

# The impact of non-cognitive skills and attitudes towards risk and trust on internal migration: Evidence from Ukraine

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*Preliminary and incomplete: please do not cite*

## Abstract

This paper provides evidence on the impacts of non-cognitive skills and attitudes towards risk and trust on the decision to migrate from rural to urban areas. Our analysis is based on a unique four-wave panel of Ukrainian Longitudinal Monitoring Survey for the period between 2003 and 2012. We adopt the Five Factor Model of personality structure, which was elaborated in the personal psychology literature, and use it in the evaluation of non-cognitive skills. Our results suggest that the personality trait openness to new experience and the willingness to take risks help reduce the perceived cost of migration and increase the probability of migration. On the other hand, the non-cognitive skills conscientiousness and extraversion are found to be negatively associated with the propensity to migrate. The effects are statistically and quantitatively significant, and mainly driven by movements from rural areas into cities. Our results are robust to several sensitivity checks, some of which take into account the issue of reverse causality.

**JEL classifications:** J61, D03, D81, R23.

**Keywords:** internal migration, non-cognitive skills, big five, risk, trust.

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# 1 Introduction

A growing body of economics literature has been investigating the role of non-cognitive skills, often referred to 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). The current study contributes to this scarce literature by providing evidence on the impact of non-cognitive skills on the decision to migrate from rural to urban areas.

Considering migration behavior within a resource allocation framework, people migrate to realize their labor market potentials 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). Individuals who are willing to take risks can relatively more easily bear mobility costs arising from lack of information and uncertainty, and hence they will have a higher tendency to move out of their regions. In an early study, Sjaastad (1962) argues that the reason why some people migrate while others do not despite similar demographic and socio-economic characteristics is related to non-monetary costs of migration – so-called ‘psychic costs’. Jaeger et al. (2010) explain the channel through which risk attitudes determine geographic mobility by the non-monetary costs, which are driven by imperfect information about other locations. Following this line of thought, we argue that non-monetary costs, particularly psychic costs of migration might be the channel through which non-cognitive skills<sup>1</sup> explain the migration decision. Psychic

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<sup>1</sup>One may argue that non-cognitive skills comprise both personality traits and attitudes towards risk and trust. To avoid conceptual confusion, in this text we use the term ‘non-cognitive skills’ only

costs of migration include the emotional burden of leaving the familiar surrounding behind, building up new social relations, adapting to a new social environment, and so on (Sjaastad, 1962). Each person evaluates these costs subjectively, and hence the size of the costs depends on the extent to which a person is more able to handle these costs. Certain non-cognitive skills 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. This paper does not aim at a theoretical model in explaining the channels, but only highlights them to help our understanding of the reason why non-cognitive skills can predict migration behavior.

In this study we focus on rural-to-urban migration in Ukraine, using the panel data set of the Ukrainian Longitudinal Monitoring Survey (ULMS). The data follow individuals over time in a longitudinal design and they provide individual level information about socio-demographic and labor market characteristics, place of residence, type of settlement, as well as information on household characteristics such as housing conditions, earnings, assets and expenditures for each panel year of 2003, 2004, 2007 and 2012. The ULMS also includes direct measures of attitudes towards risk and trust in the survey years of 2007 and 2012 and a 24-item module on non-cognitive skills added in the latest wave. Using this skill module we assess non-cognitive skills based on the widely accepted ‘Big Five’ taxonomy in the personal psychology literature –openness, conscientiousness, extraversion, agreeableness, and neuroticism (Goldberg, 1990; John and Srivastava, 1999; Lang et al., 2011). We propose a mapping of the 24 items into the big five taxonomy, utilizing the facets of the big five domains characterized by John and Srivastava (1999).

Our results suggest that non-cognitive skills such as openness to new experience and willingness to take risks that help reduce the perceived cost of migration increase the probability of an individual migrating from rural to urban areas. On the other hand, our estimates show conscientiousness and extraversion to be negatively corre-

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to indicate personality traits, particularly the big five factors.

lated with the propensity to migrate. The effects are mainly driven by movements into cities. The marginal effects from the estimation of a probit model indicate that one standard deviation increase in openness is associated with a 0.3 percentage point higher probability of moving into cities, controlling for individual characteristics and preferences. The effects are relatively larger for other facets of personality, in that individuals who rate themselves as one standard deviation more conscientious (extraverted) have a 0.5 (0.4) percentage point lower probability of moving into cities. As of risk preferences, the probability of rural-to-city migration is about 0.4 percentage points higher among relatively more risk-loving people, conditional on big five, trust and individuals characteristics. The magnitudes of the impacts are substantial considering the unconditional rural-to-city migration probability of about 1.5 percent.

On the other hand, we find no consistent evidence supporting an association of neuroticism, agreeableness and attitudes towards trust with the migration propensity. Our findings are in line with the findings from the psychology literature that indicate a strong impact of openness and conscientiousness on migration behavior, whilst either very little or no effect of extraversion. Arguably, the positive emotionality and high activity possessed by extraverted people make them more able to increase their well-being in their current places and reach a higher level of satisfaction with their existing lives. This countervailing effect dominates the stimulating effect of extraversion regarding the migration decision (John and Srivastava, 1999; Jokela, 2009; Paulauskaite et al., 2010). 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.

We furthermore show that a full model, which includes the big five factors and risk and trust preferences together, fits the data better than models including them separately. Our results are robust to several sensitivity checks including controls for regional macro indicators and using a balanced panel sample. We also provide evidence that the estimated effects of personality and risk attitudes are not driven by reverse causality.

The rest of the paper is organized as follows. To put our study into context we provide some background information about migration patterns in Ukraine in the next Section, while section 3 presents a brief summary of the pertinent literature on the link between non-cognitive skills and life outcomes. Section 4 introduces the data and variables used in the regression analysis and provides some descriptive statistics. Our principal empirical specification is presented in Section 5, while the basic estimation results are discussed in section 6. Section 7 provides some extensions and robustness checks, while section 8 gives some conclusions.

## 2 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. Most studies rely on the data coming from official statistics that are often criticized for being not accurate enough since they reflect only registered population moves. Below, to put our paper into context, we provide a brief overview of the major economic and demographic context 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 Ukraine<sup>2</sup>). This enormous population drop may jointly be explained by a combination of three major factors: low fertility rates (1.5 children per woman<sup>3</sup>), high mortality levels (deficit of births over deaths reached 158711 persons in 2013) and international out-migration (Danzer and Dietz, 2014). Apparently, these demographic trends were nurtured by unfavorable economic conditions that led to 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

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

<sup>3</sup>Fertility 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).

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 and the Great Recession, which hit Ukraine in 2008-2009, and 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.<sup>4</sup> Problems caused by these internal movements, such as, for instance, labor market integration of newcomers and their access to housing market, pointed to the multiple institutional shortcomings and obstacles that greatly discourage internal mobility in Ukraine. Although it is generally acknowledged that open and free labor markets are among important determinants of economic welfare, no consequential promotion of efficient labor resource allocation through optimization of internal migration took place in Ukraine in the last three decades. Currently, Ukrainians encounter a number of barriers to internal mobility including a complicated population registry system, weak formal labor market institutions, underdevelopment of housing and credit markets, non-portability of social benefits and wide-spread skills mismatch<sup>5</sup> (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 areas.

