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IZA DP No. 12444

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ABSTRACT

Personality Traits, Migration Intentions, and Cultural Distance*

This paper investigates the relationship between Big Five personality traits and individuals' intentions to migrate in countries that vary in their culture. Using data collected from university students in Germany, we find that extraversion and openness are positively associated with migration intentions, while agreeableness, conscientiousness, and emotional stability negatively relate to migration intentions. Openness positively and extraversion negatively relate to the willingness to move to culturally distant countries after controlling for geographic distance and economic differences between countries. Using language as a cultural distance indicator provides evidence that extravert and conscientious individuals are less likely to prefer linguistically distant countries while agreeable individuals tend to consider such countries as potential destinations.

JEL Classification: D91, J61, Z1

Keywords: migration intentions, destination choice, cultural distance, Big Five personality traits

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1. Introduction

In neoclassical economic literature, labor migration is theorized as an investment decision driven by human capital characteristics of individuals and expected wage gains (Massey et al., 1993). Despite the significant impact of economic differentials between regions on individuals' decision to migrate, these differentials are not sufficient to explain why some individuals migrate while others do not, even if they share the same socio-demographic characteristics and the same prospects for economic gains upon migration. This is because the decision to migrate is a complex process that is also influenced by non-economic factors such as social networks (Manchin and Orazbayev, 2018), cultural differences (Belot and Ederveen, 2012) and individuals' perception of potential costs and benefits of migration (Bauernschuster et al., 2014). These perceptions are shaped by preferences (Bauernschuster et al., 2014; Czaika, 2012; Groenewold et al., 2012) and psychological dispositions (Fawcett, 1985). Personality traits are influential in a large array of economic decisions and behaviors (Becker et al., 2012) but have been overlooked in economic models of migration. This paper contributes to this thin literature by investigating the relation between personality traits and individuals' intentions to migrate to culturally different alternative destinations.

This paper hypothesizes that individuals' personality traits affect the way they weigh the psychic costs and benefits of migrating to alternative locations. Using rich data that cover German students, we test to what extent personality traits relate to migration intentions and the country-location choice. Alternative locations differ in their economic (e.g., growth rates, employment opportunities) and non-economic characteristics (e.g., culture). The attractiveness of high-income regions with better employment opportunities is well documented in the literature (Bertoli et al., 2013; Czaika and Parsons, 2017; Mayda, 2010; Pedersen et al., 2008). Compared to such traditional economic motives, culture as one of the non-economic dimensions influencing the attractiveness of alternative destinations for potential migrants, has a non-negligible impact on migration flows. Cultural boundaries can be a barrier to migration even across regions within the same country (Falck et al., 2012). Although Bauernschuster et al. (2014) showed that educational attainment increases individuals' likelihood to cross these boundaries, the findings of Buenstorf et al. (2016) demonstrated that university graduates in Germany tend to prefer regions for their first job that are similar to their home region in terms of settlement type and dialect. Culture might weigh even more in the context of international migration, as cultural differences across countries are larger than that across regions of a country. Belot and Ederveen (2012) quantified the importance of economic and cultural differentials across countries in explaining migration flows. They found that a 1% higher GDP per capita and 1% lower unemployment rate in the destination country increase migration flows across OECD countries by 0.6% and 0.21%, respectively. The authors further showed that a 1% increase in cultural distance lowers migration flows by 0.33%, which is a substantial effect when compared to traditional economic factors such

as unemployment rate differentials. Hence, culture might be a justified candidate to further explain migration flows within the Global North. However, little is known about how cultural differences are subjectively evaluated by individuals with different personalities. For example, one could expect that individuals scoring high on openness to new experiences (one of the Big Five personality traits) have a more positive perception of the net benefits of migrating to culturally more remote regions.[1]

Answering this question is important for two reasons. First, considering that this paper investigates the intentions of university students to migrate for work after graduation, out-migration of university graduates whose studies are financed by regional sources puts a pressure on local governments.[2] Not only countries but also regions are competing for talent to promote regional development (Florida, 2002; Hooijen et al., 2017). Regional resources invested in higher education to attract bright youth may not be redeemed if graduates leave to other regions for work after graduation (Coniglio and Prota, 2008; Venhorst et al., 2010). Even potential positive spillover effects of a region's financing higher education on other regions' economies may be lost due to the brain drain from the region in case of international out-migration. In this respect, investigating the underlying mechanisms of young graduates' emigration in a comprehensive manner is crucial from a regional perspective. Second, examining the underlying mechanisms of location choice in the context of international migration helps us to gain insights about how immigrants are self-selected and sorted into alternative destinations, and the implications of this sorting for the integration in culturally different environments.

To the best of our knowledge, Ayhan et al. (2017) and Bütikofer and Peri (2017) are the only papers addressing the role of personality in migration decisions with an economic outlook. Ayhan et al. (2017) found that openness is positively associated with a higher propensity of migration from rural to urban areas while conscientiousness is negatively related to rural-urban migration in Ukraine. They also found a negative relation between extraversion and propensity to migrate from rural areas to cities. Bütikofer and Peri (2017) analyzed the migration patterns of Norwegian male population born in 1932-1933 enlisted for military service using two non-cognitive skills called adaptability and sociability. They found that adaptability skills have a strong impact on migration. Although the latter of these two studies included an analysis for emigration from Norway, both focused on internal migration and treat location choice as a

[1] Definitions of personality traits used in literature vary. We focus on the Big Five taxonomy in which personality is broken down into five main dimensions: extraversion, agreeableness, conscientiousness, emotional stability, and openness to new experiences (Goldberg, 1992). Our data includes measurements of personality traits according to this taxonomy.

[2] Provision of higher education is mostly free at German universities, at which students in our sample study, except small fees charged for administrative and other purposes (Thomsen and von Haaren-Giebel, 2016). Federal state governments in Germany are autonomous in their higher education policies and the financing of education within their states.

preference over different administrative units within a country. Our analyses pertain to migration from Germany to other regions in the world.

Migration psychology literature provides a more extensive treatment on the relation between personality traits and migration. There is a consensus in this literature on the positive association between migration and openness and extraversion (Camperio Ciani et al., 2007; Canache et al., 2013; Jokela, 2009; Jokela et al., 2008; Paulauskaitė et al., 2010; Silventoinen et al., 2008). However, evidence for other traits is ambiguous. Paulauskaitė et al. (2010) found a negative relation between conscientiousness and the intention to emigrate, while Jokela (2009) did not find such a significant association. Similarly, Paulauskaitė et al. (2010) did not find a relation between the intention to migrate and agreeableness while Jokela (2009) showed that less agreeable individuals are more likely to migrate. Moreover, Huang et al. (2005) found that agreeableness is positively associated with adaptation to local community once migration occurred. For neuroticism, Silventoinen et al. (2008) and Jokela et al. (2008) found a positive relation with the intention to migrate while Jokela (2009) did not find a significant association.

Although migration decisions involve the choice of where to move, fewer studies addressed the potential role of personality traits on location choices. Jokela et al. (2008) found that highly sociable (i.e., extravert) individuals are more likely to migrate longer distances and to prefer urban areas while highly emotional (i.e., neurotic) individuals tend to migrate shorter distances. Murray et al. (2005) found that individuals living in highly accessible locations in Australia (where opportunities for social interaction and services are more abundant) have higher levels of openness and extraversion. In these papers, either preferences over different administrative units to live or geographic distance is used as proxies of location choice. However, these proxies do not fully capture the potential costs associated with migrating to culturally distant locations since they only account for geographic distance. To the best of our knowledge, we are the first to investigate the association between personality traits and the perception of alternative destination countries based on cultural distance.

We test the hypothesis that personality traits are related to the migration decision using the Fachkraft data gathered among students at German universities in March 2015. Students were asked whether they want to work abroad after they graduate and, if yes, in which country.[3] The survey also includes a fifty item IPIP Big Five personality test Goldberg (1992). We estimate two models to test the relation between the various facets of personality and students' migration intentions and their preferences over alternative destinations that we characterize based on cultural distance. We construct a measure of cultural distance using Hofstede

[3] This means we define migration as voluntary labor migration in this study.

national culture dimensions indicating cultural difference between Germany and the countries students prefer to work. Our results show that being more extravert and open to new experiences is associated with stronger intentions to migrate while being more agreeable, conscientious, and emotionally stable is correlated with lower migration intentions. We show that openness positively and extraversion negatively relate to the willingness to move to countries culturally more remote, even when we control for geographic distance and economic differences between countries. Our robustness checks using language distance show that extravert and conscientious individuals are significantly less likely to prefer countries where German and English are not official languages, and that more agreeable students are more likely to consider these countries as alternative destinations.

The paper is structured as follows. Section 2 provides a conceptual framework for our hypotheses. Our data and estimation strategy are introduced in Section 3 and Section 4, respectively. Section 5 presents the estimation results. Section 6 provides a discussion of our findings and concludes the paper.

2. Conceptual framework

Economic theory suggests that individuals decide to migrate by comparing their expected lifetime utility in their current location with that in alternative destinations net of costs associated with their location decision. Differentials in economic prospects between the region of origin and destination have been put forward as motives for migration in standard economic models of migration (Harris and Todaro, 1970). In line with Sjaastad (1962) who pointed at the psychological costs of leaving friends and family, we conceptualize the role of personality traits in the cost-benefit analysis of migration. In doing this, we follow the line of reasoning provided by Almlund et al. (2011) and Borghans et al. (2008) who suggest that personality can be incorporated into the individual decision mechanism through constraints, preferences, and expectations.

