non-cognitive skills on the decision to migrate within a developing country.

Considering migration behavior within a resource allocation framework, people migrate to realize their labor market potential as far as its benefits outweigh the costs. The costs of migration increase with greater uncertainty about other locations, particularly about the housing market, labor market and education opportunities. In this respect, risk attitudes have a high predicting power in explaining the migration decision as recently documented by Jaeger et al. (2010) and Bauernschuster et al. (2014). Apart from the mobility costs due to market imperfections or the time and effort spent to search for and get familiar with a new job, there are other non-monetary considerations involved in migration such as the emotional burden of leaving familiar surroundings, family and friends, and adapting to a different cultural environment. These so-called "psychic" costs might increase the costs of moving perceived by individuals (Sjaastad, 1962).

Unlike travel costs it is not possible to quantify the magnitude of the non-pecuniary costs of migration, which is subject to a subjective evaluation by each person. Assessment of these costs may be quite different even among persons with very similar demographic and socio-economic characteristics. We argue that how individuals perceive these costs might be related to personality characteristics. Certain characteristics such

as openness to new experience may help people perceive these costs to be lower, while other skills may make people strongly attached to their communities and thus perceive the costs of leaving as higher. Here, we pursue the question what types of non-cognitive skills might make individuals perceive a lower (higher) cost and thus generate more (less) willingness to migrate¹. In this paper, we do not develop a theoretical model that shows the link between non-cognitive skills and rural-to-urban migration. Our goal is to identify those non-cognitive skills that are important predictors of migration in a consistent fashion.

The focus of this study is rural-to-urban migration in Ukraine. Rural-to-urban migration is an especially important type of mobility in the developing country context, since it has the potential to foster economic growth by reallocating workers from economically lagging-behind regions to large urban centers, where returns to human capital are higher. For the empirical analysis, we use the four waves of the Ukrainian Longitudinal Monitoring Survey (ULMS). In addition to rich information on individual and labor market characteristics, the ULMS includes direct measures of attitudes towards risk in the survey years of 2007 and 2012 and a module with 24 items on non-cognitive skills added in 2012. Using this skill module we assess non-cognitive skills based on the widely accepted ‘Big Five’ taxonomy developed in the personal psychology literature (Goldberg, 1990; John and Srivastava, 1999; Lang et al., 2011) and well taken in the economics literature (e.g., Borghans et al., 2008a, Gill and Prowse, 2016). The taxonomy measures five character skills: openness, conscientiousness, extraversion, agreeableness, and neuroticism. We propose a mapping of the 24 items into the Big Five domains, utilizing the facets of these domains characterized by John and Srivastava (1999).

Our results suggest that openness to new experience increases the probability of an individual to migrate from rural to urban areas. On the other hand, conscientiousness, agreeableness and neuroticism are negatively correlated with the propensity

¹One may argue that non-cognitive skills comprise both personality traits and risk preferences. To avoid conceptual confusion, in this text we use the term ‘non-cognitive skills’ only to indicate personality traits, particularly the Big Five factors.

to migrate. The effects are driven both by movements from rural areas into large cities and by movements from rural areas into towns. However, we find no consistent evidence supporting an association of extraversion with the migration propensity. The willingness to take risks has countervailing effects when it comes to moves into cities and moves into towns, impacting on migration positively in the former case and negatively in the latter. The magnitudes of the impacts of non-cognitive skills and risk attitudes are at any rate substantial considering unconditional rural-to-city and rural-to-town migration probabilities of about 1.5 percent each.

Our results also indicate that a full model, which uses the Big Five factors and risk preferences jointly, fits the data better than models that use them separately. Moreover, we provide evidence that the estimated effects of personality and risk attitudes are not driven by reverse causality. To the best of our knowledge, this study is the first one that explores simultaneously the effects of the Big Five factors and risk preferences on migration decisions and, in addition, focuses on these effects in a developing country context. Our results are roughly in line with the findings from the psychology literature that indicate a strong positive impact of openness and a strong negative impact of conscientiousness on migration behavior, whilst either very little or no effect of extraversion. Regarding the personality traits agreeableness and neuroticism, the evidence is rather mixed in this literature, pointing to unstable signs of the coefficients and often to statistical insignificance of the estimates. Our results are also consistent with the previous evidence by Jaeger et al. (2010) and Bauernschuster et al. (2014), showing that risk loving people are more likely to migrate.

In the following section, we provide some background information about demographic developments and migration patterns in Ukraine. Section 3 presents a brief summary of the pertinent literature on the link between non-cognitive skills and life outcomes and embeds our paper into this literature. Section 4 introduces the data, motivates the variables used in the regression analysis, and discusses our research strategy. The following section presents the main estimation results and provides some extensions and robustness checks. Finally, Section 6 discusses the results and offers some

conclusions.

2 Demographic developments and internal migration in Ukraine

In the last three decades, very little research has been done on internal labor mobility in Ukraine and many questions related to its different aspects remain unanswered. To put our paper into context, we provide a brief overview of the major economic and demographic developments and of internal migration trends in Ukraine.

During the independence years Ukraine's population contracted by roughly 9 million people from 51,9 million in 1991 to 42,8 million in 2016 (State Statistics Service of Ukraine²). This enormous population drop may jointly be explained by a combination of three major factors: low fertility rates (1.5 children per woman³), high mortality levels (deficit of births over deaths reached 158711 persons in 2013) and international out-migration (Danzer and Dietz, 2014). These demographic trends were nurtured by unfavorable economic conditions that led to an overall impoverishment of the population. In the 1990s, the country experienced a period of hyperinflation and an enduring economic recession with real GDP falling by over 60%, resulting in high rates of poverty. Among especially affected population groups were families with children and the less educated as well as the rural population (Brück et al., 2010). Although the situation slightly improved in the period of moderate economic growth in the later years, economic shocks such as the global financial crisis, which hit Ukraine in 2008-2009, and the military conflict with Russia, which started with the Russian annexation of Crimea in 2014, led again to a sharp drop in the welfare of the population. The latter conflict resulted in a large number of internally displaced people.⁴ Problems

²<http://www.ukrstat.gov.ua/>, retrieved on 25 January 2017.

³Fertility rate for 2013 according to the State Statistics Service of Ukraine. The fertility rate is traditionally lower in urban (1.365) than in rural areas (1.825).

⁴According to the Ministry of Social Policy of Ukraine, by August 2016, there were 1.8 million internally displaced people registered in the country.

caused by these internal movements, such as, for instance, the difficult labor market integration of newcomers and their limited access to the housing market, pointed to the multiple institutional shortcomings and obstacles that have greatly discouraged internal mobility in Ukraine.

A number of barriers to internal mobility includes a complicated population registry system, weak formal labor market institutions, underdeveloped housing and credit markets, non-portability of social benefits and wide-spread skills mismatch⁵ (Koettl et al., 2014). As a result, the population of Ukraine is considerably less geographically mobile than one would expect given the high economic disparities across regions and between rural and urban areas⁶.

While Kyiv is the largest magnet for internal labor migrants in the country, internal migration in Ukraine is not always directed from economically lagging to better developed industrial regions but happens mostly within the same region (from rural to urban areas) or between neighboring regions with similar levels of socioeconomic development (Koettl et al., 2014, Kupets, 2014).

The share of the urban population in Ukraine has been growing slowly in the last decades: it increased from 66.9% in 1989 to 69.2% in 2016. This process is driven by internal movements of mostly young people from rural areas to the cities in search of better economic opportunities. In general, rural areas in Ukraine provide a much poorer standard of living, worse quality of facilities and infrastructure and fewer opportunities for skills acquisition and employment as compared to large urban centers. Hence, economic disparities between rural and urban settlements encourage many people to engage in one of two popular types of internal mobility: permanent movements from rural areas to larger urban centers or commuting⁷ between the (rural)

⁵Lack of appropriate skills in rural areas is one of the factors that hinder internal migration, which otherwise would be an expected response to spatial earnings differentials. Some agriculture-dominated regions employ low-skilled workers that cannot easily become qualified for employment in high-wage industrial sectors in other regions.

⁶Despite a relatively low level of internal mobility due to institutional obstacles in Ukraine, people still decide to move from rural to urban areas and the effect of non-cognitive skills as factors affecting these decisions may be efficiently studied in settings, where migration decisions are related to high costs.

⁷The total number of commuters reached 2.6 million individuals in 2010, which amounted to 13.2%

place of residence and the (urban) location of work.

3 Our study and the literature on non-cognitive skills and life outcomes

Economic research analyzing the impact of non-cognitive skills on life outcomes has rapidly expanded since the 2008 special issue of the *Journal of Human Resources* edited by Weel (2008). In this special issue, Borghans et al. (2008a) link the evidence from the psychology of personality traits to economics. For instance, Borghans et al. (2008b) focus on the relationship between interpersonal styles (caring and directness) and labor market outcomes. Kautz et al. (2014) present a summary of the evidence from the economics literature on the predictive power of non-cognitive skills for a wide range of life outcomes, including educational achievement, labor market outcomes, health, and criminal behavior.