From a regional perspective, Ukraine is characterized by relatively low incomes in the predominantly agricultural oblasts (regional districts) in the West and higher incomes in the industrialized and more urbanized oblasts in the East (Mykhnenko and Swain, 2010). However, as is typical for post-Soviet countries marked by high levels of centralization, the largest differences in earnings persist between the capital city and the rest of the country. According to official statistics, the capital city of Ukraine,

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

<sup>5</sup>Lack 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.

Kyiv, accounted for 22.5% of total GDP in 2014. This share grew substantially since 1996, when it made up only 7.4%. Not surprisingly, Kyiv is the largest magnet for internal labor migrants in the country. At the same time, scholars acknowledge, that internal migration in Ukraine is not always directed from economically lagging to better developed industrial regions but happens mostly within the same region (rural-urban migration) 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 slowly growing 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 commuting<sup>6</sup> between the (rural) place of residence and the (urban) location of work.

### **3 Embedding our study into 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 *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. They focus on several areas where progress has been made but also address a number of issues that need further research. In another study by Borghans et al. (2008b) in the same issue the focus is on the

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<sup>6</sup>The total number of commuters reached 2.6 million individuals in 2010, which is 13.2% of the total number of employed persons.

relationship between interpersonal styles (caring and directness) and labor market outcomes. Cunha and Heckman (2008) have contributed to this growing literature through a theoretical model formulating the technology of cognitive and non-cognitive skill formation and the contribution of family investment to this formation in early versus older childhood. They further elaborate the identification and estimation of the technology of skill formation in a follow up study (Cunha et al., 2010). Kautz et al. (2014) present a summary of 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 criminality.

In contrast, much less is known about the impact of non-cognitive skills on migration behavior which constitutes the purpose of the current study. To the best of our knowledge, there is only one economic paper 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 the two aspects of non-cognitive skills, namely 'adaptability' and 'sociability', they find that adaptability has a particularly strong impact on migration for individuals with low cognitive skills. This finding is interpreted as the evidence that adaptability skills reduce the non-monetary costs of migration.

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. Those studies generally rely on the Big Five factor model. In their study 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 facets 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.

Following the psychology literature we rely on a Big Five factor model for the analysis of the impact of non-cognitive skills on rural-to-urban migration. 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 and trust on migration behavior. Our study has largely benefited from 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.

Inspired by Jaeger et al. (2010) we consider the ability to bear the non-monetary costs as the main motive why non-cognitive skills might be important for the migration decision. 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; Bauernschuster et al., 2014). Unlike travel costs it is not possible to quantify the magnitude of these costs, 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. 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 migrate.

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 migration propensity. For non-cognitive skills the relationship is not such 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 every trait. 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 and perceive a lower (psychic) cost. On the other hand, gregariousness is a typical characteristic of rural societies. 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 villages given that kinship plays a key role in every sphere of life including the professional life. In this respect, for extraverted people it might be more costly to leave their familiar surroundings behind. Consistent with this argument, it is documented in the psychology literature that positive emotionality and high level of activity typically possessed by extraverted people enable them to be better-off in their present places and to be satisfied with their current lives (John and Srivastava, 1999; Jokela, 2009; Paulauskaite et al., 2010). Taken together, these facets of extraversion might counterbalance the stimulating effect of extraversion on the migration decision.

Countervailing effects might also arise for agreeableness and neuroticism. 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 regression analysis sheds light on the facets of the big five factors that dominate in our data regarding the decision to migrate.

## 4 Data and descriptive statistics

### 4.1 Data

For the estimation of the impacts of non-cognitive skills and 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 first attempt to create a panel data set for Ukraine and is representative at the national level (see Lehmann et al., 2012). The ULMS interviews with individuals of the ages between 15 and 72, who make up our sample of analysis. The survey contains an individual questionnaire soliciting information on socio-demographic and labor force characteristics, labor market status, skills, preferences and attitudes, as well as a household questionnaire on the structure of household, housing conditions, income, assets and expenditures. It is arguably the richest panel data set regarding labor market issues in the transition region.

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 belong to a ‘rural’ area, towns (small- and medium-size) and cities (medium- and large-size) are categorized as an ‘urban’ area. 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.<sup>7</sup>

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<sup>7</sup>A potential concern is measurement error in the dependent variable 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, however, shows that ‘round-tripping’ seems to

Another important feature of the ULMS is its collection of information on non-cognitive skills, and risk and trust preferences. In the latest wave of 2012 a set of questions on 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, asks respondents how they perceive themselves. Specifically, respondents are asked their perception of themselves, 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”. In the assessment of non-cognitive skills, we map these 24 items into the Big Five Factor model –openness, conscientiousness, extraversion, agreeableness, and neuroticism. The Big Five personality constructs 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, the Big Five Factor model is preferred to the usage of single traits such as self-efficacy or self-esteem (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. For the regression analysis the scale of some items –those denoted by ‘\*’– is reversed in a way that a higher ranking would refer to a higher value for the corresponding characteristic (1=Almost never – 4=Almost always). Furthermore, each of the big five factor is the standardized average of the corresponding items (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 distorts the results is taken up in section 7.

The ULMS introduced a module on preferences in 2007 and 2012, identical to the

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be very limited.

module in the German Socio-Economic Panel (SOEP), which asks respondents about their willingness to take risks and their trust towards other persons.<sup>8</sup> The general risk question 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 scale, from 0 “completely unwilling to take risks” to 10 “completely willing to take risks”. Similarly, the question evaluating the trust attitude in general asks: “How would you assess your attitude towards other persons: Are you a person who in general trusts other persons, or are you a person who rather does not trust other persons?” The response is again on an 11-point scale, ranging between 0 “I do not trust other persons at all” and 10 “I trust other persons completely”. The regression analyses mainly rely on dichotomous variables to measure the willingness to take risks and the tendency to trust others, which mitigates potential problems from different use of scales, as explained by Jaeger et al. (2010). Both of the preference indicators take the value of 1 if the respondent chooses a value of 6 or higher on the scale.

Similar to the big five measures, we treat preferences –partly– fixed over the sample period. In particular, we assign the values of risk and trust preferences measured in 2007 to the previous survey years of 2003 and 2004.<sup>9</sup> We analyze the potential problem of reverse causality through robustness checks in Section 7.

## 4.2 Descriptive statistics

Table 2 presents summary statistics of the variables used in the regression analysis for rural-to-urban movers, rural stayers, as well as the urban sample. The former two compose our analysis sample. As 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

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<sup>8</sup>Risk and trust questions were asked in general but also in life-specific domains and with regards to specific groups of individuals, respectively. In our empirical analysis we only use the general risk and trust measures as covariates.

<sup>9</sup>In fact, we allow for variation in preferences between 2007 and 2012. However, if a respondent is not surveyed in 2007 but in 2012, then we assign the risk and trust value of 2012 to the years of 2003 and 2004. In this case, the preferences would totally be treated as fixed over the sample period.

the available variables in Table A.1 in the appendix.<sup>10</sup>

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 less likely to prefer Ukrainian for communication. However, the differences in mean values are not statistically significant for many variables, but for age, language and employment status.

