

The Effects of Personality on the Native-Migrant Wage Gap

Marli Fernandes*

September 28, 2021

Abstract

This article quantifies differences in personality skills (Big Five Factor, locus of control, reciprocity, and life goals) and their assimilation rate between first-generation immigrants and native Germans, using the GSOEP survey. The results reveal that the two groups differ in their personality traits and immigrants' personality is stable. I find that differences in the Big Five Factor and locus of control explain 17 and 11 percent of the wage gap, while life goals tend to decrease it by 9 and 5 percent, respectively, for males and females.

Keywords: Immigration, noncognitive skills, earnings

JEL classification: D91, J30, J61

1 Introduction

The existence of native-immigrant gaps in labor market outcomes has been extensively documented. In the case of Germany, several studies show a significant wage and employment gap between immigrants and native Germans (Algan, Dustmann, Glitz, and Manning (2010), Aldashev, Gernandt, and Thomsen (2012), Bartolucci (2014)). The main reasons appear to be lack of human capital, insufficient language skills, low returns for foreign education and experience (Dustmann

*PhD student at Nova School of Business and Economics. E-mail: marligfernandes@novasbe.pt I am grateful for comments made by Cátia Batista, José Tavares, Paulo M. M. Rodrigues and Pedro S. Martins, seminar participants at the Nova SBE PhD Research group, SOEP Brown Bag Seminar, XIV Labour Economics Meeting and the 14th Annual Meeting of the Portuguese Economic Journal. I acknowledge financial support from FCT - Fundação para a Ciência e Tecnologia - PD/BD/135298/2017. The usual disclaimer applies. The author does not have any conflict of interest to disclose. The data used in this paper (SOEP) builds on anonymised survey data sets that can be obtained by requesting it to soepmail@diw.de.

and Glitz (2011)), and discrimination (Kaas and Manger (2012)). If policymakers want to improve the economic integration of immigrants, it is necessary to know in detail the drivers of this inequality. This paper tries to add a fifth explanation to the immigrant-native labor market gap: personality.

Common sense suggests that personality traits, persistence and motivation matter for success in life. A vast literature has found that noncognitive skills are important determinants of labor market success (Heckman, Stixrud, and Urzua (2006), Heineck and Anger (2010), Lindqvist and Vestman (2011)), job market strategies (Caliendo, Cobb-Clark, and Uhlendorff (2015), A. D. McGee (2015)), entrepreneurship (Zhao and Seibert (2006), Caliendo et al. (2015)), investment in training (Caliendo, Cobb-Clark, Obst, Seitz, and Uhlendorff (2020)), gender and racial wage gaps (N. M. Fortin (2008), Grove, Hussey, and Jetter (2011), Urzua (2008)).¹ If personality is so relevant in the labor market, it varies among cultures and affects selection into migration (Schmitt and Allik (2005), Schmitt, Allik, McCrae, and Benet-Martínez (2007), Heine, Buchtel, and Norenzayan (2008)); personality differences may explain part of the labor market gap or integration into it. However, it might be possible that immigrants assimilate natives personality through time. Studying personality traits might also provide new answers to the integration process of immigrants.

I focus my paper on the case of Germany. Germany is a particularly interesting case study since it has the largest foreign population in the European Union; in 2018, nearly 1/4 of Germany's population had an immigrant background, and around 10% were born abroad. I focus my analysis on first-generation immigrants (who migrated after 18 years old) and compare them with West Germans without a migration background.

I utilize data from the widely used German Socio-Economic Panel (SOEP). The panel aspect of this survey has the advantage of permitting to understand the sta-

¹The paper uses interchangeably the words personality and noncognitive traits, as is common in the literature.

bility of the personality traits; further, the oversampling of immigrants gives a good number of observations. I use several personality measures (Big Five Factor, external locus of control, reciprocity, and life goals) to evaluate which are more relevant in the labor market and which might contribute to or decrease the immigrant wage gap.

I start by analyzing the migrant personality gap and its assimilation using a correlated random effects model. The levels of assimilation permit understanding how stable immigrants' personality is during their stay in the country. I find that immigrants tend to have higher levels of conscientiousness, agreeableness, external locus of control, importance of success and family, but lower levels of emotional stability (only males). Immigrants do not seem to assimilate (or negatively assimilate) Germans' personality, except for locus of control for males (negative assimilation) and importance of family for females at low rates. These results hold even when I differentiate immigrants by cohort or origin.

Before decomposing the wage gap, I further assess the seriousness of reverse causality by comparing the pooled OLS results with a linear latent factor structural equation model. The results are very similar. Nonetheless, I do not entirely claim to identify the causal effects of these traits on wages; instead, I am interested in their impact as omitted variables on potential biases in the immigrant dummy of a standard wage regression.

To assess the impact of personality traits on the native-immigrant gap, I perform an Oaxaca-Blinder decomposition and confirm the results with a Gelbach decomposition (Gelbach (2016)). The paper's main finding is of a modest but significant role for personality traits, accounting for 7.17 percent of the male native-immigrant gap and 5.34 percent of the female native-immigrant gap. External locus of control is the personality trait with the highest impact, explaining 11.46 percent for males and 6.91 percent for females, while the Big Five Factor model explains 5.54 and 3.9 percent. Life goals decrease the gap by 9.14 and 5.11 percent for males and females, respectively. Reciprocity does not seem to be very significant

in the labor market or explaining the wage gap between natives and immigrants.

The remainder of the paper is organised as follows. The next section reviews the literature and briefly resumes the recent immigration history in Germany. In Section 3 the details of the data and personality traits measured are discussed. In Section 4 the methodology is presented and Section 5 presents the results. Finally, Section 6 concludes and gives future avenues for research.

2 Literature Review and Germany's Migration History

2.1 Literature Review

Both in psychology and economics, literature shows that migrants are positively selected in terms of noncognitive skills. Focusing on internal migration, Jaeger et al. (2010) find that individuals who are more willing to take risks are also more likely to migrate. At the same time, Jokela (2009) shows that high openness and low agreeableness increased migration; in alternative, Caliendo, Cobb-Clark, Hennecke, and Uhlendorff (2019) find a relation between higher internal locus of control and migration. In the case of international migration, Boneva and Frieze (2001) show that those who want to resettle in another country tend to be more work-oriented, have higher achievement and power motivation, but lower affiliation motivation and family centrality; Bütikofer and Peri (2018) conclude that higher adaptability has a positive impact on the probability of migrating.²

Migrants' differences in personality might not only be driven by selection but also by cultural differences, as they might bring with them other characteristics. Research in psychology has proven cultural differences in the Big Five Factor (Schmitt et al. (2007)), self-esteem (Schmitt and Allik (2005)), locus of control (Cheng, Cheung, Chio, and Chan (2013)) and risk (Weber and Hsee (1998)). Likely, the personality measures used in the paper (Big Five Factor, locus of control, reciprocity

²It should be noted that this literature is concentrated in western countries.

and life goals) reflect both cultural differences and migrant selection. Answering this question is beyond the scope of the paper since my data, the German Socio-Economic Panel (GSOEP), does not allow for it.