Much less is known about the impact of non-cognitive skills on migration behavior. To the best of our knowledge, there are only two economic papers on the impact of non-cognitive skills on the decision to migrate. Bütikofer and Peri (2016) investigate the importance of cognitive and non-cognitive skills on the probability of migrating out of one's region of origin for the male population in Norway. Focusing on two aspects of non-cognitive skills, 'adaptability' and 'sociability', they find that adaptability has a particularly strong impact on migration for individuals with low cognitive skills. On the other hand, Caliendo et al. (2016) investigate the predicting role of locus of control in internal migration decision within Germany. Their findings suggest that those with an internal locus of control are predicted to search a job more intensely across larger geographic areas because they expect higher returns to their search effort.

In contrast to the scarce evidence on non-cognitive skills and migration in economic research, it has been relatively extensively studied in the psychology literature. These

of the total number of employed persons.

psychological studies generally rely on the Big Five factor model. Using a sample of Finnish twins, Silventoinen et al. (2008) find extraversion and neuroticism positively correlated with the migration propensity to neighboring Sweden. In another study using Finnish subjects, Jokela et al. (2008) point to sociability as an important determinant of internal rural-to-urban migration. On the other hand, some evidence from the U.S. suggests that high openness and low agreeableness increase the propensity to migrate within- and between-states, while extraversion can only predict within-state migration (Jokela, 2009). Focusing on two elements of the Big Five, Canache et al. (2013) find only a modest positive influence of openness and extraversion on the intention to emigrate from Latin American countries. While for openness the greatest effect is seen among relatively well-educated respondents, for extraversion it is rather a compensating effect in that low-educated respondents are less likely to intend to emigrate, but the education gap shrinks as extraversion rises. Another study, examining the impact of the Big Five factors on the intention to emigrate and using a Lithuanian student sample, finds no evidence for extraversion to have predictive power. The results of Paulauskaite et al. (2010) suggest conscientiousness and openness the only two traits to be linked with migratory intentions. The cited psychological studies do not arrive at clear-cut conclusions regarding the link between the Big Five and migration. This might be the result of methodological deficiencies or of very specific samples used in the analysis.

We rely on a Big Five factor model for the analysis of the impact of non-cognitive skills on rural-to-urban migration. But the focus of our study is not limited to this, since we analyze the impact of non-cognitive skills together with the attitudes towards risk on migration behavior. Our study draws on Jaeger et al. (2010) who provide direct evidence on risk attitudes and internal migration. Using data from the German Socio-Economic panel they find that individuals who are more willing to take risks are more likely to migrate between labor markets in Germany. Non-monetary costs due to general uncertainty (imperfect information) about other locations are considered to be the channel through which risk attitudes determine intra-country mobility. A more

recent study by Bauernschuster et al. (2014) using the same data source focuses on internal migration in order to explore the reason why more educated and risk-friendly persons move more easily over longer distances. Their findings suggest less sensitivity among those people to the cultural costs of migration proxied by linguistic variation within Germany, while costs related to geographical distance do not play a role in explaining the higher mobility of higher educated and risk-loving persons.

As documented by Jaeger et al. (2010) and Bauernschuster et al. (2014), because risk lovers are more able to deal with uncertainties connected to moving to a new place, the obvious expectation would be to find a positive relationship between the willingness to take risk and the migration propensity. For non-cognitive skills the relationship is not so self-evident given the ambiguity of the previous evidence from the psychology research. Arguably, we may anticipate that skills that reduce the cost of mobility would increase the probability of migration. For instance, openness to experience is expected to help adapt to a new environment and a different culture, and hence decrease the psychic costs of migration and increase the probability of moving. On the other hand, a skill such as conscientiousness described by the tendency to be organized, responsible, and hard-working as well as by a high valuation of persistence and predictability is expected to be negatively associated with the decision to migrate (John and Srivastava, 1999; Kautz et al., 2014). Moving to another place per se contains unpredictability (uncertainties) and inconsistency as it opens a new episode in life. Therefore, conscientious people might perceive moving as relatively costly.

It is not straightforward to anticipate the direction of the relationship for the other three traits. For extraversion the first effect that comes to mind is to increase the migration propensity, because extraverted people have better communication abilities which would help them easily adapt to a new environment. On the other hand, it is reasonable to argue that social people feel more attached to their own communities as well as more able to increase their well-being in their present places (John and Srivastava, 1999; Jokela, 2009; Paulauskaite et al., 2010). Taken together, these facets of extraversion might counterbalance each other and as a result there will be no

significant effect on the migration decision observed.

Countervailing effects might also arise for agreeableness and neuroticism.⁸ More agreeable individuals can more easily conform to different norms of a new environment so that the cost of adaptation would be lower for them. However, those people are also likely to be pleasant and satisfied with their existing lives and have a stronger emotional attachment to their own communities (Jokela, 2009). The latter facet would make them less willing to leave their current place. Similarly, some facets of neuroticism (emotional instability) such as proneness to anxiety and fear, low self-esteem, and vulnerability to stress are expected to make individuals less able to start over a life in a new place. Meanwhile, some other facets of neuroticism such as pessimism, hostility, and irritability might bring about a lower level of satisfaction with their current jobs, neighborhoods or lives as a whole, which would instigate the decision to migrate (Jokela, 2009). Our analysis helps to shed light on those facets of the Big Five factors that dominate the decision to migrate in our data sample.

4 Data, descriptive evidence and empirical strategy

4.1 Data

For the estimation of the impacts of non-cognitive skills and risk preferences on the rural-to-urban migration decision we make use of panel data from the Ukrainian Longitudinal Monitoring Survey (ULMS). The panel survey launched in 2003 was also carried out in 2004, 2007 and 2012. The ULMS is the only panel data set for Ukraine, which is accessible to researchers worldwide and is representative at the national level (see Lehmann et al., 2012). Our sample consists of individuals between the age of 15 and 72. The survey instrument contains an individual questionnaire soliciting information on socio-demographic and labor force characteristics, labor market status,

⁸The evidence is more clear-cut in the context of other micro-economic behavior. For instance, in their recent study, Gill and Prowse (2016) link the Big Five to economic behavior and find that more agreeable and less neurotic individuals perform and learn better in strategic games.

skills, preferences and attitudes, as well as a household questionnaire on the structure of the household, housing conditions, income, assets and expenditures.

For the outcome variable of interest, namely rural-to-urban migration, we exploit the survey question related to the “type of settlement of the current place of residence” which is asked in all four waves of the panel survey. Possible answer categories include six types of settlement: village, rural-type settlement, small town (population up to 20 thousands), medium town (population of 20-99 thousands), city (population of 100-499 thousands) and large city (population more than 500 thousands). While we consider villages and rural-type settlements as belonging to a ‘rural’ area, towns (small- and medium-size) and cities (medium- and large-size) are categorized as ‘urban’ areas. The dependent variable thus comprises a binary indicator which takes a value of 1 if the respondent changes the type of settlement from a rural area to an urban area between two survey periods and a value of 0 if the respondent resides in a rural area both in the current and last survey period.⁹

One important feature of the ULMS is its collection of information on non-cognitive skills in the wave of 2012, where a set of questions regarding non-cognitive skills was added to the survey. The questions, based on the World Bank’s 24-item STEP survey questions regarding non-cognitive skills (Pierre et al., 2014), asks respondents how they perceive themselves. Respondents are asked, for instance, whether they are talkative, are interested in learning new things, tend to worry, and so on. Responses are ranked on a 4-point scale: “1 Almost always”, “2 Most of the time”, “3 Some of the time” and “4 Almost never”. We transform the ranking in a way that a higher ranking refers to a higher value for the corresponding characteristic (1=Almost never – 4=Almost

⁹A person who changes from a rural to an urban area is always assigned the value 1 once this move has occurred. For example, if a person moved between 2003 and 2004, s/he will be assigned a value of 1 for the intervals 2004 to 2007 and 2007 to 2012. Given the construction of the dependent variable, a potential concern is measurement error due to ‘round-tripping’. Given that there are up to 5-year brackets between two survey periods, it is possible to experience multiple movements within such a relatively long period. Therefore, our dependent variable could underestimate the rural-to-urban migration if movers migrate back to the rural area between two survey periods. A preliminary check performed by us, which employs information on moves between reference weeks, indicates that ‘round-tripping’ is negligible. Less than 5 percent of the rural-to-urban movers experience round-tripping.

always). In the assessment of non-cognitive skills, we map these 24 items into the Big Five factors model, with openness, conscientiousness, extraversion, agreeableness, and neuroticism as the five personality constructs. The Big Five personality factors represent a widely accepted, comprehensive, and ample frame for delineating the structure of core personality traits over adulthood (Lang et al., 2011: 550). Given its universal structure validated by numerous empirical studies from different cultures as well as its rank order stability over the life cycle, we prefer the Big Five Factor model to the usage of single traits such as self-efficacy or self-esteem, which show less rank order stability (Goldberg, 1990; John and Srivastava, 1999; Lang et al., 2011).