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 and trust 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 an 11-point scale, which is about 5 percentage points higher than rural stayers. Similarly, as for the trust indicator, movers are more likely to score a relatively higher value than stayers. However, we observe an opposite pattern for the survey year of 2007. Both preferences are relatively lower scored among movers compared to stayers in 2007. The difference between the

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<sup>10</sup>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 14 in the appendix, we see that between 2007 and 2012 the number of moves was particularly small compared to the periods between 2003 and 2004 and between 2004 and 2007. This lower number could be related to less mobility in times of economic crisis but it could also point to the problem of ‘round-tripping’. While we are not able to really disentangle these two potential causes our preliminary check of ‘round-tripping’ mentioned in footnote 7 makes us, however, lean towards the first explanation.

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 variables as they 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 risk and trust preferences. We discuss this potential endogeneity problem due to the reverse causality in section 7 where we perform robustness checks of our estimation results that address this issue.

As a final descriptive exercise, we examine the distribution of the responses to the general risk and trust questions for the rural and urban samples, which are illustrated in Figure 1 and Figure 2, respectively. 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. More specifically, in 2007 one out of four rural residents are completely unwilling to take risk in general, whereas about 18% of the urban residents are represented in this group. In contrast to the risk index, the trust index has a relatively similar and right skewed distribution in rural and urban areas (Figure 2).

## 5 Empirical specification

To investigate the impact of non-cognitive skills and preferences on the propensity to migrate, we estimate the following basic specification of a probit model:

$$Y_{i,t} = \alpha + N'_i\beta + P'_{i,t}\gamma + X'_{i,t-1}\nu + \epsilon_{i,t} \quad (1)$$

where  $Y_{i,t}$  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  $t - 1$ . 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 section 7 we perform robustness checks that show that this is a reasonable assumption. The vector  $P_{i,t}$  includes the variables of risk and trust attitudes which are measured as binary indicators taking the value of 1 for values greater than 5 (on a scale of 0-10). The risk and trust measures are observed in 2007 and 2012 surveys. Thus, we assign the values of risk and trust preferences measured in 2007 to the previous survey years of 2003 and 2004 (see footnote 9). In the most extant basic specification,  $X_{i,t-1}$  is a vector of individual characteristics including 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 problems, i.e., the covariates are measured at time  $t - 1$ , before migration happens. Finally,  $\epsilon_{i,t}$  is a mean zero error term.

The estimated coefficients of  $\beta$  capture the impact of non-cognitive skills on the propensity to move from rural to urban areas, holding risk, trust and other individual characteristics constant. A concern would be that measurements of non-cognitive skills might be correlated with risk and trust 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 the conscientiousness might be overestimated by controlling for risk attitudes. We therefore include them separately as well as together in specifications in order to provide bounds on the potential bias (Bütikofer and Peri, 2016:16).

## 6 Basic results

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 –although we classify both as urban–, the decision to move into a city may require distinctive personality characteristics than moving into a town. Therefore, we break down results by rural-to-city and rural-to-town migration, presented in Table 3 in columns (4)-(6) and columns (7)-(9), respectively. Table 3 displays results for different sets of control variables. While in columns (1), (4) and (7) we do not control for any demographic and socio-economic characteristics but only the Big Five, columns (2), (5) and (8) also include pre-determined (demographic) characteristics such as sex, age, age squared and Ukrainian language<sup>11</sup> as covariates, and columns (3), (6) and (9) additionally include socio-economic controls that may be jointly determined with the migration decision, including marital status, number of kids, type of educational attainment and employment status.

In all nine specifications we find statistically significant evidence that conscientiousness predicts 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 0.8 percentage point lower probability of moving from rural to urban areas. Breaking the results down, this corresponds to a 0.5- and 0.2- percentage point lower probability of rural-to-city migration and rural-to-town migration, respectively (columns 5 and 8). The estimated effects are substantial given the unconditional migration probability of 3 percent from rural-to-urban and of about 1.5 percent from both rural-to-city and rural-to-town. We also find that individuals who rate themselves as (one standard deviation) more open to new experiences have a 0.3 percentage point higher probability of moving from rural-to-urban. A similar increase in agreeableness, however, is linked to a 0.5 percentage point

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<sup>11</sup>We 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 exogeneous to the migration decision.

decrease in the probability of moving into an urban area. The effect of agreeableness on the rural-to-urban migration is mostly attributable to the decision to moving into towns. We also estimate a negative impact of extraversion on the migration behavior, which is salient only for the rural-to-city migration. On the other hand, neuroticism is found uncorrelated with any type of migration.

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. For some traits, such as openness, the effect becomes statistically insignificant when both demographic and socio-economic characteristics are included in the model (e.g., columns 3, 6, 9). On the other hand, the signs of the marginal effects of the controls are generally in line with the theory. The older individuals the less likely they migrate and the effect has the expected concave shape. Net household income, education level 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 point lower among those who prefer to communicate in Ukrainian rather than Russian (Table 3; columns 2-3). As for moving into the city or town, the effect is smaller, yet strongly significant. The probability of migration increases with the education level, and it is the highest among university graduates (Table 3; columns 3, 6, 9). 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 having a child do not predict the migration propensity, and neither does the employment status in many specifications.

Tables 4 to 6 extend the models presented in Table 3 by including the risk and trust preference measures as covariates. While Table 4 reports the results for the outcome variable of rural-to-urban migration, Table 5 and Table 6 show the regressions of rural-to-city and rural-to-town migration, respectively. The inclusion of the risk and trust variables in the analysis does not bring about a substantial change in the impact of personality traits. This suggests that the Big Five traits, and risk and trust preferences represent distinctive features of personality and they operate as complements

in determining the propensity to migrate. In particular, the marginal effects of the big five reported in Table 4 and Table 5 are quantitatively similar to those in Table 3, where we do not control for preferences.

In line with the previous literature, we find that individuals who are relatively more willing to take risks are more likely to migrate. This effect is however present only for rural-to-city migration (Table 5). The probability of moving into cities is almost half a percentage point higher for relatively more risk-loving people, controlling for demographic and socio-economic characteristics. We also find a negative correlation between the trust indicator and the probability of moving into a city, but the coefficient estimate is not consistently statistical significant (Table 5). We find a negative association between risk willingness and rural-to-town migration, a result for which we have no good explanation. This might, however, be an indication that the differences in institutional and economic structures between rural areas and towns cannot be well defined, whereas these differences between rural areas and cities are clear cut. Hence, the discussion that follows mainly focuses on results from the rural-to-city migration.

We furthermore include the unemployment rate and the log of GDP both at the oblast level, in order to control for local macroeconomic and labor market conditions that may be relevant for migration decision.<sup>12</sup> Table 7 presents the impact of the big five together with risk and trust preferences conditioning on pre-determined (demographic) characteristics. Columns (1), (4) and (7) present baseline results without any regional controls, while the other columns additionally include either the unemployment rate or the log of GDP at the oblast level. A comparison with the baseline results makes it clear that the inclusion of either of the macro indicators does not change the coefficient estimates on non-cognitive skills. This suggests the orthogonality of the regional controls to the big five and preferences. So, attitudes towards risk and a subset of the big five, namely openness, conscientiousness and extraversion do predict

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<sup>12</sup>There 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 macro-economic measures introduced in Table 7 are hence only rough proxies for local macro-economic and labor market conditions. Since most migration is, however, intra-oblast migration, we can suppose that macro-economic conditions in the oblast are push factors regarding internal migration in Ukraine.

internal migration behavior. However, these ‘soft-skills’ are also with this specification only relevant for the decision of rural-to-city migration (columns 4-6). Table 7 also demonstrates that the regional unemployment rate is positively associated with the decision to migrate, whereas regional GDP is negatively and more strongly correlated with the migration propensity. As previously suggested, the adverse macro-economic conditions at the oblast level play a role as push factors in the migration decision. The effects are quantitatively similar in rural-to-city and rural-to-town migration. In Table 8, we additionally control for oblast fixed effects in order to capture the systematic differences across regions. Controlling for oblast fixed effect does not change the marginal effects in any major way as inspection of Table 7 and Table 8 shows.