It seems consensual that personality traits tend to be stable through adulthood (Costa and McCrae (1988), McCrae and Costa Jr (2008), Cobb-Clark and Schurer (2012), Cobb-Clark and Schurer (2013)), although stability does not mean time-invariant. The causes of stability and change in personality are still in an ongoing debate about how genes vs environment influence personality and what environmental characteristics influence personality. The role of genes is defended in the studies that have found uniformity in the factor structure of the Big Five in intercultural studies (McCrae, Costa Jr, Del Pilar, Rolland, and Parker (1998)) and uniformity in age trends (McCrae et al. (1999), McCrae et al. (2000), Fitzenberger, Mena, Nimczik, and Sunde (2019)). Accordingly to McCrae and Costa Jr (2008), "personality development is determined by biological maturation, not by life experience". However, other studies highlight the influence of social roles, normative changes and major life events (Roberts, Wood, and Smith (2005), Scollon and Diener (2006), Löckenhoff, Terracciano, Patriciu, Eaton, and Costa Jr (2009), Specht, Egloff, and Schmukle (2011)). I contribute to this literature by studying the assimilation rate of personality for immigrants in Germany for the first time.

Despite the importance of personality traits in several outcomes, surprisingly little work has examined the relationship between personality and assimilation. Brenzel and Laible (2016) for Germany document that the Big Five Factor contributes to explain the native-immigrant wage gap, but their sample - the dataset is the Linked Personnel Panel of the Institute for Employment Research - is relatively small (349 immigrants). Thum-Thyssen (2016) indicates that locus of control is correlated with employment probability and immigrants and their children tend to have a more external locus of control. For Australia, Naghsh Nejad and Schurer (2019) find that first and second-generation immigrants outperform natives on socially beneficial personality traits. This paper provides for the first time, to my

knowledge, a documentation of how several personality traits help explain the native-immigrant wage gap.

2.2 Immigration History

After the Second World War, particularly between the late 1940s and 1961, a shortage in labor necessary to rebuild a dilapidated Germany led German employers to recruit foreign workers. Employers determined the number and the origin of the immigrant flow. Bilateral treaties were signed to recruit blue-collar workers with Italy in 1955 and Spain and Greece in 1960.

Between 1962 and 1973, Germany's fast economic growth and massive shortage of low-skilled workers led the country to sign treaties with Turkey, Portugal, Tunisia, and Yugoslavia. These immigrants were called "guest workers" (*gastarbeiter*), and as the name refers to it, they were expected to stay in Germany temporarily.

In 1973 a ban reduced the number of labor migrants; however, given that the majority of "guest workers" ended up staying in the country, family reunification and high fertility rates of immigrants led to an increase in the foreign population in the country.

During the 1980s and 1990s, immigrant inflows in Germany were mainly shaped by asylum seekers and "ethnic" Germans. In the early 2000s and during the European Union enlargement, migration inflows were primarily from Poland and other Eastern European countries.

In 2015, Germany received 900,000 asylum seekers. In 2018 nearly 1/4 of Germany's population had an immigrant background; around 10% were born abroad.

For a more detailed explanation about the immigrant history in Germany, see Bauer, Dietz, Zimmermann, and Zwintz (2005).

3 Data and Measures of Personality

3.1 Data and Sample Restriction

The analysis is based on data from the SOEP. The SOEP is a nationally representative longitudinal data source that provides information about several social, cultural, political, and economic aspects of individuals living in Germany.³ Due to its panel design and over-sampling of immigrants, it permits analyzing labor market integration over time based on the performance of individuals from different birth countries or regions.

The SOEP is a longitudinal survey of private households, established in West Germany in 1984 and carried out annually. Since 1990, it has also been covered in East Germany.

The data contains information about the country of birth and year of migration of the surveyed immigrants. Because I am interested in professional integration, the statistical analysis focuses only on working individuals aged 20 to 60. This is required to avoid the specific situation of senior people in the German labor market. Also, given that East Germans have different personality traits than West Germans due to the separation and reunification of Germany (Friehe, Pannenberg, and Wedow (2015), I restrict my analysis to West Germany.

An acknowledged problem regarding immigrants' research is the definition of an immigrant since the concept diverges from country to country. Until recently, Germany only recognized a German citizen by bloodlines; after 2005, Germany started to accept birthplace under certain exceptions in the law to determine citizenship. Accordingly, I define an immigrant as a first-generation person who is not born in Germany. I also only include immigrants who migrated after 18 years old to try to have only immigrants who decided by themselves to migrate.

³See Wagner Wagner, Frick, and Schupp (2007) for further information about the survey.

3.2 Measures of personality

Five Factor Model (FFM) According to the FFM, five independent categories are sufficient to describe individual differences at the broadest level of abstraction (McCrae and Costa Jr (2008)). The dimensions of the FFM are labeled openness, conscientiousness, agreeableness, extraversion and emotional stability.

The 2005, 2009, 2013 and 2017 waves of the SOEP provide the necessary questions to measure the FFM. Since extensive psychological questioning was not feasible, the data provides a set of 15 items (listed in Table A1 in the Appendix), of which three are to capture the respective personality dimension.⁴ Participants responded to the questions on a scale from 1 (*does not apply to me at all*) to 7 (*applies to me perfectly*). The SOEP scale has comparable psychometric properties to longer FFM scales. Dehne and Schupp (2007) and Donnellan and Lucas (2008) show the validity and reliability of the short version of the Big Five used in SOEP. Lang, John, Lüdtke, Schupp, and Wagner (2011) showed that the SOEP questionnaire produces a robust five-factor structure across all age groups. Lang et al. (2011) demonstrated that the retest reliability of the scale across six weeks is acceptable (at least $r=0.75$).

I conduct an exploratory factor analysis to confirm which factor loads each item. To understand the number of factors, I run a principal component analysis, analyze how many eigenvalues are larger than one, and do a scree plot analysis. The analysis confirms that the number of factors for each personality measure is the same as determined by the SOEP, with the items loaded in their respective factors.