Our mapping into the Big Five factor model largely benefits from the domains characterized by John and Srivastava (1999) and Kautz et al. (2014). Table 1 presents the original table of the 24 items and the corresponding Big Five factors into which these items are mapped. While generating the Big Five constructs, the scale of some items –those denoted by ‘*’– are reversed for the sake of coherence with the defining construct. Each of the Big Five factor is the simple average of the corresponding items and the averages are standardized with a mean of zero and standard deviation of 1. Because the information on non-cognitive skills is only available in the survey year of 2012, we treat the Big Five personality constructs as fixed over the sample period. Whether this assumption is plausible is taken up in the robustness section of the paper. It is also worthy of note that the treatment of the non-cognitive skills fixed over the period requires us to use a balanced panel straddling the years 2003 to 2012.¹⁰

The ULMS also introduced a module on risk preferences in 2007 and 2012, identical to the module in the German Socio-Economic Panel (SOEP). Respondents are asked about their willingness to take risks in general and in life-specific domains.¹¹ In our empirical analysis we only use the general risk measure. The general risk question

¹⁰We did not pursue exploratory factor analysis since the cited literature provides us with a very intuitive and clear guidance regarding the mapping of the 24 items into the Big Five factors. Exploratory factor analysis is particularly useful when researchers have only vague notions of how to project high-dimensional data onto a lower dimensional space, which is not the case here.

¹¹These life-specific domains are: financial matters, career, health, sports and leisure, as well as car driving.

asks: "How do you see yourself: are you generally a person who is willing to take risks or do you try to avoid taking risks?" The answer can be on an 11-point Lickert scale, from 0 "completely unwilling to take risks" to 10 "completely willing to take risks". In our main regressions we rely on a dichotomous variable, the risk preference indicator, which takes the value of 1 if the respondent chooses a value of 6 or higher on the 0-to-10-scale. This mitigates potential problems from different use of scales, as explained by Jaeger et al. (2010).¹²

Similar to the Big Five measures, we treat preferences as (partly) fixed over the sample period. In particular, we assign the values of risk preferences measured in 2007 to the previous survey years of 2003 and 2004, and address the potentially arising reverse causality issue in section 5.

4.2 Descriptive statistics

Table 2 presents summary statistics of the variables used in the regression analysis for rural-to-urban movers, rural stayers, and the urban sample. The former two make up our sample for analysis. Since the 2012 survey is the only year with complete information on both non-cognitive skills and preferences, the statistics reported in Table 2 are for 2012. However, we also present summary statistics of other years for the available variables in Table A.1 in the appendix. Table 2 shows those rural-to-urban movers who moved between 2007 and 2012, the period encompassing the Great Recession. If we compare this table with Table A.1, we see that between 2007 and 2012 the number of moves was particularly small compared to the period between 2003 and 2004. This lower number could be related to less mobility in times of economic crisis. Another reason for this drop in numbers could be a selection issue. Nearly all the rural-to-urban movers whom we observe are part of the original sample that was surveyed in 2003. It is certainly feasible that those with the largest propensity to move to an urban environment moved early in the reported period and once we arrive

¹²The risk index, which measures risk attitudes on the 11-point scale is only used for some robustness checks.

in 2007 the pool of those willing to move has nearly been depleted. This potential explanation strongly influences our research strategy that we discuss below.

The urban sample is composed of those who were born and currently reside in urban areas as well as those who moved into urban areas. Table 2 demonstrates that the urban sample is significantly younger than the rural sample. Furthermore, about 70% of the urban sample prefer to communicate in Russian; these respondents are likely to be concentrated in the center and east of the country. In line with expectations, the education level and employment rate among the urban sample is higher than among rural stayers. Consistent with these patterns, compared to rural stayers, the movers into urban areas are much younger, relatively more educated, more likely to be married but have less children, more likely to be employed and more likely to prefer Russian for communication.

Table 2 also shows the average values of the Big Five factors (on a 4-point scale) separately for movers and stayers. We see a positive and statistically significant difference in the average value of openness and agreeableness for movers relative to stayers. As for conscientiousness and neuroticism movers score, on average, lower than stayers. The negative difference for each of these two skills is also statistically significant. However, as far as extraversion is concerned, the difference between movers and stayers is not statistically significant. Next, we present how attitudes towards risk are distributed between rural-to-urban movers versus stayers. As shown in Table 2, 23% of movers score their risk attitudes 6 or higher on the 11-point scale, which is about 5 percentage points higher than rural stayers. The measured risk preferences show lower scores among movers compared to stayers in 2007. The difference between the two survey years are mainly driven by movers who scored significantly lower in 2007 than 2012. The difference is more apparent for the index measure, thus we rely in our analysis on the dichotomous indicator variable as it can better mitigate the potential measurement error problem. A relevant concern can also be reverse causality, in that the migration experience might have led to an increase in the willingness to take risks or might have prompted respondents to reveal themselves as more risk loving. We

discuss this potential endogeneity problem due to reverse causality in section 5.

Finally, we examine the distribution of the responses to the general risk questions for the rural and urban samples in 2007 and 2012. As shown in Figure 1, the average of the risk index is higher in the urban than in the rural sample in both survey years. While the largest difference between the rural and urban is among the most risk-averse group in 2007, we do not see such a remarkable difference in 2012.

4.3 Empirical strategy

To investigate the impact of non-cognitive skills and risk preferences on the probability of migration, we estimate the following basic specification of a probit model:

$$Y_{i,t} = \alpha + N_i' \beta + \gamma P_{i,t+\tau} + X_{i,t-1}' \delta + \epsilon_{i,t} \quad (1)$$

where $\tau = \{0, 1, 2\}$.

$Y_{i,t}$ indicates a dummy variable which takes the value of 1 if the respondent i resides in the urban area during the reference week of survey period t , but was residing in a rural area during the reference week of the previous survey period, at time $t - 1$.¹³ It takes the value of 0 if the respondent's current and last settlements are both in the rural area. N_i is a vector of non-cognitive skills represented by the Big Five which are standardized to have a mean of 0 and standard deviation equal to 1. Because we observe responses to non-cognitive skill questions only in 2012, we assume them as time-invariant characteristics of the individual. In the next section we perform a robustness check which shows that this is a reasonable assumption. The variable $P_{i,t+\tau}$ is the risk indicator which takes the value of 1 for risk index values greater than 5 (on a scale of 0 to 10). The risk measure is observed in 2007 and 2012 surveys. For the most part, we assign the values of risk preferences measured in 2007 to the previous survey years of 2003 and 2004. However, when the risk measure is not available in 2007 we use the risk measure of 2012. In the most extant basic

¹³In subsequent periods the dependent variable takes the value 1 if the respondent ever moved.

specification, $X_{i,t-1}$ is a vector of individual characteristics with dummy variables for female, married, employed, educational attainment and Ukrainian as the preferred language of the interview, as well as continuous variables including age, age squared, the number of children in the household and the log of household income. For the time-varying covariates we rely on information from the previous survey year in order to rule out reverse causality problem, i.e., the covariates are measured at time $t - 1$, before migration happens. Finally, $\epsilon_{i,t}$ is a white noise error term.

The estimated coefficients of β capture the impact of non-cognitive skills on the propensity to move from rural to urban areas, holding risk attitudes and other individual characteristics constant. A concern would be that measurements of non-cognitive skills might be correlated with risk preferences, and this could yield biased coefficient estimates on the non-cognitive skills covariates. For instance, if those who have a higher score of conscientiousness are more risk averse, then the impact of conscientiousness might be overestimated by controlling for risk attitudes. We therefore use non-cognitive skills and risk preferences separately as well as together in specifications in order to see whether this potential bias exists (Bütikofer and Peri, 2016:16).

As we discussed in the previous descriptive section, most of the moves from rural to urban locations occurred before 2007, i.e., before the respondents provided self-assessed measures on risk preferences. One research strategy might consist in limiting our analysis to the period 2007-2012; this way we would condition on risk measures provided in 2007 that were solicited before any rural-to-urban move occurred. However, with this strategy we would ignore most of the moves that we can observe in the data set, missing all those movers who might have had a particularly high propensity to change their residence from rural to urban. We, therefore, rely on an empirical model that uses the risk measure as an explanatory variable even if migration occurred before respondents were asked about their risk preferences. As this raises reverse causality issues, we perform a number of reverse causality tests and also report the results when the analysis is restricted to migration episodes between 2007 and 2012. Since these latter results are qualitatively similar to the results when all moves are considered and

since the reverse causality tests do not point to reverse causality we are confident that our research strategy that uses the fullest information available is the most appropriate one.

5 Main results and extensions

5.1 The Big Five

Table 3 presents marginal effects of a probit model that estimates the probability to migrate from rural to urban areas. Because of substantial differences in the institutional and economic structures of cities and towns, the decision to move into a city may require distinctive personality characteristics than moving into a town. Therefore, we break down the results by rural-to-city and rural-to-town migration, presented in Table 3 in columns (5)-(8) and columns (9)-(12), respectively. Table 3 displays results for different sets of control variables. While in columns (1), (5) and (9) we do not control for any demographic and socio-economic characteristics but only the Big Five, columns (2), (6) and (10) also include pre-determined (demographic) characteristics such as gender, age, age squared and Ukrainian language¹⁴ as covariates, and columns (3), (7) and (11) additionally include socio-economic controls that may be jointly determined with the migration decision, including marital status, number of children, employment status, and log of household income. In a final specification we add dummies of educational attainment to the set of covariates. Since in many countries rural-to-urban migration is driven by individuals moving for education, we ideally would like to identify those who move for educational purposes. Since the construction of the migration variable does not allow us to determine the reason of migration, we estimate the probability to move to urban areas without and with dummies of educational attainment and establish whether the inclusion of these dummies changes the

¹⁴We consider the pre-determined characteristics exogenous, bearing in mind that the language may determine an individual's initial place of residence. On the other hand, we take language chosen for the interview as a good proxy of ethnicity, a characteristic certainly exogenous to the migration decision.

coefficient estimates on the non-cognitive skills measures.