Finally, we investigate whether non-cognitive skills and preferences contribute together to the explanation of the migration behavior by providing two goodness-of-fit measures, the Akaike’s information criterion (AIC) and the Bayesian information criterion (BIC). The first measure is used with the OLS estimation of linear probability models, while the latter measure is based on the estimation of probit models. In both types of estimation we control for pre-determined characteristics, like age, age squared, gender and language. Each row in Table 9 shows which of the three sets of regressors –Big Five measures, risk measures and trust measures– are separately or together included in the regression analysis. The explanatory power is considerably larger when combining the Big Five with preferences compared to using each set of explanatory variables individually. More importantly, the full model is always chosen by AIC, which means the explanatory power is maximized when the three concepts are included in the regression together. Following Becker et al. (2012)’s approach we also calculate adjusted  $R^2$ ’s from the estimation of linear regression models in which outcomes are regressed on the sets of pre-determined individual characteristics, the Big Five and preferences, separately and jointly (see Table A.4). Supporting the finding documented in Table 9, the explanatory power increases when combining the Big Five with preferences, namely the adjusted  $R^2$ ’s are always the highest when the three concepts are together included in the regression analysis. This finding is consistent with

the evidence by Becker et al. (2012) who show the low correlations between the big five and preferences and their complementarity in explaining life outcomes in Germany.

## 7 Extensions and robustness checks

A potential concern is that most of the migrations observed in the data occur before the risk and trust 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 lovers, 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, following Jaeger et al. (2010)'s method, we estimate similar models from Tables 4 to 6, using as the dependent variable a binary indicator for those who migrated from the rural to urban between 2007 and 2012, and regressing it on risk and trust indicators measured in 2007. We compare these results with coefficient estimates from a regression where the dependent variable is an indicator for those who ever migrated between 2003 and 2007, considering the same preference variables that are again measured in 2007. The results of the rural-to-city are particularly illuminating and shown in the middle panel of Table 10. When the dependent variable is the probability of migration between 2007 and 2012, i.e. after the risk attitude has been revealed the marginal effect of the risk indicator is significant in all specifications while this significance is not given when the dependent variable is the probability of migration between 2003 and 2007, i.e. before the risk attitude has been revealed. In contrast, trust attitudes are never significant whatever the dependent variable. That the impact of risk attitudes is only important when we focus on migrations that occurred after the risk questions were asked mitigates our worries about reverse causality.

As a further and more direct check of reverse causality, exploiting the panel feature of the ULMS, we construct a variable for the change in risk indexes between 2007 and 2012. This change-in-risk variable is regressed on the migration indicator (for moves

between 2007 and 2012). Similarly, in a separate regression, we use as a dependent variable the risk index in 2012, and look at the impact of rural-to-city migration (between 2007 and 2012), conditioning on the risk index measured in 2007 –before the move occurred. The results are provided in Table 11. The statistically insignificant coefficient estimates in Table 11 reveal that the rural-to-city 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. Corresponding checks for the trust measure are not presented here, given the insignificant role of trust attitudes in determining migration behavior.

We also assume the stability of the big five personality traits over the panel period. Reverse causality could also 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). However, we cannot internally check the validity of our assumption given the lack of repeated information on personality traits in the ULMS, in contrast to the risk and trust measures. We instead implement a different approach to validate our results following Groves (2005) and Heineck and Anger (2010). We predict residuals from the regression of big five factors on age and age squared and estimate the impact of these predicted residuals on the migration behavior. The idea behind this approach is to net out the age effect on non-cognitive skills, so that the estimated impact is a time-invariant (age-free) component of personality. Table 12 shows very similar results to our basic specification in Table 3; so, after we have 'de-aged' our measures of non-cognitive skills, openness, conscientiousness and extraversion remain important predictors of rural-to-city migration. Hence our initial assumption of the time-invariance taken from the psychology literature, seems to hold with our data.

Our main results presented in Tables 3-6 rely on an unbalanced panel sample. One concern could be the panel attrition bias which might have driven the results to some extent. If dropping out of the sample is not random, then the unobservable determi-

nants of non-response or panel attrition would be correlated with the unobservables determining migration behavior. As a result, the unbalanced panel would yield biased estimates. Considering this concern, we replicate the main analyses using a balanced sample of 2003-2012 in which only individuals tracked over the entire observation period, are kept in the sample. The results from the balanced sample are presented in the appendix Tables A.2 and Table A.3, without and with preferences, respectively. When we only estimate the impacts of big five personality traits, we find openness, conscientiousness and agreeableness are key factors determining the migration decision (Table A.2). However, in contrast to the unbalanced panel results presented in Tables 4-6, the controls for risk and trust preferences do not sweep away the significance of the coefficient on agreeableness. On the other hand, the risk measure becomes no longer associated with rural-to-city migration (Table A.3; columns 4-6). Nonetheless, the predictive power of openness and conscientiousness remains consistent regardless of which sample we use. In this balanced panel estimation, the individual-level control variables come from the year of 2003. The results are, however, very similar to those reported in Table A.2. and Table A.3, when we use the controls from the previous sample wave, instead of the first wave of the balanced panel.

## 8 Conclusion

Using the rich panel data set of the Ukrainian Longitudinal Monitoring Survey we analyze the link between non-cognitive skills and 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. We estimate probit models with the Big Five personality traits as covariates and investigate whether some of the Big Five personality traits have predictive power. We also analyze the importance of attitudes towards risk and trust in general, in these regressions.

Our results show that three of the Big Five, namely openness to new experiences,



conscientiousness and extraversion, as well as attitudes towards risk in general are consistently correlated with rural-to-urban migration. These results are driven by rural-to-city migration, whilst moving from a rural area to a town is not consistently correlated with the mentioned subset of the Big Five personality traits and with risk attitudes. The estimated effect of a one standard deviation increase in a personality trait that has some predictive power changes the probability of moving from a rural area to a city by between 0.3 and 0.5 percentage points. The size of the effects are substantial in that the unconditional rural-to-city migration probability amounts to 1.5 percent. We also show that personality traits and preferences are complementary in explaining rural-to-urban migration; hence it is crucial to have both personality traits and preferences as covariates when trying to explain this phenomenon.

Finally, reverse causality tests demonstrate that we can interpret our results as being causal as far as risk attitudes are concerned, 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. In the final analysis it is at any rate striking that non-cognitive skills are very consistent predictors of rural-to-city migration.

## Acknowledgement

We would like to thank Holger Bonin, Thomas Dohmen, Benjamin Elsner, Robert Grundke, David McKenzie and Chiara Monfardini for helpful comments and suggestions. We also thank the seminar and conference participants of IZA, of the University of Bologna, the EACES Conference in Regensburg in 2016, and the 2017 ASSA meetings.