Locus of control is "a generalised attitude, belief, or expectancy regarding the nature of the causal relationship between one's behavior and its consequences" (Rotter (1966)). It may be fair to say that this is the most widely used personality concept in economics and among the most popular research tools in psychology,

⁴The full inventory, the NEO PI-R, comprises 240 questions Costa Jr and McCrae (2008).

rivalled since the 1980s by the FFM.⁵ Those believing that what happens to them in life is due to their actions and decisions have an internal locus of control, while those who believe that life events are due to fate or luck have an external locus of control. The necessary questions to measure locus of control on a scale from 1 to 7 are included in the 2005, 2010 and 2015 surveys.⁶

Again, I conduct a principal component and a scree plot analysis to determine the number of factors. It is advised to use three factors (while SOEP created two factors); however, I decided only to extract a single external locus of control. The reliability of the internal locus of control scale is problematic low (0.18), and the exploratory factor analysis advises to separate it into two factors; even though, external locus of control seems to be more predictive of economic outcomes (Caliendo et al. (2015); Heineck and Anger (2010)). The problematic of the internal locus of control in the SOEP has already been pointed out by Piatek and Pinger (2016) and Weinhardt and Schupp (2014). Next, I reverse the coding of the response scale for the six external items so that higher values denote higher levels of disagreement. I then use the six items that load into the external locus of control and extract a single factor. The measures are standardized with mean zero and standard deviation one. The procedure is similar to the one used by Piatek and Pinger (2016), Caliendo et al. (2020) and Fitzenberger et al. (2019).

Reciprocity "means that in response to friendly actions, people are frequently much nicer and much more cooperative than predicted by the self-interest model; conversely, in response to hostile actions, they are frequently much more nasty and even brutal" (Fehr and Gächter (2000)). The 2005, 2010 and 2015 waves provide the necessary questions to measure positive and negative reciprocity. Reciprocity is surveyed with six items on a scale from 1 to 7.

Like the FFM procedure, I conduct principal component analysis to confirm

⁵See Cobb-Clark (2015) for an overview of the economics literature on locus of control.

⁶In 1999, questions were also made but on a scale from 1 to 4, for that reason, I opt for not including questions from the 1999 wave.

which factor loads each item and the number of factors. The analysis demonstrates that the number of factors for each personality measure is the same as determined by the SOEP, with the items loading in their respective factors.

Life Goals are determinants of individuals' future orientations and their occupational, educational, and family-related decision making (Baltes, Lindenberger, and Staudinger (2007)). Individual life goals also correspond to societal values since they tend to align with cultural preferences. The waves of 1990, 1992, 1995, 2004, 2008, 2012, and 2016 include six items that permit to measure the importance of success and family.⁷

Again, I conduct principal component analysis to confirm which factor loads each item and the number of factors. The analysis confirms three factors; however, I decided to include only two, relative to success and family, given that the factor about altruism has low reliability (0.24) (it only contains two items). Similar to the previous measures, they are also standardized.

Table A1 in the Appendix describes the questions included for each measure and the respective Cronbach alpha reliabilities (Cronbach (1951)). The Cronbach alphas range between 0.48 and 0.82. These reliability coefficients are relatively low compared to what is found in the literature, where they usually range between 0.70 and 0.90. However, given that the Cronbach alpha increases with the number of items and the SOEP includes fewer items than typical in the literature, the ratios are satisfactory.⁸

For details on the exploratory factor analysis, see Appendix.

⁷In the case of the importance of family life, I decided not to include one of the items since there have been significant changes in wording; in 2004 and 2008 it was asked the importance of owning a car and in 2012 and 2016 the importance of owning a house.

⁸

$$\alpha = \frac{Nc}{v + (N - 1)c} \quad (1)$$

where N is the number of items, c is the average inter-item covariance among the items and v is the average variance.

3.3 Personality traits measurement

One advantage of the factorial analysis is that it explicitly accounts that answers to items are imperfect proxies of the underlying latent traits. Latent factor models estimate the joint distribution of the latent factors and remove some of this measurement error.

After determining the number of factors, I conduct a principal component analysis and then rotate the factors using quartimin rotation to predict the resulting factors.⁹ This approach has the advantage of determining the weight assigned to each item in the overall index eliminating the need to assume equal weights and reduce the attenuation bias associated with any measurement error in the index.

Another concern through the paper is reference bias, meaning that the self-report questions can be misleading when comparing levels of personality skills across different groups of people. I believe that this is not such a concern in this paper as is typical in the cross-country papers in psychology, given that immigrants live, work, and interact with Germans. Consequently, they probably compare themselves with a majority of Germans.¹⁰ I calculate Tucker's congruence coefficient to study the similarity of the factors between the two groups and find a high level of similarity; details are available in the Appendix.

3.4 Descriptive Statistics

The means of human capital and personality variables and individual characteristics are reported separately by origin and gender in Table 1. Unsurprisingly, on average, immigrants have worse labor market outcomes than natives; this means

⁹The quartimin rotation re-weights the factor loadings obtained from the principal component analysis so that each variable mostly loads on one factor.

¹⁰For example, Schmitt et al. (2007) administered a Five Factor questionnaire in different countries and found that the rank correlation between hours worked and conscientiousness across countries is negative, though statistically insignificant. This demonstrates that cross-country studies of personality tend to have the risk of being biased.

they have lower wages, a lower probability of working full-time, and a higher likelihood of being unemployed. Men have a higher chance of having elementary education and a lower possibility of having higher education. Although women have a higher chance of having only elementary education, they also have a higher probability of being more educated than West German women. Both immigrants and West Germans have similar years of full-time experience when compared by gender.

In terms of marital status, immigrants have significantly higher chances to be married and lower chances of being divorced and unemployed.

For language ability, I use an indication of self-assessed language fluency, which the SOEP measures on a five-category ordinal Likert-scale ranging from "not speaking at all" to "speaking very well". This question has been made annually since 2005, except for 2006, 2012, and 2016. For the missing years, I interpolate considering the previous and following year. I use a binary variable for oral and written German, coded one if the language fluency is greater than three and zero otherwise.¹¹ As is perceived in Table 1, immigrants tend to speak better than write, and immigrant women seem to be more fluent in the German language than immigrant men.

Relatively to the personality variables, on average, immigrants tend to have significantly lower levels of openness, emotional stability, and negative reciprocity. Still, they have higher levels of conscientiousness, extraversion (only for females), agreeableness, external locus of control, positive reciprocity, and value more success and family when compared with natives of the same sex. Figure A.5 in the Appendix presents the distribution of the personality traits by origin, and Figure A.6 in the Appendix shows the distribution of changes in the personality traits by origin. I will study this more in-depth in the next section.

¹¹The binary language measure has been used by e.g. Dustmann and Fabbri (2003) and Danzer and Yaman (2016).