Individuals differ in their personality traits which may lead to different constraints (Borghans et al., 2008). Having specific personality traits may constitute a constraint by affecting the costs associated with migration decisions which leads individuals to make different migration decisions and choose different locations. Migration involves both monetary and non-monetary costs that differ across alternative destinations. According to Sjaastad (1962), monetary costs represent the out-of-pocket money spent for traveling and relocation and costs of gathering information. Such costs depend on socio-economic characteristics such as education and cognitive ability.[4] Non-monetary costs involve psychic costs due to

[4] Individuals with high level of ability and education might have lower cost of gathering information and higher chance of obtaining a visa or residence permit. Schwartz (1973) showed that the negative impact of distance on migration decreases with education and interpreted this finding as the indication of informational costs being lower as skill levels increase. However, it should be noted that monetary costs can also be indirectly affected by personality traits via their

leaving a familiar surrounding behind, building up new social relations abroad, and adaptation to a new social and cultural environment. Such costs can be determined by the same factors that affect monetary costs. For example, Bauernschuster et al. (2014) found that highly educated individuals more easily adapt to culturally different environments than those with lower educational attainments. We hypothesize that non-monetary costs are a function of personality traits. The level of psychic costs may vary across individuals since they may differently perceive these costs due to their personality traits.

Preferences and expectations are the other two channels through which personality traits may affect migration decision and location choice.[5] If having specific traits make individuals less risk averse or less impatient, then those traits may lead to a higher likelihood of migration.[6] Furthermore, migration decisions depend on how expectations about potential outcomes in alternative locations are constructed. Formation of expectations is based on how individuals perceive and process information which is affected by personality traits in different ways (Almlund et al., 2011). For instance, people more open to new experiences gather more information (Almlund et al., 2011). Depending on their personality and how they construct their information set, individuals may well predict, inflate, or deflate the benefits expected to be obtained in alternative locations which, in turn, may affect their decision.

Considering that personality traits enter into the decision mechanism via expected benefits and/or perceived costs, we expect the following relations between the decision to migrate to culturally distant destinations and the Big Five personality traits:

Extraversion Extravert individuals are described by characteristics such as being talkative, sociable, enterprising, adventurous, and optimistic (Goldberg, 1990). Moving to another place means a person's leaving her social network behind and building up a new network in the new location. Thus, being sociable, talkative, and enterprising makes it more likely to be more willing to migrate to new social circles. Furthermore, being optimistic may make extraverts more confident about their potential outcomes in the new location as they may tend to be overconfident in assessing their performance in tasks (Schaefer et al., 2004). In this respect, extraverts are expected to be more likely to migrate and this has been found in several studies (Canache et al., 2013; Jokela, 2009; Jokela et al., 2008; Silventoinen et al., 2008). Jokela et al. (2008) found that high sociability is related to moving to urban areas and longer distances although they

impact on individual outcomes such as educational attainment. See Almlund et al. (2011) for a review of studies on predictive power of personality on education outcomes and earnings capacity.

[5] On the relation between risk preference and migration decisions, see Massey (1990) and Jaeger et al. (2010). For the relation between time preference and migration decisions, see Bowles (1970) and Nowotny (2014)

[6] As personality shapes preferences, preferences may also shape personality. Although there is no evidence on the direction of causality, literature provides correlational evidence on the relationship between personality traits and economic and social preferences. See Almlund et al. (2011) for a review.

did not distinguish geographic and cultural distance. Because extraverts are more adventurous and optimistic, this could result in the fact that they perceive the psychic costs of migration to be lower or the expected utility to be higher in case of moving to a culturally distant destination.

Agreeableness This trait refers to characteristics such as being friendly, respectful, adaptable, and flexible (Goldberg, 1990). Jokela (2009) showed that more agreeable individuals are more likely to have strong ties within their community. As agreeable individuals tend to internalize the values and norms of their local community, this makes them less likely to migrate. However, once they decide to migrate, more agreeable people can perceive the psychic costs of moving to culturally distant regions to be lower. Huang et al. (2005) indeed showed that more agreeable expatriates better integrate to the local community in their destination country. Hence, there are two opposing effects in the relation between agreeableness and migration. On the one hand, agreeable individuals may perceive costs of leaving their community behind to be higher and therefore be less likely to migrate. On the other hand, they may perceive psychic costs to be lower once they start to live in a different location, as they are more flexible and adaptable to other cultures.

Conscientiousness This trait is characterized by being organized, systematic, responsible, predictable, and conventional (Goldberg, 1990). Conscientious individuals, just like extraverts, tend to be overconfident in assessing their performance (Schaefer et al., 2004). Although this characteristic is expected to make them predict their expected utility in an alternative location to be higher, other traits associated with conscientiousness may decrease the likelihood of such individuals to migrate. As predictability and order are important to them, conscientious people may perceive the psychic costs of migration to be higher as it involves uncertainties. Moreover, Paulauskaitė et al. (2010) argued that conscientious individuals are less willing to migrate as they may feel more responsible for their family and community. Therefore, we expect to find a negative association between conscientiousness and willingness to migrate. Huang et al. (2005) suggested that expatriates that are more conscientious are more likely to experience difficulties with integration as they perceive the new environment to be unpredictable. As cultural dissimilarity increases, unforeseen circumstances a potential migrant may experience also increase. Hence, if they migrate, conscientious people are expected to migrate to destinations that are culturally similar to their region of origin.

Emotional stability This trait is associated with characteristics such as being calm, peaceful, balanced, and confident. Neuroticism, the opposite of emotional stability, is related to being anxious, nervous, fearful, and negativistic (Goldberg, 1990). At first sight, it seems that emotionally stable individuals may be more likely to migrate as being stable and confident may make them better able at dealing with uncertainties

associated with migration. However, Silventoinen et al. (2008) and Jokela et al. (2008) found a positive relation between neuroticism and migration. These findings may be driven by neurotic people having lower job satisfaction (Van Den Berg and Feij, 1993) and lower neighborhood satisfaction (Jokela et al., 2008). Hence, the sign of the relation between emotional stability and migration is hard to predict. Furthermore, Jokela et al. (2008) found that higher neuroticism is correlated with a lower geographical distance migrated. The authors hypothesized that neurotics may avoid long distance migration due to their tendency to feel distressed. In terms of cultural distance, two opposing effects can be expected. If proneness to anxiety and fear is dominant in neurotics, then emotionally stable individuals are expected to move to culturally more distant regions compared to neurotic individuals. However, if dissatisfaction with current location prevails in neurotics, then emotionally stable individuals may be less likely to move to culturally distant regions.

Openness to new experiences Individuals who are open to new experiences are characterized by being inventive, curious, and cosmopolitan (Goldberg, 1990). As migration is essentially an experience full of novelty in terms of location, social networks, and culture, open individuals are expected to be more willing to experience it. As in other studies (Canache et al., 2013; Jokela, 2009; Paulauskaitė et al., 2010), we therefore expect to find a positive association between migration and openness. It is also straightforward to expect a positive correlation between cultural distance and openness for at least two reasons. First, because open individuals are more curious, they may search more and construct a more accurate information set (Almlund et al., 2011) leading them to more accurately predict their utility in a different location. Second, because open individuals are curious about novelties, they may perceive psychic costs of adaptation to be lower as culturally different locations may be even more attractive to them.

In brief, we expect more extravert, less agreeable, less conscientious, and more open individuals to be more likely to report migration intentions. Furthermore, we expect more extravert, more agreeable, less conscientious, and more open individuals to move to culturally distant locations as individuals having these traits may either consider a broader choice set when making their decisions or predict a higher expected utility in case of moving to an alternative location. We do not have a clear prediction for emotional stability as the results depend on which of the opposing effects mentioned above dominates.

3. Data

3.1 Fachkraft survey

We use the Fachkraft data to test our hypotheses. It is a biannual survey conducted by Maastricht University in cooperation with Studitemps GmbH among students at German universities. The survey aims to gather information on general study characteristics, the part-time student job market, and students' future career

expectations. Data is gathered online through '*Jobmensa*' that is the largest student network in Germany for student jobs and internships and has more than 400,000 users. Questionnaires are filled in via the survey hosting service called '*FluidSurveys*'. Data collection started in September 2012. We used the data from round six conducted in March 2015. University students using Jobmensa received an invitation via e-mail to participate to the survey. 7% of these students participated to the survey in March 2015. 61% of them completed the main questionnaire.