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# Figures and Tables

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

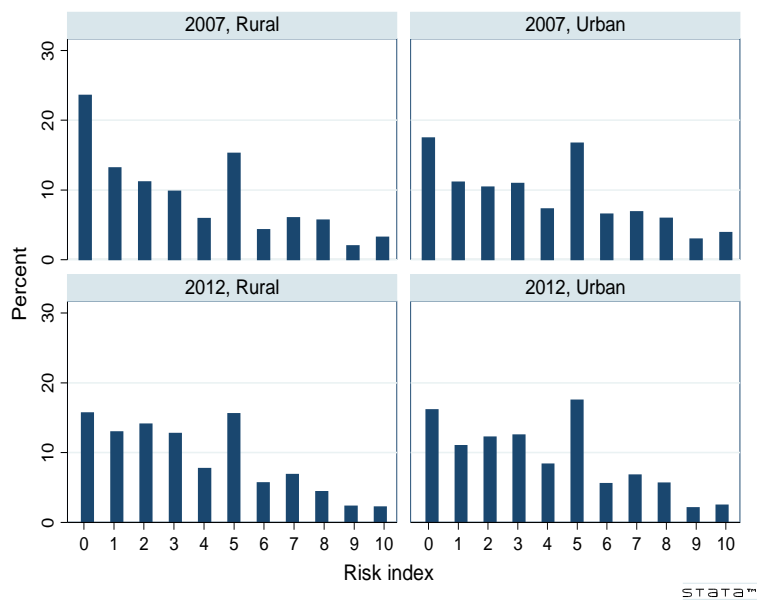


Figure 2: General trust index in urban and rural areas, in 2007 and 2012

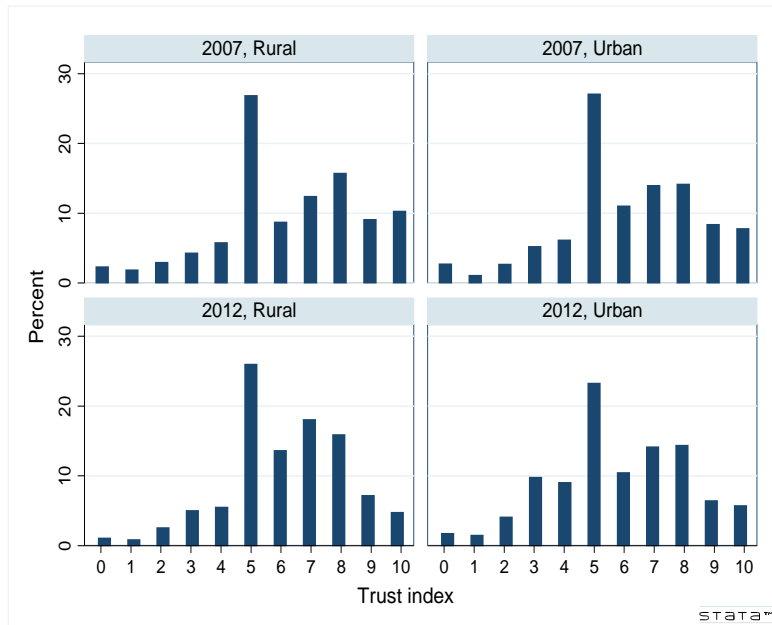


Table 1: Mapping 24 items into big five

<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			Rural stayers			Movers into urban		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Age	3644	42.84	16.13	2309	47.31	14.98	48	32.44	13.00
Female	3644	0.56	0.50	2309	0.59	0.49	48	0.58	0.50
Ukrainian language	3644	0.30	0.46	2309	0.68	0.47	48	0.42	0.50
Married	3643	0.62	0.48	2309	0.66	0.47	48	0.77	0.42
No. kids	3640	1.23	0.95	2309	1.66	1.05	48	0.88	0.87
Education level	3637	3.03	0.88	2306	2.77	0.86	48	3.23	0.93
Employed	3644	0.51	0.50	2309	0.45	0.50	48	0.71	0.46
Household income	3644	4894.72	3484.40	2309	3647.29	2497.23	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
Trust indicator	3529	0.51	0.50	2274	0.58	0.49	47	0.64	0.49
Trust index	3529	5.81	2.29	2274	6.15	2.02	47	6.38	2.35
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 2004-2007 waves of the ULMS.

Table 3: Effects of the big five on internal migration

	(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*** (0.002)	0.004** (0.002)	0.002 (0.002)	0.004*** (0.001)	0.002** (0.001)	0.001 (0.001)	0.003** (0.001)	0.001 (0.001)	0.000 (0.001)
Conscient.	-0.013*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.008*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Extraversion	-0.002 (0.002)	-0.002 (0.002)	-0.000 (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeable.	-0.008*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.003** (0.002)	-0.002 (0.001)	-0.001 (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Neuroticism	-0.004* (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.003* (0.001)	-0.002* (0.001)	-0.001 (0.001)
Age		-0.001* (0.001)	-0.002** (0.001)		-0.001** (0.000)	-0.001* (0.000)		0.000 (0.000)	-0.000 (0.000)
Age square		0.001 (0.001)	0.002* (0.001)		0.001 (0.001)	0.001 (0.001)		-0.000 (0.000)	0.000 (0.001)
Female		0.001 (0.003)	0.002 (0.003)		0.001 (0.002)	0.001 (0.002)		0.000 (0.002)	0.001 (0.002)
Ukrainian language		-0.030*** (0.003)	-0.025*** (0.003)		-0.010*** (0.002)	-0.007*** (0.002)		-0.017*** (0.002)	-0.014*** (0.002)
Married			0.000 (0.003)			-0.002 (0.002)			0.002 (0.002)
Number of kids			-0.002 (0.002)			-0.002 (0.001)			-0.000 (0.001)
Employed			0.001 (0.003)			-0.001 (0.002)			0.002 (0.002)
Log of household income			0.007*** (0.002)			0.003*** (0.001)			0.003** (0.001)
Education: Secondary			0.002 (0.003)			0.005** (0.002)			-0.004* (0.002)
Education: Vocational			0.010*** (0.003)			0.006*** (0.002)			0.002 (0.002)
Education: Higher			0.018*** (0.006)			0.007** (0.003)			0.007* (0.004)
Observations	6,164	6,153	5,729	6,079	6,068	5,644	6,077	6,066	5,649

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 square*, *number of kids* 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 with respect to the previous wave. All specifications also include year fixed effects.

Table 4: Effects of the big five & preferences on rural-to-urban migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Openness	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Conscient.	-0.013*** (0.002)	-0.013*** (0.002)	-0.013*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.009*** (0.002)
Extraversion	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Agreeable.	-0.008*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.004*** (0.002)	-0.005*** (0.002)
Neuroticism	-0.004* (0.002)	-0.004* (0.002)	-0.004* (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Risk	-0.001 (0.005)		-0.001 (0.005)	-0.001 (0.004)		-0.001 (0.004)	-0.001 (0.003)		-0.001 (0.003)
Trust		0.001 (0.004)	0.002 (0.004)		0.000 (0.003)	0.000 (0.003)		0.000 (0.003)	0.000 (0.003)
Covariates									
Set 1	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Set 2	No	No	No	No	No	No	Yes	Yes	Yes
Observations	6,125	6,121	6,090	6,114	6,110	6,079	5,692	5,687	5,658

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 preference variables of *risk* and *trust* are dummy variables for values greater than 5 on a 11-point scale. *Set 1* represents covariates of age, age square, female and Ukrainian language, while *Set 2* refers to covariates of married, number of kids, education level, employed, and log of total household income. The covariates are lagged variables with respect to the previous wave. All specifications also include year fixed effects.