Table 1: Descriptive statistics of sample, by gender and immigrant status - mean and standard deviation

| | Male | | | Female | | |
|-------------------------|--------|-----------|------------|--------|-----------|------------|
| | German | Immigrant | Difference | German | Immigrant | Difference |
| (log) gross hourly wage | 2.84 | 2.56 | 0.27*** | 2.53 | 2.31 | 0.22*** |
| <i>Education</i> | | | | | | |
| elementary | 0.06 | 0.22 | -0.15*** | 0.09 | 0.24 | -0.14*** |
| vocational training | 0.56 | 0.51 | 0.05*** | 0.63 | 0.44 | 0.18*** |
| higher | 0.38 | 0.27 | 0.11*** | 0.28 | 0.32 | -0.04*** |
| <i>Employment</i> | | | | | | |
| full-time | 0.82 | 0.74 | 0.08*** | 0.32 | 0.24 | 0.08*** |
| part-time | 0.06 | 0.07 | -0.01*** | 0.44 | 0.38 | 0.05*** |
| unemployed | 0.12 | 0.18 | -0.06*** | 0.24 | 0.37 | -0.13*** |
| <i>Experience</i> | | | | | | |
| full-time | 18.85 | 18.54 | 0.31* | 9.72 | 8.98 | 0.74*** |
| part-time | 0.83 | 1.06 | -0.23*** | 5.94 | 4.21 | 1.73*** |
| unemployment | 0.63 | 1.63 | -1.00*** | 0.71 | 1.11 | -0.40*** |
| married | 0.64 | 0.85 | -0.21*** | 0.63 | 0.80 | -0.17*** |
| divorced | 0.08 | 0.05 | 0.03*** | 0.14 | 0.12 | 0.02*** |
| single | 0.27 | 0.09 | 0.18*** | 0.23 | 0.08 | 0.16*** |
| age | 43.06 | 43.88 | -0.82*** | 42.54 | 43.05 | -0.51*** |
| years of migration | 0.00 | 15.62 | -15.62*** | 0.00 | 15.49 | -15.49*** |
| migration age | 0.00 | 28.31 | -28.31*** | 0.00 | 27.60 | -27.60*** |
| oralgerman | 1.00 | 0.74 | 0.26*** | 1.00 | 0.75 | 0.25*** |
| writtengerman | 1.00 | 0.62 | 0.38*** | 1.00 | 0.68 | 0.32*** |
| openness | -0.07 | -0.14 | 0.08** | 0.04 | 0.04 | 0.00 |
| conscientiousness | -0.09 | 0.10 | -0.19*** | 0.05 | 0.18 | -0.13*** |
| extraversion | -0.15 | -0.13 | -0.03 | 0.12 | 0.03 | 0.09*** |
| agreeableness | -0.21 | -0.00 | -0.21*** | 0.13 | 0.32 | -0.19*** |
| emotional stability | 0.25 | 0.06 | 0.19*** | -0.17 | -0.26 | 0.09*** |
| locus of control | -0.15 | 0.20 | -0.34*** | 0.02 | 0.30 | -0.28*** |
| positive reciprocity | -0.02 | 0.11 | -0.13*** | -0.05 | 0.15 | -0.20*** |
| negative reciprocity | 0.19 | -0.03 | 0.23*** | -0.12 | -0.26 | 0.15*** |
| importance of success | -0.01 | 0.23 | -0.24*** | -0.16 | 0.03 | -0.19*** |

| | | | | | | |
|----------------------|-------|------|----------|-------|-------|----------|
| importance of family | -0.05 | 0.30 | -0.34*** | -0.03 | 0.22 | -0.25*** |
| Observations | 49027 | 8106 | 57133 | 57917 | 10627 | 68544 |

Standard deviation in parenthesis. For FFM and life goals, changes are in a four-year period for the same individual; for the locus of control and reciprocity, changes are in a five-year period.

4 Methodology

4.1 Migrant Personality Gap

Using repeated cross-sectional data, I estimate the migrant personality gap and its assimilation. The estimated equation is

$$P_{it} = X'_{it}\beta + \gamma_i + \delta_t + \epsilon_{it} \quad (2)$$

Here X_{it} denotes the vector of explanatory variables, including a constant, γ_i is the individual effect, δ_t is the time effect and ϵ_{it} is the remaining stochastic error term. The explanatory variables are a dummy for being an immigrant, years since migration, age, age squared, marital status (married, divorced or single), education (elementary, vocational or higher), employment status (unemployed, part or full-time), (log) household income, employment history (years in full or part-time employment and unemployment) and state effects. Since immigrant is a time-invariant variable and the main variable of interest, it is not possible to estimate fixed effects. I apply a correlated random effects approach by adding individual averages of all time-varying covariates to Equation (2) (Mundlak (1978)) to reduce the concerns of unobserved heterogeneity biasing the estimates.¹² Wooldridge (2019) proves that correlated random effects can be employed with unbalanced panels in linear models. The model is estimated separately for males and females.

¹²I estimated Eq. (2) with fixed effects, random-effects and correlated random-effects models. A Hausman test leads to rejecting the random-effects model in favor of fixed-effects but does not reject the null hypothesis of the correlated random-effects in favor of the fixed-effects model.

4.2 Decomposition of Labor Market Outcomes Differentials

I begin by specifying the following model of earnings determination:

$$\ln(w)_{it} = \zeta immig_i + P_i\alpha + X_{it}\beta + \nu_{it} \quad (3)$$

where $\ln(w)_{it}$ is the (log) gross hourly wages; P_i is the vector of personality traits; the vector X_{it} captures the controls including immigrant status, age, age squared, married, education level, fluency in oral and written German, and state effects; and ν_{it} is the idiosyncratic error-term. The primary parameter of interest is ζ , the coefficient of the immigrant indicator variable.

Achieving causal estimation of Eq. (3) is challenging. The most important concern is reverse causality. It has been proven that noncognitive skills explain labor market outcomes, but the reversal might also be true. Cobb-Clark and Schurer (2013) show that locus of control, despite not time-invariant, cannot be meaningfully explained by a series of relevant life events. Importantly, it seems that changing job, a promotion at work, improvement or worsening of finances seem to have little impact on measured locus of control. If the model contained one endogenous input, then an instrument variable or equally suitable quasi-natural experiment approach would be possible; however, the model comprises ten endogenous variables, implying that I would need the same number of instruments. Finding such a large set of instruments is not feasible; even in need of only one, its validity could also be disputable. The small variation which occurs in individuals' personality over time appears to stem from measurement error. In this sense, I construct an average index for each personality trait for all individuals providing personality data in at least one wave.¹³

The Oaxaca-Blinder decomposition (Oaxaca (1973); Blinder (1973)) has been extensively used to decompose the average wage gap between two groups into an endowment effect explained by differences in observed characteristics and an

¹³Cobb-Clark, Kassenboehmer, and Schurer (2014) perform a similar procedure.

unexplained effect due to differences in returns to these characteristics.