In all twelve specifications we find statistically significant evidence that conscientiousness is negatively related to rural-to-urban migration. For instance, in column (2) where we only control for the pre-determined characteristics, we estimate that one standard deviation increase in conscientiousness is associated with a 1.7 percentage points lower probability of moving from rural to urban areas. Breaking the results down, this corresponds to 1.1- and 0.5- percentage points lower probability of rural-to-city migration and rural-to-town migration, respectively (columns 6 and 10). A coefficient on agreeableness of similar size is also linked to a fall in the probability of moving into an urban area. This effect of agreeableness on rural-to-urban migration is roughly evenly split between moves to cities and moves to towns. A smaller negative effect is given by neuroticism, since a one standard deviation increase in neuroticism lowers the likelihood to move to urban areas by 0.7 percentage points in general, and by 0.3 and 0.4 percentage points to cities and towns respectively. All these estimated effects are substantial given the unconditional migration probability of 3 percent from rural to urban areas, which is evenly split between rural-to-city and rural-to-town moves.

The only personality traits that is positively associated with the willingness to move is openness. We find that individuals who rate themselves as (one standard deviation) more open to new experiences have a 0.7 percentage point higher probability of moving from rural to urban locations, which is evenly split between rural-to-city and rural-to-town moves. Finally, extraversion is found to be uncorrelated with any type of migration once we include all demographic covariates, employment status and educational dummies.

As for demographic and socio-economic characteristics, the inclusion of them as control variables substantially reduces the size of the marginal effects of personality traits. However, for all the originally significant traits the effect remains statistically significant, and the signs of the marginal effects of the controls are generally in line with migration theory. Net household income, educational attainment and

the Ukrainian language are the variables which have the highest and most consistent explanatory power. The probability of rural-to-urban migration is approximately 3 percentage points lower among those who prefer to communicate in Ukrainian rather than in Russian. As for moving into cities or towns, the effect is smaller, yet strongly significant. The probability of migration increases with the education level, and it is the highest among university graduates. The impact of household income is also positive: members of financially better-off families are more likely, arguably more able, to migrate into cities. On the other hand, gender, marital status, and employment status do not predict the propensity to migrate. Finally, adding educational dummies in the regressions alters the magnitude of the effect of non-cognitive skills on rural to urban migration only very marginally. Hence, our results are not driven by a strong correlation of educational attainment, cognitive ability and personality traits. Instead these traits are primary drivers of rural-to-urban migration.

We assume stability of the Big Five personality traits over the panel period. Reverse causality could be a concern for these skills, despite the sound evidence in the personal psychology literature regarding rank order stability over time and relatively little malleability of these skills after adolescence (Lang et al., 2011). We cannot test the presence of reverse causality in personality traits and hence internally check the validity of our assumption given the lack of repeated information on personality traits in the ULMS. We, instead, implement an approach suggested by Groves (2005) and Heineck and Anger (2010) to validate our results. We predict residuals from the regressions of the Big Five factors on age, age squared and age cubed and estimate the impact of these predicted residuals on the migration behavior. The idea behind this approach is to net out the age effect of non-cognitive skills, so that the estimated impact is a time-invariant (age-free) component of personality. Table 4 shows very similar results to our basic specifications in Table 3: the signs of the coefficients on non-cognitive skills and their magnitudes are the same and in all but three cases the significance is preserved. So, after we have ‘de-aged’ our measures of non-cognitive skills, openness, conscientiousness, agreeableness and neuroticism remain important

predictors of rural-to-city and rural-to-town migration. Hence, our initial assumption of the time-invariance of the Big Five factors, in particular their non-malleability with age, taken from the psychology literature, seems to hold with our data.

5.2 The Big Five and risk preferences

Table 5 extends the model by including the risk preference measure as a covariate. The inclusion of the risk variable in the analysis does not change the impact of personality traits in a substantial way as a comparison of Table 3 and Table 5 shows. This suggests that the Big Five traits, and risk preferences represent distinctive features of personality and that they operate as complements when explaining the propensity to migrate.

In line with the previous literature, we find that individuals who are relatively more willing to take risks are more likely to migrate. This positive effect is present only for rural-to-city migration. The probability of moving into cities is 0.5 percentage points higher for relatively more risk-loving people, controlling for demographic and socio-economic characteristics. In contrast, we find a strong negative association between risk willingness and rural-to-town migration. This might be an indication that the push and pull factors regarding rural-to-town migration are very different from the push and pull determinants of moves from rural to city locations.¹⁵

Search models predict that mobility across jobs and across space falls when local macroeconomic and labor market conditions become more adverse (Pissarides, 1994). As an extension of the model that includes both personality traits and risk preferences, we, therefore, include the unemployment rate or the log of GDP, both at the *oblast* level in Table A.3 in the annex, in order to control for local macroeconomic or labor market conditions.¹⁶ Table A.3 presents the impact of the Big Five together with

¹⁵Table A.2 in the appendix provides the results of the four specifications using OLS estimation, which for the most part give very similar impacts as in Table 5.

¹⁶There are 24 Oblasts in Ukraine, forming the largest administrative units. Oblasts are larger than, e.g., counties in the U.S. but smaller than, e.g., lands in Germany. The macroeconomic measures introduced in Table A.3 are hence only rough proxies for local macroeconomic and labor market conditions. Since most migration, however, takes place within oblasts, we can suppose that internal

risk preferences when we add either the regional unemployment rate or the regional GDP growth rate. A comparison with Table 5 makes it clear that the inclusion of either of the macro indicators does only marginally change the coefficient estimates on non-cognitive skills and risk preferences. This suggests that regional controls are orthogonal to the Big Five and risk preferences and that these preferences and a subset of the Big Five, namely openness, conscientiousness, agreeableness and neuroticism consistently predict internal migration from rural areas to cities. When it comes to rural-to-town migration, we see a consistently estimated negative impact of conscientiousness, agreeableness and neuroticism as well as of risk preferences, while openness is positively correlated with moves into towns. Table A.3 also demonstrates that internal migration is pro-cyclical since adverse regional labor market and macroeconomic conditions lower spatial mobility. It is also noteworthy that regional macroeconomic and labor market conditions affect rural-to-city and rural-to-town migration in roughly equal measure and in the same direction. This last result confirms that workers tend to stay put when macroeconomic and labor market conditions get worse and that this heightened reluctance to move is independent of the potential destination.

A potential concern is that most of the moves observed in the data occur before risk preferences were first measured in the 2007 wave and that our results might possibly be subject to a reverse causality problem. As stated by Jaeger et al. (2010), successful migration could make individuals apt to rate themselves as more risk loving, which would yield an upward bias in the risk estimates from the regression of rural-to-city migration. To check the relevance of this concern, we first estimate models similar to those of Table 5, restricting the dependent variable to represent moves between 2007 and 2012, i.e., after risk attitudes were measured in 2007. This way we clearly avoid any reverse causality issue. Given that the number of moves is very limited over the period 2007 to 2012, the results of Table 6 are encouraging. They show similar point estimates and statistical significance as in Table 5 regarding rural-to-city migration, as long as we only condition on the pre-determined covariates. For all specifications

migration is pro-cyclically related to macroeconomic measures at the oblast level in Ukraine.

with respect to rural-to-town migration and when we condition on the whole sets of covariates in all specifications there is too little variation in the data to get meaningful results.

As a second and more direct check of reverse causality, exploiting the panel feature of the ULMS, we construct a variable representing the change in the risk index between 2007 and 2012. This change in the risk measure is regressed on a migration dummy (for moves between 2007 and 2012). Similarly, in a separate regression, we use as the dependent variable the risk index in 2012, and investigate the impact of internal migration (between 2007 and 2012), conditioning on the risk index measured in 2007 –before the move occurred. The results are provided in Table 7. The statistically insignificant coefficient estimates in the table reveal that internal migration between 2007 and 2012 do neither affect the observed change in the risk index over the period nor the level of risk attitudes in 2012 once we control for the risk index in 2007. We therefore conclude that reverse causality does not bias our results concerning the impact of risk attitudes on migration. This evidence is in line with the results of earlier works of Gibson et al. (2016) and Jaeger et al. (2010), who also found no impact of migration on risk preferences.