Table 5: Effects of the big five & preferences on rural-to-city migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Openness	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Conscient.	-0.008*** (0.001)	-0.008*** (0.001)	-0.007*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Extraversion	-0.003** (0.001)	-0.002** (0.001)	-0.003** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Agreeable.	-0.003** (0.002)	-0.003** (0.002)	-0.003* (0.002)	-0.002 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Neuroticism	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Risk	0.007** (0.003)		0.007*** (0.003)	0.004** (0.002)		0.004** (0.002)	0.003* (0.002)		0.003** (0.002)
Trust		-0.005** (0.002)	-0.006** (0.002)		-0.004** (0.002)	-0.004** (0.002)		-0.003** (0.001)	-0.003** (0.001)
Covariates									
Set 1	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Set 2	No	No	No	No	No	No	Yes	Yes	Yes
Observations	6,041	6,038	6,007	6,030	6,027	5,996	5,608	5,604	5,575

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 preference variables of *risk* and *trust* are dummy variables for values greater than 5 on a 11-point scale. *Set 1* represents covariates of age, age square, female and Ukrainian language, while *Set 2* refers to covariates of married, number of kids, education level, employed, and log of total household income. The covariates are lagged variables with respect to the previous wave. All specifications also include year fixed effects.



Table 6: Effects of the big five & preferences on rural-to-town migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Openness	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Conscient.	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002*** (0.001)	-0.002** (0.001)
Extraversion	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeable.	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Neuroticism	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Risk	-0.011*** (0.004)		-0.011*** (0.004)	-0.006** (0.003)		-0.006** (0.003)	-0.005** (0.002)		-0.005** (0.002)
Trust		0.008*** (0.003)	0.008*** (0.003)		0.004** (0.002)	0.004** (0.002)		0.003* (0.002)	0.003* (0.002)
Covariates				Yes	Yes	Yes	Yes	Yes	Yes
Set 1	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Set 2	No	No	No	No	No	No	Yes	Yes	Yes
Observations	6,038	6,034	6,003	6,027	6,023	5,992	5,612	5,607	5,578

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 preference variables of *risk* and *trust* are dummy variables for values greater than 5 on a 11-point scale. *Set 1* represents covariates of age, age square, female and Ukrainian language, while *Set 2* refers to covariates of married, number of kids, education level, employed, and log of total household income. The covariates are lagged variables with respect to the previous wave. All specifications also include year fixed effects.

Table 7: Effects of the big five & preferences on migration –controlling for region (oblast) level macroeconomic conditions

	(1) rural-urban	(2) rural-urban	(3) rural-urban	(4) rural-city	(5) rural-city	(6) rural-city	(7) rural-town	(8) rural-town	(9) rural-town
Openness	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.002** (0.001)	0.002** (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Conscient.	-0.008*** (0.002)	-0.008*** (0.002)	-0.007*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002* (0.001)
Extraversion	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeable.	-0.005*** (0.002)	-0.005** (0.002)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.002** (0.001)
Neuroticism	-0.003 (0.002)	-0.003 (0.002)	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.001 (0.001)
Risk	-0.001 (0.004)	-0.001 (0.004)	0.002 (0.003)	0.004** (0.002)	0.004** (0.002)	0.005*** (0.002)	-0.006** (0.003)	-0.006** (0.002)	-0.004 (0.002)
Trust	0.000 (0.003)	0.000 (0.003)	-0.000 (0.003)	-0.004** (0.002)	-0.004** (0.002)	-0.004** (0.002)	0.004** (0.002)	0.003** (0.002)	0.003** (0.002)
<i>Regional covariates</i>									
Unemployment rate		0.003*** (0.001)			0.001** (0.000)			0.001*** (0.000)	
Log GDP			-0.016*** (0.002)			-0.007*** (0.001)			-0.006*** (0.001)
Observations	6,079	6,079	6,079	5,996	5,996	5,996	5,992	5,992	5,992

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 preference variables of *risk* and *trust* are dummy variables 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 square, female and Ukrainian language, and year fixed effects. The covariates are lagged variables with respect to the previous wave.

Table 8: Effects of the big five & preferences on migration  
 –controlling for regional covariates and fixed effects

	(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	0.003** (0.002)	0.003** (0.001)	0.003** (0.002)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Conscient.	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Extraversion	-0.003* (0.001)	-0.003* (0.001)	-0.003* (0.001)	-0.003** (0.001)	-0.003** (0.001)	-0.003** (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeable.	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.000 (0.002)	-0.000 (0.001)	-0.001 (0.001)	-0.004** (0.002)	-0.003** (0.002)	-0.004** (0.002)
Neuroticism	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)
Risk	0.004 (0.003)	0.004 (0.003)	0.003 (0.003)	0.007*** (0.003)	0.007*** (0.003)	0.007** (0.003)	-0.006 (0.005)	-0.006 (0.005)	-0.007 (0.005)
Trust	0.000 (0.003)	0.001 (0.003)	0.001 (0.003)	-0.006** (0.002)	-0.005** (0.002)	-0.005** (0.002)	0.008** (0.003)	0.009*** (0.003)	0.009*** (0.003)
<i>Regional covariates</i>									
Unemployment rate		0.005*** (0.002)			0.004** (0.002)			0.003 (0.002)	
Log GDP			-0.028*** (0.007)			-0.023*** (0.006)			-0.006 (0.011)
Oblast fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,050	5,050	5,050	3,744	3,744	3,744	3,362	3,362	3,362

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 preference variables of *risk* and *trust* are dummy variables 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 square, female and Ukrainian language, as well as year and oblast fixed effects. The covariates are lagged variables with respect to the previous wave.

Table 9: Complementarity vs substitutability btw. the big five and preferences

	Obs	ll(null)	ll(model)	df	AIC	BIC	Pseudo R2
<b>Rural-to-urban migration</b>							
<b>Big five</b>	6153	-784.852	-682.816	12	1389.633	1470.329	0.130
<b>Risk</b>	7656	-987.142	-901.428	8	1818.857	1874.403	0.087
<b>Trust</b>	7687	-980.944	-894.359	8	1804.718	1860.297	0.088
<b>Risk, trust</b>	7591	-978.203	-891.472	9	1800.943	1863.356	0.089
<b>Big five, risk</b>	6114	-780.197	-679.842	13	1385.683	1473.021	0.129
<b>Big five, trust</b>	6110	-776.533	-677.229	13	1380.458	1467.788	0.128
<b>Big five, risk, trust</b>	6079	-775.656	-676.318	14	1380.637	1474.613	0.128
<b>Rural-to-city migration</b>							
<b>Big five</b>	6068	-455.678	-398.783	12	821.565	902.095	0.125
<b>Risk</b>	7548	-570.117	-531.221	8	1078.443	1133.875	0.068
<b>Trust</b>	7581	-570.596	-528.142	8	1072.284	1127.751	0.074
<b>Risk, trust</b>	7485	-569.197	-525.641	9	1069.281	1131.567	0.077
<b>Big five, risk</b>	6030	-455.127	-396.706	13	819.411	906.570	0.128
<b>Big five, trust</b>	6027	-455.083	-395.958	13	817.916	905.069	0.130
<b>Big five, risk, trust</b>	5996	-454.632	-393.714	14	815.427	909.211	0.134
<b>Rural-to-town migration</b>							
<b>Big five</b>	6066	-447.165	-384.948	12	793.896	874.422	0.139
<b>Risk</b>	7547	-565.875	-497.974	8	1011.948	1067.379	0.120
<b>Trust</b>	7578	-557.829	-490.787	8	997.574	1053.038	0.120
<b>Risk, trust</b>	7482	-556.468	-485.433	9	988.865	1051.147	0.128
<b>Big five, risk</b>	6027	-442.360	-378.874	13	783.748	870.900	0.144
<b>Big five, trust</b>	6023	-438.039	-376.013	13	778.027	865.170	0.142
<b>Big five, risk, trust</b>	5992	-437.608	-372.526	14	773.051	866.826	0.149