Suppose the mean log wage function for immigrants (m) and Germans (g) is described by $E[w_o|X_o] = X_o\beta_o$, where (again) w denotes log gross hourly wages, X is the vector of labor market characteristics (including a constant term), β is the vector of coefficients and $o = m, g$ denotes the group, then the estimate of β_o measures the impact of X on the average value of w for group o . Wages by immigrant status (o) are estimated by:

$$\ln(w_i) = X_{io}\beta_o + \epsilon_i \quad (4)$$

where X_i contains the personality traits variables and controls. The German and immigrant models can be subtracted from each other to decompose the mean native-immigrant gap into the mean difference in observed characteristics and the difference in returns to those characteristics:

$$\overline{\ln(w)}_g - \overline{\ln(w)}_m = (\overline{X}_g - \overline{X}_m)\beta_m + \overline{X}_g(\beta_g - \beta_m) = (\overline{X}_g - \overline{X}_m)\beta^* + [\overline{X}_g(\beta_g - \beta^*) - \overline{X}_m(\beta_m - \beta^*)]. \quad (5)$$

In the last equality, the first term is the outcome differential explained by group differences in the predictors, and the second term is the unexplained part.

An important issue is that the decomposition results for categorical predictors depend on the choice of the omitted base category (Jann (2008); N. Fortin, Lemieux, and Firpo (2011)). Although for the explained part, the results are not affected, for the unexplained part changing the omitted category alters the results for the single dummy variable and for the whole contribution of that categorical variable because different parts of its effect are hidden in the intercept. To address this issue, I follow the advice of Gardeazabal and Ugidos (2004) and include all dummy variables in regression but restricting the sum of estimated coefficients to be zero for each set of dummy variables generated from the same categorical variable. Furthermore, I also employ the Gelbach (2016) decomposition, which is based on

the formula for omitted variable bias. In more detail, he notes that if X_i contains K variables, the contribution of the k -variable to the gap $\overline{\ln(w)}_g - \overline{\ln(w)}_m$ is given by $\hat{\beta}_k$ multiplied by $\hat{\zeta}_k$ which are the estimates of the coefficients for $immigrant_i$ variable from K auxiliary regressions of each of the k covariates on $immigrant_i$. I view this approach as a robustness check against the results obtained from the Oaxaca-Blinder decomposition.

5 Results

5.1 Migrant Personality Gap

In Table 2, I present the estimated migrant personality gap. Full estimation results are reported in the Appendix in Tables A7 and A8. The results show that male immigrants tend to have higher levels of conscientiousness, agreeableness, external locus of control, importance of success and family. The estimated differences are sizable in magnitude, ranging between 0.191 (for agreeableness) to 0.389 (for success). For emotional stability, immigrants tend to have lower levels, 0.216. All these differences are statistically significant at a one percent level. Male immigrants do not seem to assimilate male German personality over time since the variable years of migration is not statistically significant, and the magnitudes are low. The exception is external locus of control, where it seems to exist negative assimilation at a low rate (significant at the 5% level).

Female immigrants tend to have higher levels of conscientiousness, agreeableness, external locus of control, positive reciprocity, and importance of success and family. The magnitudes are also sizable, ranging from 0.190 (for importance of family) to 0.451 (for success). They tend to have lower levels of extraversion (0.121) than native German women. These differences are statistically significant at a one percent level, except for extraversion at five percent. Female immigrants do not seem to converge female Germans' personality over time for most of the measures.

The exception seems to be for importance of family, agreeableness, and extraversion, although the assimilation rates are low.

Empirical analyses with panel data suffer from attrition. Panel attrition may bias estimation results if the probability of leaving the sample or return migration is linked to personality traits. I study whether attrition bias is a problem by applying Verbeek and Nijman (1992) methodology, which consists in adding selectivity dummies to the main equation of interest. I generate a selectivity dummy equal to 1 if an individual participates in the survey in years t and $t + 1$, and equal to 0 if the individual leaves the sample. The statistical significance of the added variable provides a test for non-response bias. I do not reject the null hypothesis for all personality traits for both males and females regressions. I performed a second test using in alternative the number of waves the individual is present, and I failed to reject the hypothesis for openness, extraversion, positive reciprocity (only for females), importance of success, and family (only for females). I re-estimate my analysis to address this issue partially, excluding individuals that the SOEP knows have left the country. The results almost do not change and are available in the Appendix in Table A9.

The assimilation rates results might be driven through the quality of subsequent cohorts of immigrants. I separate the sample into earlier (before 1996) and later arrivals (after 1995). For males, the conclusion of non-assimilation maintains, except for external locus of control for earlier arrivals where the gap enlarges by 0.0785 every year. For importance of family, there seems to exist assimilation for earlier cohorts, but this last one is only significant at 10% level. Relatively to females, assimilation for agreeableness and family for earlier arrivals seem to exist at the rates of 0.0334 and 0.0329, respectively. Results are available in Appendix in Tables A10.

Table 2: Native-migrant gap in personality by gender

| | Openness | Conscientiousness | Extraversion | Agreeableness | Emotional stability | Locus of control | Positive reciprocity | Negative reciprocity | Success | Family |
|--------------------|----------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|----------------------|----------------------------------|-------------------------------------|
| Male | | | | | | | | | | |
| immigrants | 0.0463 (0.0595) | 0.289 ⁺⁺⁺ (0.0593) | -0.0117 (0.0587) | 0.191 ⁺⁺⁺ (0.0598) | -0.216 ⁺⁺⁺ (0.0542) | 0.309 ⁺⁺⁺ (0.0697) | -0.0140 (0.0755) | -0.0281 (0.0706) | 0.389 ⁺⁺⁺ (0.0453) | 0.238 ⁺⁺⁺ (0.0387) |
| years of migration | 0.0113 (0.0102) | -0.0142 (0.00981) | 0.0123 (0.00901) | 0.00822 (0.0104) | 0.000838 (0.00910) | 0.0279 ⁺⁺ (0.0122) | 0.00900 (0.0148) | 0.00338 (0.0127) | -0.00210 (0.00570) | -0.00439 (0.00526) |
| Observations | 14318 | 14318 | 14318 | 14318 | 14318 | 11320 | 11320 | 11320 | 23756 | 23756 |
| Female | | | | | | | | | | |
| immigrants | 0.0846 (0.0558) | 0.194 ⁺⁺⁺ (0.0498) | -0.121 ⁺⁺ (0.0508) | 0.221 ⁺⁺⁺ (0.0513) | -0.0539 (0.0501) | 0.341 ⁺⁺⁺ (0.0555) | 0.180 ⁺⁺⁺ (0.0594) | -0.0453 (0.0618) | 0.451 ⁺⁺⁺ (0.0418) | 0.190 ⁺⁺⁺ (0.0368) |
| years of migration | 0.00964 (0.00798) | 0.00908 (0.00751) | 0.0129 ⁺ (0.00733) | -0.0135 ⁺ (0.00773) | -0.00771 (0.00777) | -0.00396 (0.0109) | -0.00394 (0.0115) | 0.00623 (0.0107) | -0.00382 (0.00558) | -0.00910 ⁺⁺ (0.00442) |
| Observations | 16781 | 16781 | 16781 | 16781 | 16781 | 13226 | 13226 | 13226 | 26889 | 26889 |