Although participation is incentivized, the response rate is low. Nevertheless, the sample is representative for the student population: the distribution of observable characteristics in the Fachkraft data does not differ substantially from the Sozialerhebung[7], another large-scale German survey among students having a systematic sample and conducted regularly at German universities by the government (Bergerhoff et al., 2015). Particularly, the distribution of students across regions (i.e., German federal states) and study fields are the same in both surveys and close to the population distribution reported by the Federal Statistical Office of Germany (Destatis). Furthermore, both surveys provide similar estimates for the share of students who work during their study. Additionally, 20% (19%) of the students reported that their fathers (mothers) were not born in Germany in the 2012 wave of the Sozialerhebung, which is quite similar to the immigration background of the students in the Fachkraft sample. However, both the Fachkraft and the Sozialerhebung overrepresent females (i.e., 60/40) in comparison to the Destatis statistics (i.e., 50/50), and the distribution of students by age in the Fachkraft slightly differs from those reported by the Sozialerhebung and the Destatis. The mean age of the students in our sample is below the median age reported by the Destatis (i.e., 23.5) and the mean age in the 2012 wave of the Sozialerhebung (i.e., 24.4). It is because the Fachkraft survey is sent through an online platform where mainly student jobs and internships are posted.

3.2 Dependent variables

Intention to migrate The Fachkraft survey includes a question on where university students want to work after their graduation.[8] Students are provided with a binary response option where they can choose either Germany or abroad. Our first outcome variable, *intention to migrate*, is based on the responses given to this question. This variable reflects stated preferences of students rather than their actual behavior. There are different standpoints across disciplines on how intentions relate to actual behavior. Intentions are considered as an integral part of decision making process in sociological and psychological theories of mobility (DaVanzo, 1980; Fawcett, 1985). This strand of literature assumes sequential decisions for

[7] The Sozialerhebung survey is conducted in every three years. The statistics that we use for comparison are taken from the 2012 wave of the Sozialerhebung, see Middendorff et al. (2013) for details.
[8] The question is "Where would you like to work after the study?" (original question in German: "Wo wollen Sie nach dem Studium gerne arbeiten?").

mobility where the intention to move is followed by actual move (Lu, 1999). In economics, research traditionally focuses on actual behavior rather than intentions. This is because individuals' preferences are believed to be revealed by their actual behavior but not to be fully reflected by their intentions (DaVanzo, 1980). Nevertheless, the use of stated preferences in several subfields of economics has become common as stated preferences allow to simulate market setting and to model choices by fully observing the alternatives (Sund, 2010). According to the theory of reasoned action by Fishbein and Ajzen (1975), acting depends on the intention to act which is determined by beliefs about and evaluation of the consequences of acting and one's motivation to comply with these beliefs. Especially international migration is a complex process, which requires extensive preparation to gather information regarding the destination country, to find a job and an accommodation, and to deal with bureaucratic processes such as obtaining a visa or residence permit. In this respect, intention to migrate may indicate future actual migration if it includes motivation to prepare for it. While intentions are informative for actual behavior, research shows that there is no one-to-one correspondence between intention to migrate and actual migration. Van Dalen and Henkens (2013) found that 34% of native Dutch residents who stated their willingness to emigrate actually moved abroad in the following five years after their first survey. Thus, we should note that our results should not be directly translated to realized migration.

Cultural distance Students who stated their intention to work abroad are also asked which country they would like to move to. Using this information, and following Hofstede (2001), we constructed our second dependent variable, *cultural distance*, as the cultural difference between Germany and the preferred country of migration that the students indicated. Hofstede (2001) defines culture as '*collective mental programs*' reflected by values and behaviors of individuals living in a society which differentiate them from the members of another society. Hofstede's initial four-dimensional taxonomy[9] is based on a survey on values conducted among employees of the International Business Machines (IBM), a large multinational company, around the world between 1967 and 1973. Since then the survey (recently called Values Survey Module) has been conducted in many other countries and the most recent data is published on Hofstede's website. Hofstede's national culture dimensions are a standard in literature, and used in many research fields in

[9] The initial Hofstede taxonomy includes the following dimensions: (i) Power distance index (PDI) expressing to what extent the less powerful individuals in a society expect and accept the unequal distribution of power. This dimension reflects the level of hierarchy in a society. (ii) Individualism index (IDV) measuring the degree to which individuals are responsible only for themselves and their immediate family in a society. The counterpart of it is collectivism where individuals are seen as an integral part of larger groups. (iii) Masculinity index (MAS) reflecting the distribution of emotional roles between men and women in a society. (iv) Uncertainty avoidance index (UAI) expressing to what extent the members of a society tolerate unexpected and unstructured situations. Later, two other dimensions are also added which are long-term vs. short-term orientation and indulgence vs. restraints. The detailed descriptions for all dimensions can be found in Hofstede (2001) and Hofstede and Hofstede (2015, December 08). We did not include the last two dimensions when constructing our cultural distance variable since index values for these dimensions are only available for a limited number of countries.

economics, psychology, sociology, international marketing, and management (Søndergaard, 1994; Steenkamp, 2001). We think that the Hofstede framework provides an appropriate measure of cultural difference for our study. Hofstede and McCrae (2004) showed that Big Five personality traits are correlated with national culture dimensions. Their findings indicate that individuals' personality is to a certain extent linked to the 'collective mental programs' of the societies they live in. In this respect, the deviation of an individual's personality traits from the average traits observed in a society may be a good predictor of how much a person is likely to move to culturally distant countries.

Following Kogut and Singh (1988), we compute the cultural distance between home country H, Germany, and preferred migration country d as follows:

$$Cultural\ distance_{i,d} = \frac{1}{4}\sum_{k=1}^{4}\frac{(I_{dk}-I_{Hk})^2}{V_k} \quad (1)$$

where I_{dk} represents the score of a country in each culture dimension $k = 1,..,4$, I_{Hk} represents Germany's score in that dimension, and V_k is variance of the scores in dimension k. This index measures the deviation of every alternative destination country from Germany in each of Hofstede's dimension. Then deviations are corrected for differences in the variance of dimensions to equalize the scale across dimensions for averaging. We further discuss the intuition of this index in Section 3.5.

3.3 Big Five personality traits

The Fachkraft survey includes the fifty item IPIP Big Five personality test based on Goldberg (1992) and Goldberg et al. (2006). Our key independent variables are the students' scores in five dimensions of personality constructed as follows: There are ten items for each personality traits consisting of five *'*positive keyed*'* and five *'*negative keyed*'* items that represent two poles of a trait.[10] Students are asked to assess to what extent a given item reflects their personality on a five-point Likert scale ranging from very inaccurate to very accurate. This scale is scored from one to five for positive keyed items and from five to one for negative keyed items. We obtained students' total scale score by summing all score numbers assigned to each item in the test.[11] In our analysis, we use students' personality scores standardized to mean 0 and standard deviation 1.

[10] For instance, the item "Don't mind being the center of attention" is a positive keyed item for extraversion. The item "Don't like to draw attention to myself" is a negative keyed item for the same trait but it represents the opposite pole that is introversion.
[11] We followed the methodology suggested on IPIP website.

3.4 Control variables

Based on previous studies in the economics of migration, we include the control variables mentioned below in our analyses.

Economic preferences The Fachkraft survey includes information on students' risk and time preferences. We control for the former as migration is a risky choice due to leaving a familiar environment to move to a less known location. Previous studies showed that risk averse individuals are less likely to migrate (Jaeger et al., 2010) and, when they do migrate, to move to locations culturally similar to home (Bauernschuster et al., 2014). Likewise, we control for students' time preference since migration is modelled in the neoclassical framework as an investment decision that involves benefits to be collected in the future in return to initial costs (Gibson and McKenzie, 2011; Nowotny, 2014). Hence, individuals who are more patient are expected to be more likely to migrate than individuals who are impatient.

Students' preference for risk is measured in our survey by a scale from 1 to 10 along which students self-assessed their willingness to take risks in general as well as by a question on their choices between secure and risky payment options. In a similar manner, we measured students' time preference by a scale from 1 to 10 along which students self-reported their willingness to give up today to profit in the future in their financial decisions and their tendency to postpone tasks.[12] We took an equally-weighted average of these two measures for each of the economic preferences to construct our variables for risk aversion and impatience, respectively.

Demographic and family characteristics There is a well-established migration literature providing theoretical and empirical analysis on the demographics of migration. Following this literature, we included a set of standard controls in our models: age, gender, partnership status, previous migration experience, and parents' educational attainment.

Firstly, as migration is modelled as a human capital investment the benefits of which are to be collected in a future time span, the probability of migration is expected to decrease with age (DaVanzo, 1980; Massey et al., 1993). Furthermore, the long-lasting consensus in the literature on women being more likely to be dependent migrants has been fragmented by studies showing that especially educated women can be more regionally and internationally mobile than men (Docquier et al., 2009; Faggian et al., 2007). Being in a stable relationship, however, might hinder migration as shown by, e.g., Bauernschuster et al. (2014), De

[12] See Falk et al. (2018) for a validation of such questions to measure preferences for risk and time.

Grip et al. (2010), and Jaeger et al. (2010). This is because being in a stable relationship increases the costs of moving and shifts the unit of decision from the individual to the family (DaVanzo, 1980).

Previous migration experience increases the likelihood of future migration as it may change individuals' perceptions of migration costs (DaVanzo, 1980). Furthermore, permanent and temporary study mobility may be a precursor of high-skilled migration in the future. De Grip et al. (2010) showed that the likelihood of moving abroad for the first job among recent Dutch graduates is positively associated with their parents' immigration background as well as their own previous migration experience. Parey and Waldinger (2011) reported that the introduction and expansion of the Erasmus exchange program of European Union increased the probability of graduates working abroad by about 15%. Following these studies, we control for students' migration history by their parents' immigration background and their own experience of study exchange. While the data does not allow us to reconstruct the full history of study experience abroad, the Fachkraft survey includes information on whether or not a student studied abroad in the semester prior to the survey.