Table 10: Effects of risk & trust measured in 2007 on migration between 2007-2012 vs. 2003-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Rural-to-urban migration</b>									
<b>(a) between 2007-2012</b>									
Risk 2007	0.013** (0.007)		0.015** (0.006)	0.004 (0.004)		0.005 (0.004)	0.002 (0.003)		0.003 (0.003)
Trust 2007		0.002 (0.006)	0.003 (0.006)		-0.000 (0.004)	0.001 (0.004)		0.001 (0.003)	0.002 (0.003)
Observations	2,079	2,108	2,032	2,079	2,108	2,032	1,976	1,998	1,930
<b>(b) between 2003-2007</b>									
Risk 2007	-0.002 (0.008)		-0.002 (0.008)	-0.006 (0.007)		-0.007 (0.007)	-0.004 (0.006)		-0.005 (0.006)
Trust 2007		-0.005 (0.006)	-0.005 (0.007)		-0.004 (0.005)	-0.003 (0.006)		-0.003 (0.005)	-0.002 (0.005)
Observations	2,634	2,671	2,582	2,621	2,658	2,569	2,469	2,499	2,422
<b>Rural-to-city migration</b>									
<b>(c) between 2007-2012</b>									
Risk 2007	0.012*** (0.004)		0.012*** (0.004)	0.004** (0.002)		0.004** (0.002)	0.002* (0.001)		0.002* (0.001)
Trust 2007		-0.004 (0.004)	-0.003 (0.004)		-0.002 (0.002)	-0.002 (0.002)		-0.000 (0.001)	-0.000 (0.001)
Observations	2,056	2,088	2,013	2,056	2,088	2,013	1,953	1,978	1,911
<b>(d) between 2003-2007</b>									
Risk 2007	0.004 (0.006)		0.005 (0.006)	-0.001 (0.005)		-0.000 (0.005)	-0.000 (0.004)		0.000 (0.004)
Trust 2007		-0.009** (0.005)	-0.010** (0.005)		-0.008* (0.004)	-0.008* (0.004)		-0.005 (0.003)	-0.005 (0.003)
Observations	2,601	2,638	2,549	2,588	2,625	2,536	2,436	2,466	2,389
<b>Rural-to-town migration</b>									
<b>(e) between 2007-2012</b>									
Risk 2007	-0.002 (0.006)		0.000 (0.005)	-0.003 (0.004)		-0.001 (0.004)	-0.001 (0.002)		-0.000 (0.002)
Trust 2007		0.005 (0.004)	0.007 (0.004)		0.003 (0.003)	0.004 (0.003)		0.002 (0.002)	0.002 (0.002)
Observations	2,059	2,087	2,012	2,059	2,087	2,012	1,960	1,981	1,914
<b>(f) between 2003-2007</b>									
Risk 2007	-0.007 (0.006)		-0.008 (0.006)	-0.004 (0.004)		-0.004 (0.004)	-0.003 (0.003)		-0.003 (0.003)
Trust 2007		0.004 (0.004)	0.005 (0.004)		0.003 (0.003)	0.003 (0.003)		0.002 (0.002)	0.002 (0.002)
Observations	2,594	2,631	2,542	2,581	2,618	2,529	2,432	2,462	2,385
<b>Covariates</b>									
Set 1	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Set 2	No	No	No	No	No	No	Yes	Yes	Yes

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note: The table shows marginal effects from probit estimation, evaluated at sample mean. The outcome variable, measured in 2012, captures the rural-to-city migration between 2007 and 2012. The preference variables of *risk* and *trust*, measured in 2007, denote dummy variables for values greater than 5 on a scale from 0 to 10. The big five factors –openness, conscientiousness, extraversion, agreeableness, neuroticism– are standardized averages with a mean of 0 and standard deviation of 1. *Set 1* represents covariates of age, age square, female and Ukrainian language, while *Set 2* refers to covariates of married, number of kids, education level, employed, and log of net household income. The covariates are measured in 2007.

Table 11: Reverse causality check for risk: OLS estimation

	(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)	0.119 (0.205)
Observations	1,596	1,596	1,521	1,580	1,580	1,505	1,583	1,583	1,512
(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)	-0.008 (0.185)
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)	0.212*** (0.026)
Observations	1,596	1,596	1,585	1,580	1,580	1,569	1,583	1,583	1,573
Covariates									
Set 1	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Set 2	No	No	Yes	No	No	Yes	No	No	Yes

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 as well as 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 square, female and Ukrainian language, *Set 2* refers to covariates of married, number of kids and education level, employed, and log of net household income,. The covariates are measured in 2007.

Table 12: Age-free effects of the big five on internal migration

	(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	0.005** (0.002)	0.003* (0.002)	0.001 (0.002)	0.003** (0.001)	0.002* (0.001)	0.001 (0.001)	0.002* (0.001)	0.001 (0.001)	-0.000 (0.001)
Conscient	-0.011*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.006*** (0.002)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Extraversion	-0.003 (0.002)	-0.002 (0.002)	-0.000 (0.001)	-0.003** (0.001)	-0.002** (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeable	-0.007*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.003* (0.002)	-0.002 (0.001)	-0.002 (0.001)	-0.004*** (0.002)	-0.003*** (0.001)	-0.003*** (0.001)
Neuroticism	-0.003	-0.003	-0.002	-0.001	-0.001	-0.001	-0.002	-0.002*	-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

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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. *Set 1* represents covariates of age, age square, female and Ukrainian language, while *Set 2* refers to covariates of married, number of kids, education level, employed, and log of total household income. The covariates are lagged variables with respect to the previous wave.