Correlated random effects model. All regressions include state and year effects. Controls included in all regressions are age, age squared, married, divorced, (single is the omitted category); vocational training, higher education, (elementary education is the omitted category); part-time, full-time, (unemployed is the omitted category); experience in full-time, part-time and unemployment; (log) household income and health satisfaction. Standard errors clustered at the individual level in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

The initial results might also be masked due to heterogeneity at the origin level. I also separate the sample into immigrants from countries belonging to the European Union (EU) and countries that do not belong. Immigrants from non-EU countries seem to differ more from Germans than immigrants from EU countries. For males, only immigrants from non-EU countries differ in terms of having higher levels of conscientiousness, agreeableness, and external locus of control, although both types of immigrants tend to have higher and similar levels of importance of success and family and lower levels of emotional stability. For females, only immigrants from non-EU countries tend to differ significantly in higher levels of conscientiousness, agreeableness, external locus of control, positive reciprocity, and importance of family. The magnitudes of importance of success are also higher; immigrants from EU countries have higher levels of openness. Relatively to the assimilation rates, for males, the variable years of migration is not statistically significant for both specifications, except for external locus of control for non-EU immigrants where assimilation is at the rate of 0.0270. For females, the variable is significantly different from zero for importance of family at the rate of 0.0124 for immigrants coming from non-EU countries and divergence of extraversion for EU immigrants at the level 0.0358. Results are available in Appendix in Tables A11.

5.2 Decomposition of Labor Market Outcomes Differentials

The estimates from a pooled OLS model are shown in Table 3 for males and females. The results begin in column (1), which only includes the immigrant dummy variable without any other control variable: it essentially captures the raw immigrant disadvantage for males, and it is 0.254. Column (3) shows the raw immigrant disadvantage for females, and it is 0.210. As the explanatory variables are added to the model, the wage gap decreases for the males because the native-immigrant male log wage differentials are "explained" by additional regressors; the immigrant dummy captures part of the differentials "unexplained" by these regressors.

There is no evidence of earnings assimilation for male immigrants since the variable years of migration is not statistically significant. Its value is very low, in contrast to female immigrants. The variables that predict better, as expected, the labor market success are the education variables. For males with vocational training or higher education, gross hourly wages are higher by 8.7 and 37.6 percent, respectively, compared to having only elementary education; for females, having vocational training or higher education raises gross hourly wages by 17.0 and 51.2 percent, respectively.

Analyzing the importance of the personality traits, for males, conscientiousness, extraversion, agreeableness, external locus of control, and negative reciprocity are negatively associated with wages. In contrast, emotional stability, importance of success, and family are positively related.¹⁴ All these variables are statistically significant at one percent level, except for negative reciprocity significant at ten percent. External locus of control is the most relevant noncognitive skill in the labor market, an increase of one point in this variable decreases wages by 9.45 percent. For females, openness, conscientiousness, agreeableness, and external locus of control are negatively associated with wages, while emotional stability, positive reciprocity, importance of success, and family are positively associated. As expected, external locus of control is the most relevant trait in the job market, an increase in one point is related to a wage lower 6.65 percent, although it should also be highlighted the importance of success which is associated with a 6.34 percent higher wage.¹⁵

The main concern in this analysis is the issue of reverse causality, personality traits might affect wages, but the reversal might also be true. In Section 5.2, I

¹⁴Strangely the fact that conscientiousness is negatively associated with wages, I investigate the possibility of non-linearities. Conscientiousness is negatively associated with wages only for males at the top 25 percent and not statistically significant for the others, given that the labor market might penalize perfectionism. The results for this exercise are available in Appendix in Table A12.

¹⁵For a study entering into better detail about the returns to personality traits in the German labor market, see Heineck and Anger (2010).

Table 3: (Log) Gross Hourly Wages

| | Male | | Female | |
|---------------------------|-----------------------|-----------------------------|-----------------------|-----------------------------|
| | (1) | (2) | (3) | (4) |
| immigrants | -0.254+++ (0.0186) | -0.180+++ (0.0331) | -0.210+++ (0.0176) | -0.306+++ (0.0307) |
| years of migration | | 0.000733 (0.00163) | | 0.00746+++ (0.00159) |
| openness | | -0.00271 (0.00681) | | -0.0223+++ (0.00647) |
| conscientiousness | | -0.0243+++ (0.00686) | | -0.0135++ (0.00675) |
| extraversion | | -0.0223+++ (0.00661) | | -0.0104 (0.00660) |
| agreeableness | | -0.0327+++ (0.00652) | | -0.0275+++ (0.00673) |
| emotional stability | | 0.0285+++ (0.00657) | | 0.0325+++ (0.00653) |
| external locus of control | | -0.0945+++ (0.00651) | | -0.0665+++ (0.00659) |
| positive reciprocity | | 0.00423 (0.00610) | | 0.0144++ (0.00575) |
| negative reciprocity | | -0.0113+ (0.00634) | | -0.00343 (0.00642) |
| importance of success | | 0.0596+++ (0.00708) | | 0.0634+++ (0.00694) |
| importance of family | | 0.0382+++ (0.00657) | | 0.00597 (0.00679) |
| age | | 0.0604+++ (0.00425) | | 0.0368+++ (0.00380) |
| age squared | | -0.000551+++ (0.0000471) | | -0.000485+++ (0.0000450) |
| married | | 0.0866+++ (0.0130) | | -0.0185 (0.0118) |
| vocational training | | 0.0870+++ (0.0188) | | 0.170+++ (0.0184) |
| higher education | | 0.376+++ (0.0218) | | 0.512+++ (0.0205) |
| experience | | -0.000430 (0.00161) | | 0.0148+++ (0.000957) |
| oral German | | 0.179+++ (0.0355) | | 0.0251 (0.0368) |
| written German | | 0.0240 (0.0290) | | 0.0316 (0.0315) |
| Controls | No | Yes | No | Yes |
| State effects | No | Yes | No | Yes |
| Year effects | No | Yes | No | Yes |
| Observations | 40421 | 40421 | 40894 | 40894 |
| R^2 | 0.021128 | 0.287231 | 0.014529 | 0.206570 |

Controls included in all regressions are age, age squared and married. Standard errors clustered at the individual level in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

find that for the majority of the personality measures, the levels of assimilation are not statistically significant and low. To check further the seriousness of reverse causality, I re-estimate the model using a linear latent factor structural equation model (SEM), which is a simplified version of the estimators proposed in Cunha and Heckman (2008) and Cunha, Heckman, and Schennach (2010).¹⁶ This permits me to account for the possibility that wages simultaneously determine personality traits. I do this by simultaneously estimating ten measurement equations - one for each personality trait - and an equation that links wages to the personality traits. Results are provided in Table A13 and A14 in the Appendix. The SEM coefficients (i) are of the same sign; (ii) have the same statistical significance; and (iii) do not differ significantly in magnitude from the correlated random effects coefficients, except for importance of family for females. Thus, reverse causality does not seem to be an issue for the conclusions, except for importance of family for females.¹⁷

Table 4 presents the results of the Oaxaca-Blinder decomposition performed by estimating Equation (5). I also present results for the Gelbach (2016) decomposition as a robustness check to the Oaxaca-Blinder decomposition.