We also included parents' educational attainment as a proxy of a student's socioeconomic background. Resources owned in the home country relieve credit constraints that may hinder migration (DaVanzo, 1980; Massey et al., 1993). Thus, students can benefit from their parents' high socioeconomic status to cover the initial costs associated with migration. Moreover, Sutin et al. (2017) showed that children's openness, extraversion, and emotional stability improves with their parents' years of schooling. Hence, students' decision to migrate and preferences over countries may be affected through such an intergenerational mechanism.

Grade and study characteristics It has been documented that the most successful students are more likely to emigrate to larger cities (Coniglio and Prota, 2008) or abroad (Venhorst et al., 2010), especially if they studied in peripheral regions. We include students' GPA at the time of the survey in our models to control for the positive selection of emigrants. Another proxy for the positive self-selection is the degree level. We control for whether a student pursues a bachelor's, master's, or PhD degree. Furthermore, we included a control for whether or not a student studies in a STEM field to capture the role of degree transferability upon migration (Bodvarsson and Van den Berg, 2013). Although one could expect the graduates of STEM fields to be more mobile due to the high degree of the transferability of their skills across labor markets of different countries, it should be noted that the demographic shrinkage and skill shortages in Germany might create favorable labor market prospects for the students currently studying in such fields (Bellmann and Hübler, 2014). Lastly, we control for whether or not a student is studying in her final year at the time of the

survey because those students may have more incentives to carefully consider labor market opportunities available both in her current location and abroad.

Characteristics of preferred destination countries In our models of destination choice on the basis of cultural distance, we control for country characteristics in addition to the aforementioned controls to isolate geographic, economic, and bureaucratic factors affecting students' location choices. First, we include geographic distance between Germany and a student's preferred destination country. As DaVanzo (1980) stated, geographic distance has been traditionally used in migration analysis to account for a broad range of pecuniary and non-pecuniary costs of migration.

Second, we control for the differences in economic conditions between Germany and students' preferred destination countries by differentials in GDP per capita and unemployment rate for high-skilled youth. Neoclassical models of migration theorize that migration flows across countries are a consequence of disequilibrium in labor markets and that migration flows are expected to continue until earnings or employment differentials between countries disappear (Massey et al., 1993). Empirical studies provide evidence on the responsiveness of migration flows to GDP differentials (Bertoli et al., 2013; Mayda, 2010) and differences in unemployment rates (Belot and Ederveen, 2012; Czaika and Parsons, 2017) between countries.

Besides the non-economic factors such as culture, the limited responsiveness of migration flows to economic factors is also influenced by bureaucratic requirements (e.g., visa or residence permit) that hinder the free movement across borders (Mayda, 2010). Free movement of workers relieves such bureaucratic barriers within European Economic Area (EEA). German nationals can freely move, search for job, and work in one of the EEA members countries and Switzerland without a visa or permit. Hence, in our analyses we also control for intended migration to EEA countries or Switzerland.

3.5 Sample size and sample statistics

28,120 individuals participated to the March 2015 Fachkraft survey. We exclude 4,535 individuals for whom the study status is unknown, who are high school students or have already graduated at the time of the survey to only focus on university students (N=23,585). 52% of these students (i.e., 12,284 students) responded to the 50-item IPIP questionnaire as participation into the personality module of the survey is optional. We also excluded 12% of the students who participated to the IPIP questionnaire, but who are not German nationals. We exclude those because foreign students studying in Germany might be willing to return to their home countries after they complete their study program. In our sample, we retained students between ages 17 and 30 that are typical ages to study in a bachelor's, master's, or PhD program. We also

dropped students form whom the scores of the preferred destination country is not available in Hofstede's culture dimensions dataset[13], whose study programs do not fit into the standard cycles of higher education[14], and whose scores in one of the Big Five personality traits and economic preferences are missing. Our final estimation sample includes 7,412 students.

Table 1 provides a summary of our dependent and independent variables. Summary statistics for all variables are provided in Table 2. Students in our sample are around 22 years of age, almost 60% of whom are females. More than half of them are either married or in a stable relationship. 18.6% of the students have one parent with a migration background. A small share (3.2% or 237 individuals) studied abroad in the semester preceding the survey. 20% of the students who studied abroad in the last semester studied in a German-speaking country. Another 20% report they studied in an English-speaking country. 84% of them studied in one of the EU/EEA member countries or in Switzerland.[15] 45% of students have at least one parent with academic qualification. Their GPA varies from 2.2 to 2.5, on average. They are predominantly studying in bachelor's programs. Almost 37% of the students study a STEM field, and 12.5% of them are in their final year of study.

Table 2 shows that almost 20% of students reported their intention to emigrate from Germany to start a career abroad after graduation. This percentage is higher than the actual emigration rate of high-skilled Germans, i.e., 7.6% in 2010 according to IAB Brain Drain dataset (Brücker et al., 2013) and 5.2% after five years of graduation between years 1992-2005 according to the graduate survey of the German Centre for Higher Education Research and Science Studies (DZHW) (Parey et al., 2017). As we discussed in Section 2, it reflects that emigration intentions may not be fully realized. The emigration rate reported by Parey et al. (2017) might also be affected by the returns within five years after graduation. Based on the German

[13] 87 students who fulfill the other criteria in our sample selection were dropped due to their preferred countries' scores in culture dimensions are not available. These countries are as follows: Andorra, Azerbaijan, Bahrain, Bolivia, Bosnia and Herzegovina, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Cuba, Dominican Republic, Egypt, Gambia, Ghana, Grenada, Haiti, Iceland, Iraq, Kazakhstan, Kenya, Lebanon, Macedonia, Maldives, Mauritius, Micronesia, Mongolia, Myanmar, Namibia, Nigeria, Paraguay, Qatar, Ruanda, Samoa, Saudi Arabia, Somalia, St. Lucia, Syria, Tanzania, Tunisia, Tuvalu, Uganda, United Arab Emirates, Yemen. One student who prefers going to Taiwan is dropped due to Taiwan's GDP is missing.

[14] Higher education institutions in Germany grant degrees such as "Diplom" or "Magister" and have programs which require a "State Exam" for the grant of the degree. These degrees are not one-to-one match to either of bachelor's, master's, or PhD degrees.

[15] We do not have information on whether these students did their study exchange under the ERASMUS or any other exchange program. Considering the information provided by German Academic Exchange Service (DAAD), which is the largest organization in Germany that supports international cooperation in higher education, ERASMUS study mobility is prevailing among all other programs of study or training abroad available to German students. According to DAAD's 2015 Annual Report, German scholarship holders predominantly prefer European and overseas English-speaking countries even though a variety of collaborations of DAAD exist around the world (German Academic Exchange Service (DAAD), 2016).

Socioeconomic Panel Data (GSOEP), Liebau and Schupp (2011) reported that around 25% of Germans reported their willingness to emigrate in 1998 but only 5% of them actually left Germany by 2009. Their analysis on the 2009 wave revealed that young graduates consider temporary emigration more than permanent emigration. The majority intends to stay in Germany, which is in line with the findings from previous studies. Based on DZHW data of 2004/2005 study cohort, Haussen and Uebelmesser (2018) reported that 60.4% of the graduates live in Germany five years after graduation and that they live in the regions where they studied. Busch and Weigert (2010) also reported 70% stay rate in regions after ten years of graduation based on GSOEP 1980-2004 which the authors interpret as the creation of regional labor markets by the universities in German federal states.

As shown in Table 2, 49.5% of the students who report a migration intention is willing to move to either German-speaking or English-speaking countries. This is consistent with exchange student's actual choices as reported in German Academic Exchange Service (DAAD) (2016). The sample statistics for the free mobility dummy shows that 50.5% of the students consider moving to countries without bureaucratic barriers for migration. Overall, 82.7% of the students who reported their intention to migrate are willing to move to either EU/EFTA countries or overseas English-speaking countries. Table 3 provides further descriptive statistics for students' preferred destination countries and their geographic, economic, and cultural distance from Germany.

Our cultural distance variable varies between 0.033 and 4.589. If it is equal to zero, this means that the destination country's culture is similar to the culture in Germany based on Hofstede's culture dimensions. Mean cultural distance that students in our sample are willing to migrate is 0.993. This mean value is close to the index scores of, e.g., Belgium (0.968) or Finland (1.109). Based on these index values, Switzerland is culturally the closest country to Germany while Guatemala is the farthest. As shown in Figure 1, German-speaking and overseas English-speaking countries are culturally close to Germany. As Table 5 shows, countries that are geographically closer to Germany and that have similar economic development levels are much closer culturally. Still, pairwise correlations are relatively low such that even within Europe, there are significant cultural differences.

Table 4 shows the mean personality traits of students who intend and do not intend to migrate. As expected, students who have an intention to move abroad are more extravert, less agreeable, less conscientious, less emotionally stable, and more open compared to students who have the intention to stay in Germany. The table also shows differences in personality for students with a migration intention by cultural distance to Germany. Contrary to expectations, we find that students who are willing to move to culturally distant countries have significantly lower levels of extraversion than students that are willing to move to countries

culturally similar to Germany. They do score higher on agreeableness as expected but the difference between the two groups are not significant. In addition, students who are willing to move to culturally distant countries are significantly less conscientious and less emotionally stable. They seem to be less open, which is contrary to our expectations, but differences between groups are not significant.