## Appendix A Tables

Table A.1. Summary statistics (2004 & 2007)

2004	Urban			Rural stayers			Movers into urban		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Age	3800	43.20	16.69	3234	44.96	16.46	133	42.20	16.02
Female	3800	0.59	0.49	3234	0.58	0.49	133	0.52	0.50
Ukrainian language	3799	0.36	0.48	3233	0.69	0.46	133	0.16	0.37
Married	3782	0.60	0.49	3218	0.67	0.47	131	0.69	0.47
No. kids	3799	1.27	0.98	3232	1.65	1.17	133	1.32	1.00
Education level	3797	2.72	1.02	3232	2.32	1.00	133	2.66	0.89
Employed	3800	0.51	0.50	3234	0.40	0.49	133	0.51	0.50
Household income	3639	866.30	741.70	3094	579.76	509.54	131	784.64	439.27
2007	Urban			Rural stayers			Movers into urban		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Age	3606	43.70	16.91	2676	46.78	15.86	73	41.30	15.31
Female	3606	0.58	0.49	2676	0.59	0.49	73	0.44	0.50
Ukrainian language	3595	0.38	0.49	2663	0.67	0.47	73	0.41	0.50
Married	3603	0.62	0.48	2675	0.69	0.46	73	0.71	0.46
No. kids	3603	1.22	0.96	2675	1.67	1.09	73	1.41	1.07
Education level	3585	2.98	0.82	2658	2.69	0.87	73	2.85	0.72
Employed	3606	0.53	0.50	2676	0.45	0.50	73	0.67	0.47
Household income	3438	2452.01	1717.34	2570	1769.28	1250.33	68	2241.60	1570.78
Risk indicator	3533	0.26	0.44	2561	0.20	0.40	73	0.19	0.40
Risk index	3533	3.77	2.90	2561	3.18	2.89	73	2.89	2.78
Trust indicator	3542	0.55	0.50	2598	0.56	0.50	73	0.51	0.50
Trust index	3542	6.11	2.31	2598	6.26	2.40	73	5.63	1.92

Source: Authors' tabulations from the 2004-2007 waves of the ULMS.

Table A.2. **Effects of the big five on migration: Balanced panel of 2003-2012, using covariates from 2003**

balanced panel									
	(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*** (0.002)	0.004** (0.002)	0.003* (0.002)	0.004*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.003** (0.001)	0.001 (0.001)	0.001 (0.001)
Conscient.	-0.013*** (0.002)	-0.008*** (0.002)	-0.009*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.002** (0.001)	-0.003** (0.001)
Extraversion	-0.002 (0.002)	-0.001 (0.001)	-0.000 (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeable.	-0.007*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.004*** (0.001)	-0.002** (0.001)	-0.002* (0.001)	-0.004** (0.002)	-0.002** (0.001)	-0.002** (0.001)
Neuroticism	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Covariates from 2003									
Set 1	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Set 2	No	No	Yes	No	No	Yes	No	No	Yes
Observations	5,174	5,167	4,676	5,105	5,098	4,608	5,113	5,106	4,619

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 preference variables of *risk* and *trust* are dummy variables for values greater than 5 on a 11-point scale. *Set 1* represents covariates of age, age square, female and Ukrainian language, while *Set 2* refers to covariates of married, number of kids, education level, employed, and log of total household income. The covariates are lagged variables with respect to the previous wave. All specifications also include year fixed effects.

Table A.3. **Effects of the big five & preferences on migration: Balanced panel of 2003-2012, using covariates from 2003**

balanced panel									
	(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*** (0.002)	0.004** (0.002)	0.003* (0.002)	0.004*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.003** (0.001)	0.001 (0.001)	0.001 (0.001)
Conscient.	-0.013*** (0.002)	-0.008*** (0.002)	-0.009*** (0.002)	-0.007*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.002* (0.001)	-0.002** (0.001)
Extraversion	-0.001 (0.002)	-0.000 (0.001)	0.000 (0.001)	-0.002* (0.001)	-0.002 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Agreeable.	-0.008*** (0.002)	-0.005*** (0.002)	-0.005*** (0.002)	-0.004*** (0.001)	-0.002** (0.001)	-0.002* (0.001)	-0.004*** (0.002)	-0.002** (0.001)	-0.003** (0.001)
Neuroticism	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Risk 2007	-0.006 (0.005)	-0.006 (0.004)	-0.005 (0.004)	0.002 (0.003)	0.001 (0.002)	0.000 (0.002)	-0.010** (0.004)	-0.005** (0.003)	-0.005** (0.003)
Trust 2007	0.007* (0.004)	0.006** (0.003)	0.007** (0.003)	-0.000 (0.002)	0.000 (0.002)	0.001 (0.002)	0.008*** (0.003)	0.005*** (0.002)	0.005** (0.002)
Covariates from 2003									
Set 1	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Set 2	No	No	Yes	No	No	Yes	No	No	Yes
Observations	5,127	5,120	4,633	5,059	5,052	4,565	5,066	5,059	4,576

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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 preference variables of *risk* and *trust* are dummy variables for values greater than 5 on a 11-point scale. *Set 1* represents covariates of age, age square, female and Ukrainian language, while *Set 2* refers to covariates of married, number of kids, education level, employed, and log of total household income. The covariates are lagged variables with respect to the previous wave. All specifications also include year fixed effects.

Table A.4. Effects of the big five & preferences on migration: OLS estimation

	(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		0.004* (0.002)	0.004 (0.002)			0.002 (0.002)	0.002 (0.002)			0.002 (0.001)	0.002 (0.001)	
Conscient		-0.011*** (0.003)	-0.011*** (0.003)			-0.008*** (0.002)	-0.008*** (0.002)			-0.004*** (0.001)	-0.004*** (0.001)	
Extraversion		-0.003 (0.002)	-0.002 (0.002)			-0.003** (0.002)	-0.004** (0.002)			0.001 (0.001)	0.002 (0.001)	
Agreeable		-0.009*** (0.003)	-0.008*** (0.003)			-0.004* (0.002)	-0.003 (0.002)			-0.005*** (0.002)	-0.005*** (0.002)	
Neuroticism		-0.005** (0.002)	-0.005* (0.002)			-0.002 (0.002)	-0.002 (0.002)			-0.004** (0.002)	-0.003** (0.002)	
Risk				-0.004 (0.005)			0.008** (0.004)	0.006* (0.004)			-0.010*** (0.003)	-0.010*** (0.003)
Trust				-0.000 (0.004)			-0.008** (0.003)	-0.009*** (0.003)			0.007** (0.003)	0.006** (0.003)
Age	-0.002** (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Age square	0.001* (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002** (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)
Female	-0.006* (0.004)	0.003 (0.005)	0.002 (0.005)	-0.009** (0.004)	-0.004 (0.003)	0.002 (0.003)	0.003 (0.004)	-0.003 (0.003)	-0.003 (0.003)	0.001 (0.003)	-0.001 (0.003)	-0.006* (0.003)
Ukrainian language	-0.052*** (0.005)	-0.049*** (0.006)	-0.048*** (0.006)	-0.047*** (0.005)	-0.018*** (0.003)	-0.018*** (0.004)	-0.019*** (0.004)	-0.016*** (0.004)	-0.036*** (0.004)	-0.033*** (0.004)	-0.032*** (0.004)	-0.032*** (0.004)
Constant	0.114*** (0.016)	0.108*** (0.020)	0.108*** (0.020)	0.113*** (0.017)	0.073*** (0.012)	0.078*** (0.017)	0.080*** (0.017)	0.076*** (0.014)	0.045*** (0.010)	0.033*** (0.012)	0.031** (0.012)	0.040*** (0.011)
Observations	8,459	6,153	6,079	7,591	8,328	6,068	5,996	7,485	8,336	6,066	5,992	7,482
Adjusted R-squared	0.024	0.031	0.031	0.022	0.009	0.017	0.019	0.011	0.019	0.019	0.020	0.018

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note: The table shows marginal effects from OLS estimation. The big five factors –openness, conscientiousness, extraversion, agreeableness, neuroticism– are standardized averages with a mean of 0 and standard deviation of 1. The preference variables of *risk* and *trust* are dummy variables for values greater than 5 on a 11-point scale. The individual-level covariates are lagged variables with respect to the previous wave.