We furthermore investigate whether non-cognitive skills and risk preferences contribute jointly to the explanation of the migration behavior by calculating the Akaike’s information criterion (AIC), a goodness-of-fit measure applied to non-linear models. Given two models are estimated with the same data, the model with the smaller value of the information criterion is considered to show a better fit¹⁷. Each row in Table 8 shows, besides the pre-determined characteristics (i.e., age, age squared, gender and language), which of the two sets of regressors –Big Five measures, risk measures– are separately or together included in the regression analysis. Inspection of Table 8 shows that the Big Five factors have larger explanatory power, improving the goodness-of-fit measures more than the risk factor. As for rural-to-city migration, where the willing-

¹⁷The AIC is a measure for comparing non-linear models that are estimated with maximum likelihood. AIC is defined as:

AIC = $-2 \cdot \ln(\text{likelihood}) + 2 \cdot k$, where k = number of parameters estimated.

ness to take risk risk is consistently estimated as a significant positive determinant of the migration probability, the explanatory power is maximized, i.e., the AIC is smallest, when both non-cognitive skills and risk attitudes are included in the regression. For rural-to-town migration, we also have a better fit of the data when both personality traits and risk preferences are included. These findings are consistent with the evidence by Becker et al. (2012) who show very low correlations between the Big Five and risk preferences and their complementarity in explaining life outcomes in Germany. However, differently from the labor market outcomes explored by Becker et al. (2012), our data hardly suggest a strong complementarity between the Big Five and risk preferences in explaining rural-to-urban migration in Ukraine.

Finally, it is worth mentioning that attrition is not a concern in our paper. If the reason an individual leaves the sample is correlated with the idiosyncratic error term—those unobserved factors that change over time and affect the outcome variable—then the resulting selection problem can cause biased estimates. However, since we use a balanced panel (given the operational sample focuses on those observed in 2012) the problem we might face is not attrition, but rather non-random sub-sample selection due to the usage of a balanced panel (i.e., unobserved characteristics associated with retention may be correlated with the unobserved characteristics of the migration outcome). The focus of the study is the evaluation of the impact of non-cognitive skills on migration. Since these skills are only measured in 2012, the analysis must rely on a balanced panel as indicated before.

6 Discussion and conclusions

Using rich panel data of the Ukrainian Longitudinal Monitoring Survey we analyze the link between non-cognitive skills and risk preferences and rural-to-urban migration in Ukraine. To this purpose we map 24 facets of non-cognitive skills into the Big Five personality traits, i.e., openness to new experiences, conscientiousness, extraversion, agreeableness and neuroticism. Estimating probit models, we analyze the importance

of these Big Five personality traits and of general risk attitudes for internal migration behavior.

Our results show that four of the Big Five traits, namely openness to new experiences, conscientiousness, agreeableness and neuroticism are consistently correlated with rural-to-urban migration. These results are driven both by rural-to-city and by rural-to-town migration. While openness to new experiences impacts positively on the migration decision, the other three significant personality traits lower the willingness to migrate. Our risk measure is, however, ambiguous, since persons expressing a greater willingness to take risks have a higher propensity to move from rural areas to cities while we establish a negative correlation when it comes to moves to towns.

The estimated effects of a one standard deviation increase in a significant personality trait or in our risk measure amount to between 0.2 and 1 percentage points regarding moving from a rural area to a city, and between 0.2 and 0.8 percentage points as far as moves from a rural area to a town are concerned. The size of these effects are substantial in that the unconditional rural-to-city and the rural-to-town migration probabilities both amount to 1.5 percent.

The notion that non-cognitive skills might work through the channel of psychic costs of migration seems to be borne out by our results. We find a consistent positive correlation between openness to new experiences and the probability to migrate; persons endowed more with this personality trait are better able to adapt to a new environment and a different culture. Conscientiousness is, on the other hand, consistently negatively correlated with the likelihood of rural-to-city migration. Persons with this trait are hard-working, responsible and well-functioning in the environment where they find themselves, hence they have little reason to be dissatisfied with their current situation. Doing well in the given environment in combination with a dislike for unpredictability might explain why conscientious people perceive out-migration as relatively costly. That agreeable people tend to see out-migration as relatively costly seems to indicate that those facets of this personality trait that keep individuals tied to their place of origin are stronger than the facets that enable them to deal with new

environments relatively well. That persons with a relatively neurotic character find it costly to expose themselves to a new environment strikes us as intuitive.

Reverse causality tests allow us to conclude that a causal interpretation of the link between risk attitudes and migration has some validity, i.e., risk preferences are determinants of internal migration in Ukraine, whilst internal migration does not seem to influence these preferences. We also perform a robustness check for non-cognitive skills that demonstrates that the assumption of the time-invariant nature of these skills is reasonable. We also show that personality traits and risk preferences are complementary in explaining rural-to-urban migration. This tells us that cross section or pooled data regressions that do not include personality traits when estimating the impact of risk attitudes on life outcomes might suffer from an omitted variables bias. In the final analysis it is at any rate striking that non-cognitive skills are very consistent predictors of rural-to-urban migration.

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Figures and Tables

Figure 1: General risk index in urban and rural areas, in 2007 and 2012

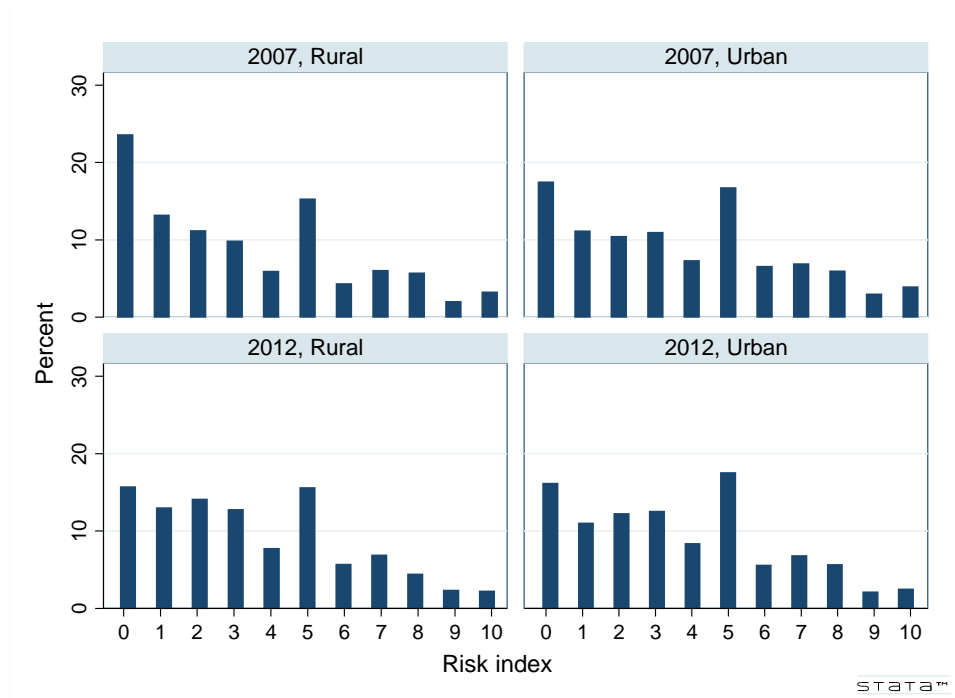


Table 1: Mapping 24 items into the Big Five factors

<i>How do you see yourself?</i>	
<p>3 Do you come up with ideas other people haven't thought of before?</p> <p>11 Are you very interested in learning new things?</p> <p>14 Do you enjoy beautiful things, like nature, art and music?</p>	Openness
<p>2 When doing a task, are you very careful?</p> <p>6 Do you finish whatever you begin?</p> <p>8 Do you work very hard? For example, do you keep working when others stop to take a break?</p> <p>12* Do you prefer relaxation more than hard work?</p> <p>13 Do you enjoy working on things that take a very long time (at least several months) to complete?</p> <p>17 Do you work very well and quickly?</p> <p>21 Do you think carefully before you make an important decision?</p>	Conscientiousness
<p>1 Are you talkative?</p> <p>4* Do you like to keep your opinions to yourself prefer to keep quiet when you have an opinion?</p> <p>20 Are you outgoing and sociable, for example, do you make friends very easily?</p>	Extraversion
<p>9 Do you forgive other people easily?</p> <p>16 Are you very polite to other people?</p> <p>19 Are you generous to other people with your time or money?</p> <p>23 Do you ask for help when you don't understand something?</p>	Agreeableness
<p>5* Are you relaxed during stressful situations?</p> <p>7 Do people take advantage of you?</p> <p>10 Do you tend to worry?</p> <p>15* Do you think about how the things you do will affect you in the future?</p> <p>18 Do you get nervous easily?</p> <p>22 Are people mean/not nice to you?</p> <p>24* Do you think about how the things you do will affect other?</p>	Neuroticism

Table 2: Summary statistics (2012)

	Urban sample			Rural stayers			Movers into urban		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Age	3644	42.84	16.13	2308	47.31	14.98	48	32.44	13.00
Female	3644	0.56	0.50	2308	0.59	0.49	48	0.58	0.50
Ukrainian language	3644	0.30	0.46	2308	0.68	0.47	48	0.42	0.50
Married	3643	0.62	0.48	2308	0.66	0.47	48	0.77	0.42
Number of children	3640	1.23	0.95	2308	1.67	1.05	48	0.88	0.87
Education level	3637	3.03	0.88	2305	2.77	0.86	48	3.23	0.93
Employed	3644	0.51	0.50	2308	0.45	0.50	48	0.71	0.46
Household income	3644	4894.72	3484.40	2308	3648.39	2497.21	48	4198.10	2212.40
Risk indicator	3527	0.22	0.42	2270	0.18	0.39	48	0.23	0.42
Risk index	3527	3.62	2.71	2270	3.20	2.64	48	3.75	2.61
Openness	3643	3.05	0.54	2308	3.01	0.57	48	3.19	0.52
Conscientiousness	3643	2.87	0.47	2308	2.99	0.44	48	2.94	0.48
Extraversion	3643	2.63	0.62	2308	2.65	0.60	48	2.66	0.61
Agreeableness	3641	2.85	0.52	2303	2.96	0.49	48	3.05	0.52
Neuroticism	3643	2.09	0.41	2308	2.10	0.40	48	2.02	0.41

Source : Authors' tabulations from the 2012 wave of the ULMS.