4. Empirical strategy

We performed two types of regression analyses to test our hypotheses. First, we estimate a probit regression (Equation 2) where our dependent variable is *intention to migrate*, and report marginal effects. We expect to find significant β's for each personality trait j in the directions explained in Section 2. We control for risk and time preferences, socio-demographic characteristics such as age, sex, relationship status, parents' immigrant background, and educational attainment as well as students' past study exchanges and study-related characteristics (GPA, level and field of study, and being in the final year).

$$Intention\ to\ migrate_i = \alpha + \beta_j * Personality\ traits_{ij} + \gamma * Controls_i + \varepsilon_i \quad (2)$$

$$Cultural\ distance_{i,d} = \delta + \theta_j * Personality\ traits_{ij} + \mu * Controls_i + \lambda * Controls_d + u_i \quad (d \neq H) \quad (3)$$

In our second model (Equation 3), the dependent variable is *cultural distance* (Equation 1) between Germany's and each potential destination country, which we estimate using OLS for the sample of students who report a migration intention (d ≠ H). We expect to find significant θs for each personality trait j with signs in the direction explained in Section 2. In this model, we include the same set of controls as in Equation 2. We additionally control ($Controls_d$) for geographic distance, differences in GDP and differences in high-skilled youth unemployment rate between Germany and destination country *d*, as well as the possibility to freely move to the destination country, to isolate geographic, economic, and bureaucratic factors affecting destination choice.

In an alternative specification to Equation 3, we model the destination choice in terms of language proximity rather than cultural distance. Using a multinomial logistic framework, we model the willingness to migrate to 1) a German-speaking country, 2) an English speaking country or 3) another country.

5. Results

5.1 Migration intentions

Estimation results of probit models for intention to migrate are presented in Table 6. Focusing on the results in Column 4, a one standard deviation increase in extraversion (6.6 points) and openness (4.8 points) are associated with 1% and 2.4% increase in the probability of intending to migrate, respectively.[16] These estimates account for approximately 0.8% and 2.5% of the unconditional probability of intending to migrate observed in the sample (19.9%) for one point increase in extraversion and openness, respectively. Conversely, one standard deviation increase in agreeableness (5.1 points) and conscientiousness (5.6 points) are correlated with 2.6% and 2.2% decrease in the probability of intending to migrate. These account for 2.6% and 2% of unconditional probability for one unit change in these two traits, respectively. Moreover, we find that a one standard deviation increase in emotional stability (6.6 points) is associated with 1.4% decrease in probability of intending to migrate. A one unit change in this trait is related to 1.1% change in the probability of intending to migrate over the unconditional probability.

Our estimates for intention to migrate in Table 6 show that one standard deviation increase in risk aversion is associated with around 5% decrease in likelihood of having migration intention. Unlike risk preferences, we do not find a significant association of time preference with intention to migrate. Although inclusion of risk aversion improves the explanatory power of our model (compare Column 2 to Column 1), it hardly changes the magnitude of our estimates for personality traits except for extraversion. This is in line with Becker et al. (2012) who showed that risk preferences and personality traits are complementary in explaining individuals' labor market success, health status, and life satisfaction.

Including demographic and family characteristics in our model for intention to migrate does not significantly change the marginal effects estimated for personality traits (compare Column 3 to Column 2). Younger students, students with an immigrant background, and students who previously participated in a study exchange program are more likely to have migration intentions while students who have a stable relationship are less likely to consider starting a career abroad. Female students more often consider starting a career abroad than male students do. This finding coincides with recent trends in international migration flows that show that skilled women are increasingly internationally mobile for career purposes (Docquier et al., 2009). Students with parents with skilled-worker qualifications are less likely to have migration intentions compared to students with parents having an academic degree.

[16] Unstandardized scores of Big 5 personality traits are presented in Table 9.

Marginal effects estimated for personality traits are also robust to the inclusion of grade and study-related characteristics (compare Column 4 with Columns 2 and 3). We unexpectedly find that students with a higher GPA are less likely to have migration intentions. PhD students have stronger migration intentions than undergraduate students. The opposite is observed for master's students but their migration intentions do not significantly differ from that of undergraduate students. Students in their final year are also less likely to consider starting a career abroad. Students in STEM fields are less likely to express intentions to move to another country after graduation in comparison to students in non-STEM fields, which is consistent with the reported shortages for STEM fields in Germany (Bellmann and Hübler, 2014). However, this relation is not statistically significant.

5.2 Cultural distance

Results of OLS estimation for our cultural distance model on the sample of students who express a migration intention are presented in Table 7. Column 1 shows that a one standard deviation increase in openness (4.9 points for students who have a migration intention) is associated with 0.05 units increase in the cultural distance that students are willing to migrate. It accounts for 1% of the unconditional mean of cultural distance (0.993 units) for one unit increase in openness. This roughly corresponds to the cultural distance between Germany and Belgium or Finland. Unlike openness, conscientiousness is negatively associated with cultural distance that German students intend to migrate. However, it is not significant when we include our controls. Contrary to our hypothesis, we find that extraversion is negatively associated with cultural distance, and propose an explanation for this in Section 3 where we investigate migration to German-, English- and other-speaking countries as an alternative measure to cultural distance.

As Table 7 further shows, increase in risk aversion is negatively associated with cultural distance that German students are willing to migrate but coefficients are not statistically significant. Similarly, we do not find a robust significant association between time preference and the cultural distance that students are willing to migrate. The only demographic characteristics that is significantly associated with cultural distance is age. Older students with migration intentions are more likely to consider countries culturally more distant from Germany for starting a career. Parental educational attainment is also significantly associated with students' country choices. Students with parents with skilled worker or technician qualifications report preferences for countries culturally more similar to Germany compared to students with parents having an academic degree. Controlling for demographic characteristics and parental socioeconomic background renders the correlation between conscientiousness and cultural distance insignificant. Still, our main correlations for extraversion and openness preserve their validity after including such control variables into the cultural distance model.

The inclusion of country-specific characteristics (geographic distance, differences in the level of GDP per capita, and free mobility) significantly improves the explanatory power of our model (compare R-squared in Column 5 to that in Column 4). This could be expected since the expected costs of and benefits from migration are directly influenced by these characteristics. However, even after controlling for these variables, the coefficients for openness and extraversion do not change substantially (compare Column 5 to Column 4). Although there is a decline in the magnitude and the significance level of openness, the coefficient of openness in Column 5 is not statistically different from the coefficient of openness reported in Column 4. Thus, based on our specification in Column 5, a one-unit increase in a student's openness score is associated with 0.8% increase in cultural distance that a student is willing to migrate over the unconditional mean of cultural distance (0.993 units).

In Column 6, we replace the difference in the level of GDP per capita between Germany and a student's preferred destination country with the difference in high-skilled youth unemployment rate between the two countries to control for the role of employment prospects in the country choice of students. The contribution of unemployment differentials to the explanatory power of our model is less than that of GDP differentials (compare the difference in R-squared between Column 4 and Column 6 to the difference in R-squared between Column 4 and Column 5). This is in line with the findings of, e.g., Mayda (2010) and Belot and Ederveen (2012) who found that international migration flows within OECD are less responsive to unemployment differentials than GDP differentials across countries. The inclusion of unemployment differentials does not alter the correlations we find for extraversion and openness.

5.3 Language distance

German students in our sample who intend to start a career abroad mostly prefer English or German speaking countries. These countries, to a certain extent, share common cultural characteristics as reflected by pairwise correlations between Hofstede cultural distance index and language dummies in Table 5. Hence, we use country-language groups as a substitute for Hofstede cultural distance index to check the robustness of our main findings. We defined a categorical variable taking 0 for German-speaking countries, 1 for English-speaking countries, and 2 for other countries and replicated our analysis for cultural distance. Marginal effects from a multinomial logit estimation are presented in Table 8.

We find that extravert students are significantly less likely to prefer non-German/non-English-speaking countries as potential migration destinations. One standard deviation increase in extraversion is related to a 3.2% decline in likelihood of having an intention to migrate to a non-German/non-English-speaking country and a 2.9% increase in likelihood of having a preference over an English-speaking country after

controlling for economic preferences, demographic and family characteristics, grade and study-related characteristics, and country-specific characteristics. These estimates provide further insights that we do not capture in our main analysis. Students scoring higher on agreeableness are more likely to prefer non-German/non-English-speaking countries as a one standard deviation increase in agreeableness is associated with a 2.2% increase in having a preference for non-German/non-English-speaking countries and a 1% decrease in having an intention to move to a German-speaking country. Furthermore, students scoring higher in conscientiousness are more likely to prefer German-speaking countries as migration destinations. A one standard deviation increase in conscientiousness is associated with a 1.1% increase in likelihood of considering a German-speaking country as a potential destination.