Considering the Oaxaca-Blinder decomposition, immigrant males tend to earn 28.98 percent less than native male Germans. From this gap, and for the explained part, personality traits account for 0.0208 log points, meaning 7.17 percent of the wage gap, which is a small but not trivial part of the immigrant wage gap. The most relevant personality trait in explaining this gap is the external locus of control, which explains 11.46 percent; however, it also needs to be highlighted the relevance of the variables importance of success and family in reducing the wage gap, respectively, by 4.31 and 4.83 percent. Conscientiousness, agreeableness, and

¹⁶Cobb-Clark et al. (2014) use the same strategy as a robustness check for reverse causality.

¹⁷I apply the Verbeek and Nijman (1992) methodology again to test the relevance of panel attrition. In equation (4), I add a dummy equal to 1 if an individual participates in the survey in years t and $t + 1$, and equal to 0 if the individual leaves the sample. I do not reject the null hypothesis for both males and females; I do not reject the null hypothesis only for males for the alternative test using the number of waves. Results available upon request.

emotional stability have smaller impacts on increasing the wage gap but are statistically significant at a one percent level. The variables openness, positive and negative reciprocity do not statistically significantly impact the wage gap. For the unexplained part, sometimes attributed to discrimination, personality traits account for 5.55 percent of the wage gap.¹⁸ The human capital variables (education, experience, and fluency in oral and written German) have a higher impact in explaining the wage gap; summed, they account for 0.0993 log points (34.26 percent of the wage gap). Education and fluency are the most relevant variables, with almost equal weight, 15.49 and 15.70 percent, respectively, of the wage gap.

About females, they tend to earn 25.04 percent less than native female Germans. From this gap, personality traits account for 0.0106, which is 4.22 percent of the wage gap, an amount smaller than for males. Again, the most relevant personality trait in explaining the gap is the external locus of control, accounting for 6.91 percent of the wage gap. The variables conscientiousness, agreeableness, and emotional stability have small but statistically significant effects in increasing the wage gap, while positive reciprocity slightly reduces it. In the unexplained part, the personality traits have a small impact, accounting for only -1.64 percent of the gap. For females, the most relevant variable is years of migration, reducing the wage gap by 52.32 percent. Experience and fluency in written German are statistically significant in explaining the wage gap, respectively, 5.05 and 5.36 percent. Education seems to not be statistically significant in impacting the wage gap.

The results found from the Gelbach decomposition are very similar to the Oaxaca-Blinder decomposition; the contribution of the covariates is the same, though the overall gap is lower (25.4 percent for males and 20.98 percent for the females), and as a consequence, the variables included tend to explain more the wage gap.¹⁹

¹⁸Although the unexplained part is often interpreted as discrimination, it may also result from misspecification of the relationships or unobserved heterogeneity. For this reason, I do not present in detail the results from the unexplained part. Details for the unexplained part are available upon request.

¹⁹The wage gap in the Oaxaca-Blinder differs from the Gelbach decomposition due to the Gardeazabal and Ugidos (2004) procedure.

An important issue is the role of schooling in the formation and measurement of noncognitive skills. Suppose high-ability individuals select into higher levels of education. In that case, one should not control educational attainment in a regression that aims to estimate the total effect of these skills on labor market outcomes. In contrast, if higher levels of schooling improve personality skills, not controlling for educational attainment will bias the estimates. In this particular case, the issue becomes even more tricky since the majority of the immigrants completed their education in their home country, and there are country differences in access to education (selection differences) and the quality of the instruction (differences in education effects on the skills). Excluding the variable education increases the coefficients of the personality traits variables, but the statistically significant variables are the same for both sex.²⁰

Finally, there might exist selection into the labor market. I re-estimate the Oaxaca-Blinder decomposition correcting for selection using a two-step Heckman sample selection model (Heckman (1979)). The inverse Mills ratio is estimated using the common regressors and the variables number of children, amount of unemployment benefit I (*Arbeitslosengeld I*), unemployment benefit II (*Arbeitslosengeld II*), child allowance, and housing benefit. The results do not differ significantly from the ones presented.²¹

²⁰Results available upon request.

²¹Results available upon request.

Table 4: Decomposition of the native-migrant wage gap

| | Male | | | | | | Female | | | | | |
|---------------------------|----------------|----------|--------------|----------|----------------|----------|--------------|----------|----------------|----------|--------------|----------|
| | Oaxaca-Blinder | | Gelbach | | Oaxaca-Blinder | | Gelbach | | Oaxaca-Blinder | | Gelbach | |
| | contribution | % of gap | contribution | % of gap | contribution | % of gap | contribution | % of gap | contribution | % of gap | contribution | % of gap |
| Raw log wage gap | .2898 | | 0.2540 | | 0.2504 | | 0.2098 | | | | | |
| Sum of explained | 0.0745 | 25.70% | -0.0121 | -4.18% | -0.0941 | 37.60% | | | | | | |
| years of migration | -0.0121 | -4.18% | -0.0121 | -4.76% | -0.131+++ | -52.32% | -0.131+++ | -62.44% | | | | |
| Personality traits | 0.0208 | 7.17% | 0.0208 | 8.18% | 0.0106 | 4.22% | 0.0106 | 5.04% | | | | |
| openness | -0.0002 | -0.07% | -0.0002 | -0.08% | 0.0014 | -0.56% | 0.0014 | -0.67% | | | | |
| conscientiousness | 0.0049+++ | 1.69% | 0.0049+++ | 1.93% | 0.0025+ | 1.00% | 0.0025+ | 1.00% | | | | |
| extraversion | 0.0002 | 0.07% | 0.0002 | 0.08% | -0.0007 | -0.28% | -0.0007 | -0.33% | | | | |
| agreeableness | 0.0066+++ | 2.26% | 0.0066+++ | 2.58% | 0.0057+++ | 2.28% | 0.0057+++ | 2.72% | | | | |
| emotional stability | 0.0046+++ | 1.59% | 0.0046+++ | 1.81% | 0.0037+++ | 1.46% | 0.0037+++ | 1.74% | | | | |
| external locus of control | 0.0332+++ | 11.46% | 0.0332+++ | 13.07% | 0.0173+++ | 6.91% | 0.0173+++ | 8.25% | | | | |
| positive reciprocity | -0.0005 | -0.16% | -0.0005 | -0.19% | -0.0035++ | -1.41% | -0.0035++ | -1.68% | | | | |
| negative reciprocity | -0.0015 | -0.52% | -0.0015 | -0.59% | -0.0002 | -0.07% | -0.0002 | -0.08% | | | | |
| success | -0.0125+++ | -4.31% | -0.0125+++ | -4.92% | -0.0114+++ | -4.55% | -0.0114+++ | -5.43% | | | | |