Table 3: Effects of the Big Five on migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	rural-urban	rural-urban	rural-urban	rural-urban	rural-city	rural-city	rural-city	rural-city	rural-town	rural-town	rural-town	rural-town
Openness	0.013*** (0.003)	0.007*** (0.002)	0.006** (0.002)	0.004* (0.002)	0.006*** (0.002)	0.003** (0.002)	0.002* (0.002)	0.001* (0.001)	0.008*** (0.002)	0.003** (0.001)	0.003** (0.001)	0.002* (0.001)
Conscientiousness	-0.026*** (0.003)	-0.017*** (0.003)	-0.018*** (0.003)	-0.018*** (0.003)	-0.015*** (0.002)	-0.011*** (0.002)	-0.011*** (0.002)	-0.010*** (0.001)	-0.011*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Extraversion	-0.002 (0.002)	-0.002 (0.002)	0.000 (0.002)	-0.000 (0.002)	-0.003* (0.002)	-0.003* (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeableness	-0.021*** (0.003)	-0.016*** (0.003)	-0.016*** (0.003)	-0.015*** (0.002)	-0.011*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.012*** (0.002)	-0.008*** (0.001)	-0.008*** (0.001)	-0.007*** (0.001)
Neuroticism	-0.010*** (0.003)	-0.007*** (0.003)	-0.007*** (0.003)	-0.006*** (0.002)	-0.005** (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.005*** (0.002)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
Age		-0.000 (0.001)	-0.000 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.001* (0.000)	0.001 (0.000)	0.000 (0.001)	-0.000 (0.001)
Age squared		-0.000 (0.001)	-0.000 (0.001)	0.002 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.000 (0.001)
Female		0.002 (0.004)	0.006 (0.004)	0.007 (0.004)	0.003 (0.003)	0.003 (0.003)	0.005** (0.003)	0.005** (0.002)	-0.000 (0.002)	-0.000 (0.002)	0.001 (0.003)	0.002 (0.002)
Ukrainian language		-0.092*** (0.007)	-0.081*** (0.007)	-0.081*** (0.006)	-0.033*** (0.005)	-0.026*** (0.004)	-0.026*** (0.004)	-0.025*** (0.004)	-0.061*** (0.006)	-0.056*** (0.005)	-0.056*** (0.005)	-0.053*** (0.005)
Married		0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	-0.001 (0.004)	-0.001 (0.004)	0.006** (0.003)	0.006** (0.003)	0.006** (0.003)	0.005** (0.002)
No. children		-0.008*** (0.003)	-0.008*** (0.003)	-0.006*** (0.003)	-0.006*** (0.003)	-0.006*** (0.003)	-0.006*** (0.003)	-0.005** (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Employed		0.009* (0.005)	0.009* (0.005)	0.007 (0.005)	0.005 (0.005)	0.005 (0.005)	0.005 (0.003)	0.005 (0.003)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)	0.003 (0.003)
Household income		0.012*** (0.002)	0.012*** (0.002)	0.009*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Education: Secondary		0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.012*** (0.004)	0.012*** (0.004)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)
Education: Vocational		0.022*** (0.005)	0.022*** (0.005)	0.022*** (0.005)	0.022*** (0.005)	0.022*** (0.005)	0.011*** (0.003)	0.011*** (0.003)	0.008** (0.004)	0.008** (0.004)	0.008** (0.004)	0.008** (0.004)
Education: Higher		0.030*** (0.009)	0.030*** (0.009)	0.030*** (0.009)	0.030*** (0.009)	0.030*** (0.009)	0.016*** (0.006)	0.016*** (0.006)	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)
Observations	6,347	6,336	5,927	5,908	6,170	6,159	5,751	5,733	6,169	6,158	5,757	5,739

Note: The table shows marginal effects from probit estimation, evaluated at sample mean. The Big Five factors –openness, conscientiousness, extraversion, agreeableness, neuroticism– are standardized averages with a mean of 0 and standard deviation of 1. The covariates of *age*, *age squared*, *number of children* and *log of household income* are continuous variables, while *female*, *Ukrainian language*, *married* and *employed* refer to dummy variables. The control for *education* is a categorical variable with the reference category of basic secondary level education. These control variables are lagged, i.e. the values are taken from the previous wave. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Age-free effects of the Big Five on migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	rural-urban	rural-urban	rural-urban	rural-urban	rural-city	rural-city	rural-city	rural-city	rural-town	rural-town	rural-town	rural-town
Openness	0.012*** (0.003)	0.008*** (0.002)	0.006** (0.002)	0.004* (0.002)	0.004* (0.002)	0.003* (0.002)	0.002 (0.002)	0.001 (0.001)	0.008*** (0.002)	0.003*** (0.001)	0.003** (0.001)	0.002 (0.001)
Conscientiousness	-0.026*** (0.003)	-0.017*** (0.003)	-0.018*** (0.003)	-0.018*** (0.003)	-0.015*** (0.002)	-0.011*** (0.002)	-0.011*** (0.002)	-0.010*** (0.002)	-0.012*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Extraversion	-0.002 (0.002)	-0.002 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeableness	-0.020*** (0.003)	-0.016*** (0.003)	-0.016*** (0.003)	-0.013*** (0.003)	-0.009*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.012*** (0.002)	-0.008*** (0.001)	-0.008*** (0.001)	-0.007*** (0.001)
Neuroticism	-0.010*** (0.003)	-0.007*** (0.003)	-0.007*** (0.003)	-0.007*** (0.002)	-0.004* (0.002)	-0.003* (0.002)	-0.003*** (0.002)	-0.003* (0.002)	-0.006*** (0.002)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003** (0.001)
Age	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002* (0.001)	-0.001** (0.001)	-0.001** (0.001)	-0.000 (0.001)	-0.001* (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	-0.001 (0.001)
Age squared	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.003* (0.002)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)
Female	0.002 (0.004)	0.002 (0.004)	0.006 (0.004)	0.007 (0.004)	0.004 (0.003)	0.004 (0.003)	0.005* (0.003)	0.005* (0.003)	-0.000 (0.003)	-0.000 (0.003)	0.001 (0.003)	0.002 (0.002)
Ukrainian language	-0.092*** (0.007)	-0.092*** (0.007)	-0.081*** (0.006)	-0.081*** (0.007)	-0.033*** (0.005)	-0.026*** (0.005)	-0.025*** (0.004)	-0.025*** (0.004)	-0.056*** (0.006)	-0.061*** (0.006)	-0.056*** (0.006)	-0.053*** (0.005)
Married	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	0.006** (0.003)	0.006** (0.003)	0.006** (0.003)	0.005** (0.002)
No. children	-0.008*** (0.003)	-0.008*** (0.003)	-0.008*** (0.003)	-0.006** (0.003)	-0.006** (0.002)	-0.006** (0.002)	-0.005** (0.002)	-0.005** (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Employed	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)	0.007 (0.005)	0.005 (0.003)	0.005 (0.003)	0.005 (0.003)	0.005 (0.003)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)	0.003 (0.003)
Household income	0.012*** (0.002)	0.012*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.006*** (0.001)	0.006*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
Education: Secondary	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.012*** (0.004)	0.012*** (0.004)	0.012*** (0.004)	0.012*** (0.004)	-0.005 (0.003)	-0.005 (0.003)	-0.005 (0.003)	-0.005 (0.003)
Education: Vocational	0.022*** (0.005)	0.022*** (0.005)	0.022*** (0.005)	0.022*** (0.005)	0.011*** (0.003)	0.011*** (0.003)	0.011*** (0.003)	0.011*** (0.003)	0.008** (0.004)	0.008** (0.004)	0.008** (0.004)	0.008** (0.004)
Education: Higher	0.030*** (0.009)	0.030*** (0.009)	0.030*** (0.009)	0.030*** (0.009)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)
Observations	6,347	6,336	5,927	5,908	6,170	6,159	5,751	5,733	6,169	6,158	5,757	5,739