6. Conclusion

In this paper, we investigate whether personality traits are related to individuals' international migration intentions and preferences over alternative destination countries with different cultural background. We use the Fachkraft survey with information on German university students' migration intentions after they graduate, their preferred destination country, and their Big Five personality traits. The results are in line with our hypotheses that more open and extravert students are more likely to consider moving abroad while more conscientious and agreeable students are less inclined to migrate. We find that more emotionally stable students are less likely to have migration intentions. This suggests that emotionally stable individuals are more satisfied with their current location and community, making them less likely to develop migration intentions. Such an interpretation is in line with findings from Jokela et al. (2008), Silventoinen et al. (2008), and Van Den Berg and Feij (1993).

With respect to cultural distance, we find that openness positively and extraversion negatively relate to the willingness to move to countries that are culturally more remote. This holds even when we control for risk aversion, time preference, personal characteristics, geographic distance and economic differences between countries. This suggests an independent relation between personality and cultural distance of migration. Although the correlation with respect to openness is as expected, this does not hold for extraversion. Using language distance as an alternative to cultural distance, we show that extraverts are more likely to consider countries where German or English are official languages. It explains why we observe a negative association of cultural distance with extraversion in our main analyses. We also find that more agreeable students are more likely to consider non-German/non-English-speaking countries while conscientious students are more likely to prefer German-speaking countries as potential destinations when we use language as a cultural distance indicator. Although there is a consensus in migration psychology literature on that extraverts are more likely to migrate, evidence on their location choice is not straightforward. Jokela

et al. (2008) find that highly sociable (i.e., extravert) individuals are more likely to migrate longer distances and to prefer urban areas while Jokela (2009) finds that higher extraversion predicts higher migration flows within but not between states in the US. Ayhan et al. (2017) found a negative relation between extraversion and the propensity to migrate from rural areas to cities and explain this finding by social individuals' feeling more attached to their own communities. We think that in our case, extraverts perceive their utility being lower in linguistically distant countries where they may not easily involve in social interactions. Hence, they prefer countries where they can easily overcome language barriers.

Our results indicate a positive self-selection of immigrants in terms of openness and extraversion. A likely reason for this is that individuals with such traits may integrate into their host countries more easily and faster. The fact that more open and extravert graduates are more likely to consider moving abroad suggests that countries willing to increase the influx of skilled migrants should invest in infrastructures that are likely to attract such migrants, e.g., cultural and social venues. However, immigrants are negatively self-selected in terms of conscientiousness. This may result in a slower economic integration process in the host country's job market considering that conscientiousness is often associated with higher job performance (Almlund et al., 2011). Furthermore, we find that immigrants may sort themselves into countries where they can easily integrate as indicated by our findings for extravert and agreeable individuals' preferences over linguistic characteristics of countries. This suggests that the language skills of the native population will mitigate the success of migration policies aimed at attracting skilled graduates.

One limitation of this research is that we use intention data rather than actual behavior. In our data, about 20% report an intention to migrate. This percentage is higher than the estimated emigration rate reported in other German studies (Brücker et al., 2013). Although emigration intentions may not be fully realized, intentions are predictive of future behavior (Manski, 1990). Panel data for the UK indeed reveals that the probability to actually move within five years is three times higher for individuals who state such an intention compared to individuals who do not (Böheim and Taylor, 2002).

This paper could be further improved by extending the analysis beyond the Big Five personality traits. Individuals' aspirations and beliefs also play a role in their migration decisions. Individuals with, e.g., higher self-efficacy (Hoppe and Fujishiro, 2015) or internal locus of control (Caliendo et al., 2015) might be more willing to undertake the necessary preparations required for migration. In this respect, analysis on decision to migrate can be enriched by including individuals' core self-evaluations, aspirations, and motivations. To the best of our knowledge, our paper constitutes the first empirical attempt in the migration literature to investigate the subjective evaluation of costs of and benefits from international migration by incorporating cross-cultural and behavioral approaches into the standard utility maximization framework

in economics. In this respect, the notion of culture is the focal point of our paper. We operationalized this concept by using Hofstede's dimensional approach to culture. It is a static approach that does not take into account the potential change in cultural values over time as presented by Inglehart (1971) and Inglehart and Welzel (2005). Based on European Value Studies and World Values Surveys from 1900 to 1990 conducted in 110 countries, Beugelsdijk and Welzel (2018) found that, for instance, younger generations are more individualistic and joyous as a supporting evidence for the approach of Inglehart (1971). However, the authors also found that the degree of the change is unique in each country, which suggests different historical roots as a supporting evidence to the approach of Hofstede (2001). Thus, we believe that testing the hypotheses of this study with alternative measures of cultural distance and with samples including different generations will be an important assessment for the generalizability of our findings.

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Tables and Figures

Table 1: Dependent and independent variables

Dependent variables	
Intention to migrate	Binary variable: 0 if a student intends to start a career in Germany after finishing her studies (base group), 1 if abroad
Cultural distance	Cultural difference between Germany and a student's preferred destination country to work. Continuous variable measured by a composite index constructed through four Hofstede national culture dimensions based on the formula of Kogut and Singh (1988)
Language distance	Categorical variable for the country where a student intends to start a career after finishing her studies: 0 if a student intends to move one of the German- speaking countries (Austria, Belgium, Luxembourg, Switzerland) (base group), 1 if a student intends to move one of the English-speaking countries (Australia, Canada, Ireland, New Zealand, UK, USA), 2 otherwise
Key independent variables	
Big Five personality traits	Standardized continuous variables for Extraversion, Agreeableness, Conscientiousness, Emotional stability, and Openness measured by 50-item IPIP inventory
Control variables	
Risk aversion	Standardized continuous variable for risk attitude (the increase in the variable indicates an increase in risk aversion.)
Impatience	Standardized continuous variable for time preference (the increase in the variable indicates a stronger preference for immediate gains and for avoidance of immediate costs.)
Age	Age of students in years, continuous variable
Female	Binary variable: 0 if male (base group), 1 if female
Having a stable relation	Binary variable: 0 if a student does not have a stable relationship (base group), 1 if a student has a stable relationship or is married
Immigrant background	Binary variable: 0 if both parents have German passport (base group),1 if one of the parents has a non-German passport
Exchange last semester	Binary variable: 0 if a student studied in Germany in the last semester just before the time of the survey (base group), 1 if a student studied abroad in the last semester
Parents' educational attainment	The highest degree completed by either of the parents. Categorical variable (from the highest to the lowest degree): 0 if academic degree (base group), 1 if skilled worker qualification, 2 if technician qualification, 3 if no vocational qualification
GPA[a]	Indicator of academic success, measured by grade point average at the time of the survey
Level of study	Categorical variable for the degree followed: 0 if Bachelor's (base group), 1 if Master's, 2 if PhD
STEM field	Binary variable: 0 if a student studies in a non-STEM field (i.e. education, art & music, media & communication, medical sciences, psychology, law, religion, social sciences & humanities, sports, language & culture, economics) (base group), 1 if a student studies in a STEM field (i.e. computer sciences, engineering sciences, mathematics, natural sciences)
Last year student	Binary variable: 0 if a student has more than two semesters left until the completion of her degree program (base group), 1 if a student has two or fewer semesters left until the completion of her degree program
Geographic distance[b]	Log distance between central points of Germany and a student's preferred destination country measured in kilometers
Diff GDP level[c]	Log difference between Germany's and a student's preferred destination country's average GDP per capita (constant 2010 US$) in the period 2010-2014
Diff unemployment[d]	Log difference between Germany's and a student's preferred destination country's unemployment rates among high-skilled youth aged 15-24 in 2015
Free mobility	Dummy variable taking 0 if a student intends to move to one of the non-EEA countries (base group), 1 if a student intends to move to one of the EU/EEA member countries or to Switzerland

Notes: [a] It is a categorical variable ranging from 1 (representing a grade lower than 1.3) to 8 (representing a grade higher than 3.8). We treated GPA as a continuous variable in our regressions. However, we also included it as a categorical variable as a robustness check. The coefficients of our key independent variables are not affected by the choice of using GPA as either a categorical or a continuous variable.

[b] Calculated using *geodist* command in Stata which uses a mathematical model of the earth to calculate the length of the shortest curve between two points.

[c] Data is retrieved from the World Bank's World Development Indicators (retrieved on 2016, September 08).

[d] Data on unemployment rate by age, sex, and education is retrieved from the International Labor Organization's ILOSTAT (retrieved on 2019, February 22). Missing values for certain age groups, education categories, and years are completed as follows: Argentina (2014), Australia (2013), Belgium (2014), China (15-24 unemployment rate in all education groups in 2015 ILO modelled estimate in Nov.2018), India (2012), Iran (2016, 15+, total unemployment rate), Israel (2013), Morocco (2012, intermediate education), New Zealand (2013), South Korea (+15), Venezuela (2012).