Note: The table shows marginal effects from probit estimation, evaluated at sample mean. The Big Five factors –openness, conscientiousness, extraversion, agreeableness, neuroticism– are the predicted residuals from the regressions of the Big Five on age of the first-,second-, and third-order polynomials. The predicted residuals are standardized with a mean of 0 and standard deviation of 1. Other covariates are considered the same as those in Table 3. Bootstrapped standard errors in parentheses (with a replication number of 500); *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Effects of the Big Five and risk on migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	rural-urban	rural-urban	rural-urban	rural-urban	rural-city	rural-city	rural-city	rural-city	rural-town	rural-town	rural-town	rural-town
Openness	0.012*** (0.003)	0.006*** (0.002)	0.005** (0.002)	0.004* (0.002)	0.006*** (0.002)	0.003** (0.002)	0.002* (0.002)	0.001* (0.001)	0.006*** (0.002)	0.002** (0.001)	0.002* (0.001)	0.001 (0.001)
Conscientiousness	-0.025*** (0.003)	-0.017*** (0.003)	-0.018*** (0.003)	-0.018*** (0.003)	-0.015*** (0.002)	-0.011*** (0.002)	-0.011*** (0.002)	-0.010*** (0.002)	-0.009*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Extraversion	-0.002 (0.002)	-0.002 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.003** (0.002)	-0.003** (0.002)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeableness	-0.020*** (0.003)	-0.014*** (0.003)	-0.014*** (0.003)	-0.014*** (0.002)	-0.010*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.010*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)
Neuroticism	-0.008*** (0.003)	-0.006** (0.003)	-0.006** (0.002)	-0.006** (0.002)	-0.005** (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.004* (0.002)	-0.003** (0.001)	-0.003* (0.001)	-0.002* (0.001)
Risk indicator	-0.008 (0.006)	-0.004 (0.005)	-0.006 (0.005)	-0.005 (0.005)	0.011** (0.005)	0.007** (0.004)	0.005** (0.003)	0.005* (0.003)	-0.019*** (0.003)	-0.009*** (0.002)	-0.009*** (0.002)	-0.008*** (0.002)
Age		-0.001 (0.001)	-0.000 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.001 (0.001)	0.001 (0.000)	0.001 (0.000)	0.000 (0.000)	-0.000 (0.001)
Age squared		0.000 (0.001)	-0.000 (0.001)	0.002 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)
Female		0.002 (0.004)	0.006 (0.004)	0.007 (0.004)	0.004 (0.003)	0.004 (0.003)	0.006** (0.003)	0.006** (0.002)	-0.001 (0.002)	-0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Ukrainian language		-0.086*** (0.007)	-0.076*** (0.007)	-0.076*** (0.007)	-0.034*** (0.005)	-0.034*** (0.005)	-0.026*** (0.004)	-0.025*** (0.004)	-0.052*** (0.005)	-0.048*** (0.005)	-0.048*** (0.005)	-0.045*** (0.005)
Married		0.005 (0.005)	0.005 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	-0.001 (0.004)	-0.001 (0.003)	0.006** (0.002)	0.006** (0.002)	0.006** (0.002)	0.005** (0.002)
No. children		-0.008*** (0.003)	-0.008*** (0.003)	-0.007** (0.003)	-0.007** (0.003)	-0.006** (0.003)	-0.006** (0.003)	-0.005** (0.003)	-0.005** (0.003)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Employed		0.010* (0.005)	0.010* (0.005)	0.008 (0.005)	0.005 (0.005)	0.005 (0.005)	0.005 (0.003)	0.004 (0.003)	0.005 (0.003)	0.005 (0.003)	0.005 (0.003)	0.004 (0.003)
Household income		0.011*** (0.002)	0.011*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.006*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003** (0.001)
Education: Secondary				0.005 (0.005)	0.005 (0.005)	0.005 (0.005)	0.012*** (0.004)	0.012*** (0.004)				-0.006** (0.003)
Education: Vocational				0.021*** (0.005)	0.021*** (0.005)	0.021*** (0.005)	0.011*** (0.003)	0.011*** (0.003)				0.007** (0.004)
Education: Higher				0.029*** (0.009)	0.029*** (0.009)	0.029*** (0.009)	0.016*** (0.006)	0.016*** (0.006)				0.008 (0.005)
Observations	6,291	6,280	5,872	5,855	6,132	6,121	5,714	5,697	6,113	6,102	5,702	5,686

Note: The table shows marginal effects from probit estimation, evaluated at sample mean. The Big Five factors –openness, conscientiousness, extraversion, agreeableness, neuroticism– are standardized averages with a mean of 0 and standard deviation of 1. The *risk indicator* is a dummy variable for values greater than 5 on a 11-point scale. Other covariates are considered the same as those in Table 3. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 6: **Effects of the Big Five and risk on migration:
Migration occurs between 2007-2012, after risk is measured in 2007**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	rural-urban	rural-urban	rural-urban	rural-city	rural-city	rural-city	rural-town	rural-town	rural-town
Openness	0.008** (0.003)	0.002* (0.002)	0.001 (0.001)	0.004** (0.002)	0.001* (0.001)	0.000 (0.000)	0.003 (0.002)	0.000 (0.001)	0.000 (0.001)
Conscientiousness	-0.009*** (0.003)	-0.003* (0.002)	-0.003* (0.002)	-0.005*** (0.002)	-0.002** (0.001)	-0.000 (0.000)	-0.003 (0.003)	-0.001 (0.002)	-0.001 (0.001)
Extraversion	-0.001 (0.003)	-0.002 (0.002)	-0.000 (0.001)	-0.002* (0.002)	-0.002** (0.001)	-0.000 (0.000)	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)
Agreeableness	0.003 (0.003)	0.003 (0.002)	0.002 (0.001)	0.001 (0.002)	0.001 (0.001)	0.000 (0.000)	0.001 (0.002)	0.001 (0.002)	0.001 (0.001)
Neuroticism	-0.004 (0.003)	-0.003 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.000 (0.000)	-0.003 (0.002)	-0.002 (0.002)	-0.001 (0.001)
Risk indicator	0.013 (0.008)	0.004 (0.005)	0.002 (0.003)	0.015** (0.007)	0.006** (0.003)	0.001 (0.001)	-0.003 (0.005)	-0.002 (0.003)	-0.001 (0.001)
Covariates									
Set 1	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Set 2	No	No	Yes	No	No	Yes	No	No	Yes
Observations	2,074	2,074	1,971	2,051	2,051	1,948	2,054	2,054	1,955

Note: The table shows marginal effects from probit estimation, evaluated at sample mean. The outcome variable, measured in 2012, captures the migration that occurred between 2007 and 2012. The *risk* indicator, measured in 2007, denotes a dummy variable for values greater than 5 on a scale from 0 to 10. *Set 1* represents covariates of age, age squared, female and Ukrainian language, while *Set 2* refers to covariates of married, number of children, education level, employed, and log of net household income. The covariates are measured in 2007. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 7: **Reverse causality check for risk:
The impact of migration on the risk measure**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(a) Dependent variable: Change in risk index btw. 2007-12									
(i) Rural-urban migration btw. 2007-2012		-0.065 (0.199)	-0.089 (0.201)	0.070 (0.207)					
(ii) Rural-city migration btw. 2007-2012					-0.340 (0.354)	-0.368 (0.349)	-0.022 (0.438)		
(iii) Rural-town migration btw. 2007-2012								0.158 (0.199)	0.137 (0.250)
Observations		1,596	1,596	1,521	1,580	1,580	1,505	1,583	1,583
(b) Dependent variable: Risk index in 2012									
(i) Rural-urban migration btw. 2007-2012		0.052 (0.176)	-0.116 (0.173)	-0.157 (0.178)					
(ii) Rural-city migration btw. 2007-2012					-0.080 (0.309)	-0.273 (0.301)	-0.354 (0.317)		
(iii) Rural-town migration btw. 2007-2012								0.160 (0.191)	0.013 (0.224)
Risk index 2007		0.250*** (0.025)	0.209*** (0.026)	0.209*** (0.026)	0.249*** (0.025)	0.208*** (0.026)	0.208*** (0.026)	0.253*** (0.025)	0.212*** (0.023)
Covariates									
Set 1		No	Yes	Yes	No	Yes	Yes	No	Yes
Set 2		No	No	Yes	No	No	Yes	No	Yes
Observations		1,596	1,596	1,585	1,580	1,580	1,569	1,583	1,573

Note: Rows (i), (ii) and (iii) display *OLS* estimation results from separate regressions, based on a balanced panel sample of 2007 and 2012. In **panel (a)** the outcome variable is the change in the risk index between 2007 and 2012, which is regressed on (one of the three) migration variable measured in 2012, capturing the moves between 2007 and 2012. In **panel (b)** the outcome variable refers to the risk index measured in 2012, which is regressed on the migration variable measured in 2012 and the risk index measured in 2007. The *risk index* is measured on a scale of 0 to 10. The top and bottom panel regressions also condition on two sets of controls variables. While *Set 1* represents covariates of age, age squared, female and Ukrainian language, *Set 2* refers to covariates of married, number of children and education level, employed, and log of net household income. The covariates are measured in 2007. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8: **Complementarity between the Big Five and risk in explaining the migration propensity**

	Obs	ll(null)	ll(model)	df	AIC	Pseudo R2
Rural-to-urban migration						
Risk	6280	-1313,53	-1170,05	6	2352,11	0,109
Big five	6280	-1313,53	-1112,57	10	2245,14	0,153
Big five and risk	6280	-1313,53	-1112,21	11	2246,42	0,153
Rural-to-city migration						
Risk	6121	-805,10	-737,27	6	1486,53	0,084
Big five	6121	-805,10	-691,55	10	1403,10	0,141
Big five and risk	6121	-805,10	-689,82	11	1401,65	0,143
Rural-to-town migration						
Risk	6102	-736,86	-631,63	6	1275,26	0,143
Big five	6102	-736,86	-617,35	10	1254,70	0,162
Big five and risk	6102	-736,86	-611,34	11	1244,69	0,170

Note: AIC refers to the Akaike's information criterion. The AIC is a goodness-of-fit measure calculated after the estimation of probit models. The model with the smaller value of the information criterion is considered to be better. All specifications include individual-level controls of age, age squared, female, and Ukrainian language.

Appendix Tables

Table A.1 Summary statistics of 2004 and 2007

2004	Urban sample			Rural stayers			Movers into urban		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Age	3800	43.20	16.69	1843	41.99	13.55	75	40.17	13.64
Female	3800	0.59	0.49	1843	0.62	0.49	75	0.56	0.50
Ukranian language	3799	0.36	0.48	1843	0.69	0.46	75	0.13	0.34
Married	3782	0.60	0.49	1836	0.72	0.45	74	0.73	0.45
Number of children	3799	1.27	0.98	1842	1.67	1.09	75	1.28	0.97
Education level	3797	2.72	1.02	1842	2.47	0.95	75	2.83	0.78
Employed	3800	0.51	0.50	1843	0.49	0.50	75	0.60	0.49
Household income	3639	866.30	741.70	1762	625.29	565.80	74	847.43	437.99
2007	Urban sample			Rural stayers			Movers into urban		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Age	3606	43.70	16.91	1851	44.71	13.87	49	40.20	13.94
Female	3606	0.58	0.49	1851	0.62	0.49	49	0.49	0.51
Ukranian language	3595	0.38	0.49	1840	0.67	0.47	49	0.35	0.48
Married	3603	0.62	0.48	1850	0.73	0.44	49	0.69	0.47
Number of children	3603	1.22	0.96	1850	1.70	1.06	49	1.53	1.12
Education level	3585	2.98	0.82	1840	2.77	0.80	49	2.84	0.75
Employed	3606	0.53	0.50	1851	0.51	0.50	49	0.69	0.47
Household income	3438	2452.01	1717.34	1775	1829.06	1288.00	49	2082.53	1260.03
Risk indicator	3533	0.26	0.44	1779	0.19	0.40	49	0.16	0.37
Risk index	3533	3.77	2.90	1779	3.17	2.83	49	2.35	2.69

Source : Autors' tabulations from the 2004 and 2007 waves of the ULMS.

Table A.2: OLS estimation: Effects of the Big Five and risk on migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	rural-urban	rural-urban	rural-urban	rural-urban	rural-city	rural-city	rural-city	rural-city	rural-town	rural-town	rural-town	rural-town
Openness	0.013*** (0.003)	0.007** (0.003)	0.005* (0.003)	0.004 (0.003)	0.006*** (0.002)	0.002 (0.002)	0.001 (0.003)	0.000 (0.003)	0.007*** (0.002)	0.005*** (0.002)	0.005** (0.002)	0.004* (0.002)
Conscientiousness	-0.027*** (0.003)	-0.022*** (0.003)	-0.025*** (0.003)	-0.025*** (0.003)	-0.019*** (0.003)	-0.016*** (0.003)	-0.018*** (0.003)	-0.018*** (0.003)	-0.010*** (0.002)	-0.008*** (0.002)	-0.009*** (0.002)	-0.009*** (0.002)
Extraversion	-0.003 (0.003)	-0.003 (0.003)	-0.001 (0.003)	-0.001 (0.003)	-0.004** (0.002)	-0.005*** (0.002)	-0.003* (0.002)	-0.003 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Agreeableness	-0.022*** (0.003)	-0.022*** (0.003)	-0.023*** (0.004)	-0.023*** (0.004)	-0.013*** (0.003)	-0.013*** (0.003)	-0.014*** (0.003)	-0.014*** (0.003)	-0.011*** (0.002)	-0.012*** (0.002)	-0.012*** (0.002)	-0.012*** (0.002)
Neuroticism	-0.009*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.009*** (0.003)	-0.005** (0.002)	-0.006** (0.003)	-0.006** (0.003)	-0.006** (0.003)	-0.004** (0.002)	-0.005** (0.002)	-0.005** (0.002)	-0.005** (0.002)
Risk indicator	-0.009 (0.007)	-0.006 (0.007)	-0.007 (0.007)	-0.007 (0.007)	0.012** (0.006)	0.011** (0.006)	0.010* (0.006)	0.010* (0.006)	-0.022*** (0.004)	-0.017*** (0.004)	-0.017*** (0.004)	-0.017*** (0.004)
Age		-0.000 (0.001)	-0.000 (0.002)	-0.002 (0.002)	-0.002* (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.002 (0.001)	0.002** (0.001)	0.002** (0.001)	0.000 (0.001)	-0.001 (0.001)
Age squared		-0.000 (0.001)	-0.000 (0.002)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.002 (0.002)	-0.002** (0.001)	-0.002** (0.001)	-0.000 (0.001)	0.001 (0.001)
Female		0.006 (0.006)	0.011 (0.007)	0.012* (0.007)	0.008 (0.005)	0.008 (0.005)	0.010** (0.005)	0.011** (0.005)	-0.001 (0.005)	-0.001 (0.005)	0.002 (0.005)	0.003 (0.005)
Ukrainian language		-0.097*** (0.007)	-0.093*** (0.007)	-0.094*** (0.007)	-0.044*** (0.006)	-0.044*** (0.006)	-0.041*** (0.006)	-0.041*** (0.006)	-0.061*** (0.006)	-0.061*** (0.006)	-0.060*** (0.006)	-0.060*** (0.006)
Married			0.003 (0.007)	0.003 (0.007)			-0.008 (0.006)	-0.008 (0.006)			0.011** (0.005)	0.011** (0.005)
No. children			-0.007** (0.003)	-0.005* (0.003)			-0.006** (0.003)	-0.005* (0.003)			-0.001 (0.002)	-0.001 (0.002)
Employed			0.016** (0.007)	0.014** (0.007)			0.010** (0.005)	0.010* (0.005)			0.007 (0.005)	0.006 (0.005)
Household income			0.017*** (0.003)	0.014*** (0.003)			0.011*** (0.002)	0.009*** (0.002)			0.007*** (0.002)	0.006** (0.002)
Education: Secondary				0.009 (0.008)				0.021*** (0.006)				-0.011* (0.006)
Education: Vocational				0.032*** (0.008)				0.021*** (0.006)				0.014** (0.007)
Education: Higher				0.036*** (0.011)				0.025*** (0.008)				0.014 (0.009)
Constant	0.061*** (0.003)	0.138*** (0.024)	0.016 (0.035)	0.056 (0.037)	0.031*** (0.003)	0.103*** (0.021)	0.009 (0.028)	0.031 (0.030)	0.033*** (0.003)	0.040*** (0.015)	0.003 (0.022)	0.026 (0.024)
Observations	6,291	6,280	5,872	5,855	6,132	6,121	5,714	5,697	6,113	6,102	5,702	5,686
Adjusted R-squared	0.024	0.067	0.076	0.079	0.021	0.041	0.051	0.052	0.010	0.043	0.046	0.049

Note: The table shows the OLS estimation results from the regression of migration on the Big Five, risk and covariates that are the same as those described in Table 5. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A.3: Effects of the Big Five and risk on migration conditional on regional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	rural-urban	rural-urban	rural-urban	rural-city	rural-city	rural-city	rural-town	rural-town	rural-town
Openness	0.006*** (0.002)	0.006*** (0.002)	0.005** (0.002)	0.003** (0.002)	0.003** (0.002)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)
Conscientiousness	-0.017*** (0.003)	-0.015*** (0.002)	-0.012*** (0.002)	-0.011*** (0.002)	-0.010*** (0.002)	-0.009*** (0.002)	-0.005*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)
Extraversion	-0.002 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.003** (0.002)	-0.003** (0.001)	-0.003** (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
Agreeableness	-0.014*** (0.003)	-0.013*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.003** (0.002)	-0.006*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)
Neuroticism	-0.006** (0.003)	-0.005** (0.002)	-0.001 (0.002)	-0.003* (0.002)	-0.003* (0.002)	-0.001 (0.002)	-0.003** (0.001)	-0.002** (0.001)	-0.001 (0.001)
Risk indicator	-0.004 (0.005)	-0.004 (0.005)	0.002 (0.005)	0.007** (0.004)	0.007* (0.004)	0.009** (0.004)	-0.009*** (0.002)	-0.007*** (0.002)	-0.005** (0.002)
<i>Regional covariates</i>									
Unemployment rate		-0.007*** (0.001)			-0.002*** (0.001)			-0.003*** (0.001)	
Log of GDP			0.034*** (0.003)			0.016*** (0.002)			0.013*** (0.002)
Observations	6,280	6,280	6,280	6,121	6,121	6,121	6,102	6,102	6,102

Note: The table shows marginal effects from probit estimation, evaluated at sample means. The Big Five factors –openness, conscientiousness, extraversion, agreeableness, neuroticism– are standardized averages with a mean of 0 and standard deviation of 1. The *risk indicator* is a dummy variable for values greater than 5 on a 11-point scale. Regional controls include *unemployment rate* and *log of GDP* at *oblast* level. All specifications also include individual-level controls of age, age squared, female and Ukrainian language, as well as year fixed effects. The covariates are lagged variables, i.e., the values are taken from the previous wave. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.