Table 2: Summary statistics

Variable	N	Mean	Std. Dev.	Min	Max
Dependent variables					
Intention to migrate	7,412	0.199	0.399	0	1
Cultural distance (Hofstede)	1,474	0.993	0.907	0.0333	4.589
Language distance[a]	1,474	1.317	0.644	0	2
German-speaking country	146	0.099			
English-speaking country	715	0.485			
Other countries	613	0.416			
Big 5 personality traits					
Extraversion	7,412	0	1	-2.664	2.642
Agreeableness	7,412	0	1	-4.912	1.955
Conscientiousness	7,412	0	1	-3.351	2.735
Emotional stability	7,412	0	1	-2.511	2.772
Openness	7,412	0	1	-3.870	2.583
Controls					
Risk aversion	7,412	0	1	-2.503	3.194
Impatience	7,412	0	1	-2.435	3.157
Age	7,412	22.24	2.840	17	30
Female	7,412	0.589	0.492	0	1
Having a stable relation	7,412	0.556	0.497	0	1
Immigrant background	7,412	0.186	0.389	0	1
Exchange last semester[b]	7,412	0.032	0.176	0	1
Parents' educational attainment[a,b]	7,412	0.907	1.001	0	3
Academic degree	3,349	0.452			
Skilled worker qualification	2,139	0.289			
Technician qualification	1,186	0.160			
No vocational qualification	738	0.099			
GPA	7,412	3.698	1.448	1	8
Level of study[a]	7,412	0.211	0.424	0	2
Bachelor's	5,900	0.796			
Master's	1,461	0.197			
PhD	51	0.007			
STEM field	7,412	0.346	0.476	0	1
Last year student	7,412	0.125	0.330	0	1
Geographic distance	1,474	7.847	1.231	5.809	9.815
Diff GDP level	1,474	-0.176	0.718	-3.392	0.859
Diff unemployment	1,474	0.797	0.536	-0.201	2.406
Free mobility	1,474	0.505	0.500	0	1

Source: Authors' tabulation

Notes: [a] Mean values of sub-categories of language distance, parents' educational attainment, and level of study represent percentage distribution of the respective sub-categories in the sample. Mean values of dummy variables that take the minimum value of 0 and the maximum value of 1 can be interpreted as a percentage.

[b] Educational attainment of 570 students' parents are not known. They are coded under "No vocational qualification" and these missing values are controlled in our regressions. 703 students who were not registered at a university in the last semester just before the time of the survey are coded as if they did not do a study exchange. Our regressions are also controlled for the unavailability of the information on exchange status of these students.

Table 3: Descriptive statistics of students' preferred destination countries

Country	# Students	Cultural distance	Geographic distance	Diff GDP level	Diff unemployment
Argentina	11	0.549	9.396	-1.296	1.128
Australia	83	0.328	9.565	0.199	0.293
Austria	33	0.489	6.132	0.090	0.598
Belgium	14	0.968	6.029	0.020	1.206
Brazil	13	1.209	9.118	-1.328	1.165
Bulgaria	1	1.851	7.311	-1.828	1.392
Canada	70	0.339	8.741	0.114	0.647
Chile	5	2.393	9.431	-1.148	1.596
China	45	2.527	8.928	-2.109	0.898
Colombia	8	1.858	9.132	-1.857	1.514
Costa Rica	1	2.694	9.154	-1.631	1.582
Croatia	3	1.801	6.679	-1.161	1.903
Czech Republic	3	0.380	5.963	-0.780	0.986
Denmark	38	2.642	6.073	0.284	0.780
Ecuador	1	2.435	9.210	-2.146	1.052
Estonia	1	0.923	7.171	-0.980	0.748
Finland	16	1.109	7.511	0.058	1.226
France	46	1.133	6.604	-0.056	1.291
Greece	2	1.781	7.511	-0.603	2.406
Guatemala	1	4.589	9.146	-2.710	0.066
Hungary	2	0.589	6.685	-1.181	0.943
India	7	1.423	8.789	-3.344	2.051
Indonesia	1	2.545	9.309	-2.543	1.650
Iran	4	0.935	8.315	-1.968	1.076
Ireland	37	0.427	7.148	0.135	0.934
Israel	9	0.683	8.000	-0.310	0.635
Italy	24	0.207	6.841	-0.223	2.056
Japan	34	1.264	9.113	0.003	0.066
Latvia	1	2.251	7.045	-1.227	1.220
Luxembourg	9	0.218	5.809	0.859	1.028
Malaysia	2	3.755	9.282	-1.494	1.246
Malta	1	0.926	7.450	-0.779	0.223
Mexico	15	1.820	9.149	-1.554	1.285
Morocco	4	0.949	7.954	-2.668	2.369
Netherlands	47	1.971	5.904	0.145	0.375
New Zealand	21	0.305	9.815	-0.221	0.780
Norway	29	2.389	7.598	0.708	0.241
Panama	1	3.728	9.147	-1.544	0.870
Peru	5	2.131	9.248	-2.065	0.860
Philippines	1	2.543	9.236	-2.933	1.519
Poland	6	0.942	6.427	-1.179	1.352
Portugal	1	2.579	7.558	-0.693	1.926
Romania	3	2.831	7.118	-1.615	1.663
Russia	8	3.106	8.439	-1.350	1.414
Singapore	14	3.369	9.224	0.123	1.375
Slovenia	3	3.080	6.483	-0.632	0.811
South Africa	10	0.223	9.115	-1.753	2.018
South Korea	11	2.001	9.053	-0.625	-0.201
Spain	66	0.946	7.377	-0.376	2.099
Sweden	65	3.106	7.264	0.193	0.969
Switzerland	90	0.033	6.179	0.545	0.748
Thailand	8	2.059	9.074	-2.087	1.060
Turkey	29	1.357	7.768	-1.391	1.882
United Kingdom	203	0.597	6.793	-0.105	0.704
United States of America	301	0.423	8.970	0.128	0.327
Venezuela	2	2.464	9.046	-1.130	1.386
Vietnam	5	2.563	9.116	-3.392	1.468

Source: Authors' tabulation

Notes: First column represents number of students who prefer moving to the countries listed (57 countries). The other columns show the cultural distance, log geographic distance, log difference in GDP level and in high-skilled youth unemployment rate between Germany and the countries listed, respectively.

Table 4: Mean values of personality traits across students

	Intention to migrate			Cultural distance		
	No	Yes	Diff	Low	High	Diff
Big 5 personality traits						
Extraversion	-0.021	0.085	-0.106***	0.037	-0.057	0.094**
			(0.029)			(0.053)
Agreeableness	0.022	-0.089	0.111***	-0.021	0.032	-0.053
			(0.029)			(0.053)
Conscientiousness	0.027	-0.107	0.134***	0.069	-0.107	0.176***
			(0.029)			(0.053)
Emotional stability	0.016	-0.063	0.079***	0.032	-0.050	0.082*
			(0.029)			(0.053)
Openness	-0.026	0.106	-0.132***	0.001	-0.002	0.003
			(0.029)			(0.053)
Observations	5,938	1,474		897	577	

Source: Authors' tabulation

Notes: Standardized scores of personality traits are reported. High (low) cultural distance refers to being above (below) median value observed in the sample. Differences at means are significant at *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Pairwise correlations of characteristics of students' preferred destination countries

	Cultural distance	Geographic distance	Diff GDP level	Diff unemployment	Free mobility	English speaking country	German speaking country
Cultural distance (Hofstede)	1.0000						
Geographic distance	0.3044*	1.0000					
	0.0213						
Diff GDP level	-0.3930*	-0.4948*	1.0000				
	0.0025	0.0001					
Diff unemployment	0.0319	-0.0059	-0.3964*	1.0000			
	0.8135	0.9655	0.0023				
Free mobility	-0.2295	-0.9059*	0.5206*	0.0135	1.0000		
	0.0860	0.0000	0.0000	0.9209			
English-speaking country	-0.3994*	0.1448	0.3406*	-0.3062*	-0.0846	1.0000	
	0.0021	0.2827	0.0095	0.0205	0.5317		
German-speaking country	-0.3138*	-0.4434*	0.3618*	-0.1139	0.3000*	-0.0942	1.00000
	0.0175	0.0006	0.0057	0.3988	0.0234	0.4857	

Source: Authors' tabulation

Notes: Number of observations is 57. Significance levels are reported under each Pearson correlation coefficient. * p<0.05. English-speaking country is a dummy that takes 1 if a student intends to move to one of the English-speaking countries (Australia, Canada, Ireland, New Zealand, UK, USA), 0 otherwise. German-speaking country is a dummy that takes 1 if a student intends to move to one of the German-speaking countries (Austria, Belgium, Luxembourg, Switzerland), 0 otherwise.

Table 6: Probit estimates for intention to migrate

Variables	(1)	(2)	(3)	(4)
Big Five personality traits				
Extraversion	0.023***	0.012**	0.011**	0.010**
	(0.005)	(0.005)	(0.005)	(0.005)
Agreeableness	-0.024***	-0.022***	-0.026***	-0.026***
	(0.005)	(0.005)	(0.005)	(0.005)
Conscientiousness	-0.021***	-0.024***	-0.022***	-0.022***
	(0.005)	(0.006)	(0.005)	(0.005)
Emotional stability	-0.014***	-0.018***	-0.015***	-0.014***
	(0.005)	(0.005)	(0.005)	(0.005)
Openness	0.026***	0.024***	0.026***	0.024***
	(0.005)	(0.005)	(0.005)	(0.005)
Risk aversion		-0.053***	-0.049***	-0.049***
		(0.005)	(0.005)	(0.005)
Impatience		-0.005	-0.006	-0.005
		(0.005)	(0.005)	(0.005)
Age			-0.008***	-0.006***
			(0.002)	(0.002)
Female			0.031***	0.028***
			(0.010)	(0.010)
Having a stable relation			-0.100***	-0.100***
			(0.009)	(0.009)
Immigrant background			0.035***	0.037***
			(0.012)	(0.013)
Exchange last semester			0.195***	0.191***
			(0.031)	(0.031)
Parents' educational attainment (base: Academic degree)				
Skilled worker qualification			-0.033***	-0.034***
			(0.011)	(0.011)
Technician qualification			-0.014	-0.015
			(0.013)	(0.013)
No vocational qualification			-0.009	-0.009
			(0.032)	(0.032)
GPA				-0.007**
				(0.003)
Level of study (base: Bachelor's)				
Master's				-0.022
				(0.014)
PhD				0.123*
				(0.065)
STEM field				-0.013
				(0.010)
Last year student				-0.032**
				(0.015)
Observations	7,412	7,412	7,412	7,412
Pseudo R-squared	0.0127	0.0297	0.0624	0.0653
Log pseudolikelihood	-3650.47	-3587.47	-3466.63	-3455.98

Source: Authors' estimation

Notes: Dependent variable is *intention to migrate*, binary variable taking 0 if a student intends to start her career in Germany and 1 if abroad. Marginal effects from probit estimations are presented in columns. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: OLS estimates for cultural distance

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Big Five personality traits						
Extraversion	-0.060**	-0.063**	-0.065**	-0.067**	-0.061***	-0.065**
	(0.025)	(0.026)	(0.026)	(0.026)	(0.024)	(0.025)
Agreeableness	0.010	0.010	0.014	0.013	0.008	0.002
	(0.026)	(0.026)	(0.027)	(0.027)	(0.024)	(0.026)
Conscientiousness	-0.053**	-0.047*	-0.040	-0.037	0.010	-0.019
	(0.023)	(0.028)	(0.028)	(0.028)	(0.026)	(0.028)
Emotional stability	-0.002	-0.003	-0.011	-0.010	-0.010	-0.011
	(0.024)	(0.025)	(0.026)	(0.026)	(0.024)	(0.025)
Openness	0.050**	0.049**	0.048*	0.051**	0.040*	0.058**
	(0.025)	(0.025)	(0.025)	(0.025)	(0.023)	(0.025)
Risk aversion		-0.020	-0.016	-0.013	-0.014	-0.015
		(0.024)	(0.024)	(0.024)	(0.023)	(0.024)
Impatience		0.014	0.008	0.006	0.013	0.004
		(0.028)	(0.028)	(0.029)	(0.026)	(0.027)
Age			0.028***	0.030***	0.020**	0.026***
			(0.009)	(0.010)	(0.009)	(0.010)
Female			-0.027	-0.029	-0.079	-0.067
			(0.053)	(0.056)	(0.051)	(0.054)
Having a stable relation			-0.036	-0.034	-0.029	-0.062
			(0.048)	(0.049)	(0.044)	(0.048)
Immigrant background			0.040	0.038	-0.012	0.016
			(0.059)	(0.059)	(0.053)	(0.057)
Exchange last semester			0.054	0.052	0.042	0.040
			(0.095)	(0.097)	(0.095)	(0.099)
Parents' educational attainment (base: Academic degree)						
Skilled worker qualification			-0.135**	-0.141**	-0.135**	-0.142**
			(0.058)	(0.058)	(0.053)	(0.057)
Technician qualification			-0.153**	-0.156**	-0.115*	-0.133**
			(0.065)	(0.065)	(0.059)	(0.064)
No vocational qualification			-0.010	-0.011	-0.021	0.027
			(0.166)	(0.167)	(0.156)	(0.164)
GPA				0.011	0.014	0.009
				(0.018)	(0.016)	(0.018)
Level of study (base: Bachelor's)						
Master's				-0.056	-0.062	-0.048
				(0.084)	(0.075)	(0.082)
PhD				-0.113	-0.108	-0.092
				(0.262)	(0.219)	(0.257)
STEM field				-0.033	0.029	-0.005
				(0.053)	(0.049)	(0.052)
Last year student				0.068	0.090	0.075
				(0.097)	(0.084)	(0.094)
Geographic distance					0.218***	0.168***
					(0.055)	(0.056)
Diff GDP level					-0.533***	
					(0.030)	
Diff unemployment						0.317***
						(0.046)
Free mobility					0.954***	0.494***
					(0.135)	(0.140)
Constant	0.993***	0.993***	0.469**	0.404*	-1.667***	-1.311**
	(0.024)	(0.024)	(0.202)	(0.229)	(0.525)	(0.543)
Observations	1,474	1,474	1,474	1,474	1,474	1,474
R-squared	0.009	0.009	0.024	0.026	0.203	0.078

Source: Authors' estimation

Notes: Dependent variable is *cultural distance* measured by the difference of Germany from the most preferred destination country a student is willing to migrate in a composite index constructed through four Hofstede national culture dimensions based on the formula of Kogut and Singh (1988). Coefficients from OLS estimations are presented in columns. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Multinomial logit estimates for language distance

	German-speaking country		English-speaking country		Other countries	
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Big Five personality traits						
Extraversion	0.016*	0.003	0.016	0.029***	-0.031**	-0.032***
	(0.008)	(0.006)	(0.014)	(0.011)	(0.014)	(0.012)
Agreeableness	-0.018**	-0.010*	-0.010	-0.012	0.028**	0.022*
	(0.008)	(0.006)	(0.014)	(0.011)	(0.014)	(0.012)
Conscientiousness	0.022***	0.011*	0.027*	-0.006	-0.048***	-0.006
	(0.008)	(0.006)	(0.014)	(0.013)	(0.013)	(0.014)
Emotional stability	-0.001	0.004	0.007	0.003	-0.006	-0.007
	(0.008)	(0.005)	(0.014)	(0.011)	(0.013)	(0.012)
Openness	-0.000	-0.005	-0.014	-0.002	0.015	0.007
	(0.008)	(0.006)	(0.014)	(0.011)	(0.014)	(0.012)
Risk aversion		-0.002		0.004		-0.001
		(0.005)		(0.010)		(0.011)
Impatience		-0.002		-0.009		0.011
		(0.006)		(0.011)		(0.013)
Age		-0.003		-0.008*		0.011**
		(0.002)		(0.004)		(0.005)
Female		-0.014		0.030		-0.017
		(0.011)		(0.023)		(0.026)
Having a stable relation		0.006		-0.054***		0.047**
		(0.010)		(0.019)		(0.022)
Immigrant background		-0.009		0.004		0.005
		(0.012)		(0.024)		(0.027)
Exchange last semester		0.001		-0.018		0.017
		(0.018)		(0.040)		(0.045)
Parents' educational attainment (base: Academic degree)						
Skilled worker qualification		-0.011		0.065***		-0.054**
		(0.012)		(0.025)		(0.027)
Technician qualification		-0.009		0.060**		-0.052*
		(0.015)		(0.027)		(0.030)
No vocational qualification		-0.018		0.079		-0.061
		(0.022)		(0.077)		(0.081)
GPA		0.000		-0.006		0.006
		(0.004)		(0.007)		(0.008)
Level of study (base: Bachelor's)						
Master's		0.020		0.052*		-0.072**
		(0.016)		(0.031)		(0.034)
PhD		0.042**		0.040		-0.081
		(0.021)		(0.092)		(0.088)
STEM field		-0.013		-0.045**		0.058**
		(0.011)		(0.022)		(0.024)
Last year student		0.008		-0.083**		0.075*
		(0.019)		(0.034)		(0.039)
Geographic distance		-0.115***		0.092***		0.023
		(0.007)		(0.019)		(0.022)
Diff GDP level		0.208***		0.241***		-0.449***
		(0.012)		(0.011)		(0.013)
Free mobility		0.097***		-0.312***		0.214***
		(0.005)		(0.065)		(0.064)
Observations	1,474	1,474	1,474	1,474	1,474	1,474
Pseudo R-squared	0.0103	0.4454	0.0103	0.4454	0.0103	0.4454
Log pseudolikelihood	-1378.37	-772.40	-1378.37	-772.40	-1378.37	-772.40

Source: Authors' tabulation

Notes: Dependent variable is language distance, a categorical variable taking 0 if a student reports a German-speaking country as a preferred destination, 1 if an English-speaking country, and 2 otherwise. Marginal effects from multinomial logit estimation are presented in columns. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Descriptive statistics of unstandardized scores of Big 5 personality traits

Big 5 personality traits	N	Mean	Std. Dev.	Min	Max
Full sample					
Extraversion	7,412	32.57	6.596	15	50
Agreeableness	7,412	40.04	5.097	15	50
Conscientiousness	7,412	34.72	5.587	16	50
Emotional stability	7,412	31.63	6.626	15	50
Openness	7,412	37.59	4.805	19	50
Sample of students intending to migrate to countries for which Hofstede index is available					
Extraversion	1,474	33.13	6.630	15	50
Agreeableness	1,474	39.58	5.256	18	50
Conscientiousness	1,474	34.12	5.894	17	50
Emotional stability	1,474	31.22	6.843	15	50
Openness	1,474	38.10	4.868	21	50

Source: Authors' tabulation

Figure 1: Cultural distance of students' preferred destinations from Germany