| | | | | | | | | |
|--------------------|------------|----------|------------|--------|----------|---------|----------|--------|
| family | -0.0140+++ | -4.83% | -0.0140+++ | -5.51% | -0.0014 | -0.56% | -0.0014 | -0.67% |
| Human capital | 0.0993 | 34.26% | 0.0993 | 39.09% | 0.0276 | 11.03% | 0.0276 | 13.16% |
| education | 0.0449+++ | 15.49% | 0.0449+++ | 17.68% | 0.0016 | 0.66% | 0.0016 | 0.78% |
| experience | -0.0001 | -0.03% | -0.0001 | -0.04% | 0.0126++ | 5.05% | 0.0125++ | 6.03% |
| oral german | 0.0455+++ | 15.70% | 0.0455+++ | 17.91% | 0.0047 | 1.86% | 0.0044 | 2.22% |
| written german | 0.0090 | 3.11% | 0.0090 | 3.54% | 0.0088 | 3.50% | 0.0088 | 4.17% |
| Sum of unexplained | 0.2126 | 73.36% | | | 0.3445 | 137.58% | | |
| Personality traits | 0.0161 | 5.55% | | | -0.0041 | -1.64% | | |
| Human capital | -0.8128 | -280.47% | | | 0.8880 | 354.65% | | |

Notes: For each variable or set of variables, reported are the net explained contribution of the raw wage gap and the percentage of the gap explained due to origin differences in values of each category of variables. Gelbach decomposition follows Gelbach (2016). Each specification also includes controls for age, age squared, married, and state effects. Education is a categorical variable, including elementary, vocational training, and higher education. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

6 Conclusion

The relevance of personality traits to the labor market success has been increasingly emphasized. However, economic examination of their importance in explaining the native-immigrant wage gap is almost unknown. I start the empirical part of the paper by analyzing how immigrants and Germans without migration backgrounds differentiate in terms of these skills and if they assimilate them. I find that, on average, immigrants have higher levels of conscientiousness, agreeableness, external locus of control, importance of success and family, and lower levels of emotional stability. Their personality is stable during their stay in the host country.

I emphasize that the paper does not have normative implications, meaning that I do not imply that immigrants should assimilate the personality of the receiving country. Research has been finding both positive and negative effects of cultural diversity on economic development (Alesina and Ferrara (2005), Ottaviano and Peri (2006)). The objective of the paper is to document what immigrants do and its consequences.

To measure the impact of native German and immigrant differences in these personality traits on the native-immigrant pay gap, I use Oaxaca-Blinder and Gelbach decompositions (Gelbach (2016)). I conclude that personality traits have, although not large, a significant impact on the wage gap, explaining about 7.17 percent of the gap for males and 4.22 for females. External locus of control is the factor that plays the most considerable role, accounting for 11.46 percent for males and 6.91 percent for females, while the Big Five Factor explains 5.54 and 3.9 percent. The impact of personality traits on the wage gap is reduced by the life goals, by 9.14 and 5.11 for males and females; although one should be careful interpreting the role of importance of family for females given that these traits seem to be more endogenous.

Even though personality traits seem to be stable, I cannot completely claim

having identified a causal effect of these traits on wages. It is a desirable goal to improve the labor market conditions of immigrants; however, it is debatable whether it would be good to achieve this goal by manipulating immigrants' personality; therefore, the direction of causality is not relevant for policymakers. Perhaps more interesting is how to improve immigrants' labor market outcomes considering their personality traits; for example, Kaur, Kremer, and Mullainathan (2010) demonstrate that workplace arrangements can mitigate self-control problems, raising labor productivity. A. McGee and McGee (2016) conclude that job search is linked to the locus of control in the absence of information about the impact of search effort on job offers, but this link disappears when subjects are told the exact relationship between effort and offers. Relating these ideas to improving immigrants' labor market outcomes is an exciting avenue for future research.

References

- Aldashev, A., Gernandt, J., & Thomsen, S. L. (2012). The immigrant-native wage gap in germany. *Jahrbücher für Nationalökonomie und Statistik*, 232(5), 490–517.
- Alesina, A., & Ferrara, E. L. (2005). Ethnic diversity and economic performance. *Journal of economic literature*, 43(3), 762–800.
- Algan, Y., Dustmann, C., Glitz, A., & Manning, A. (2010). The economic situation of first and second-generation immigrants in france, germany and the united kingdom. *The Economic Journal*, 120(542), F4–F30.
- Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2007). Life span theory in developmental psychology. *Handbook of child psychology*, 1.
- Bartolucci, C. (2014). Understanding the native–immigrant wage gap using matched employer–employee data: evidence from germany. *ILR Review*, 67(4), 1166–1202.
- Bauer, T., Dietz, B., Zimmermann, K. F., & Zwintz, E. (2005). German migration: Development, assimilation, and labour market effects. *European Migration: What do we know*, 197–261.
- Blinder, A. S. (1973). Wage discrimination: reduced form and structural estimates. *Journal of Human resources*, 436–455.
- Boneva, B. S., & Frieze, I. H. (2001). Toward a concept of a migrant personality. *Journal of Social Issues*, 57(3), 477–491.
- Brenzel, H., & Laible, M.-C. (2016). *Does personality matter? the impact of the big five on the migrant and gender wage gaps* (Tech. Rep.). IAB-Discussion Paper.
- Bütikofer, A., & Peri, G. (2018). The role of cognitive and noncognitive skills in selecting into migration. *NBER Working Paper*, 23877.
- Caliendo, M., Cobb-Clark, D. A., Hennecke, J., & Uhlendorff, A. (2019). Locus of control and internal migration. *Regional Science and Urban Economics*, 79, 103468.
- Caliendo, M., Cobb-Clark, D. A., Obst, C., Seitz, H., & Uhlendorff, A. (2020). Lo-

- cus of control and investment in training. *Journal of Human Resources*, 0318–9377R2.
- Caliendo, M., Cobb-Clark, D. A., & Uhlendorff, A. (2015). Locus of control and job search strategies. *Review of Economics and Statistics*, 97(1), 88–103.
- Cheng, C., Cheung, S. F., Chio, J. H.-m., & Chan, M.-p. S. (2013). Cultural meaning of perceived control: A meta-analysis of locus of control and psychological symptoms across 18 cultural regions. *Psychological bulletin*, 139(1), 152.
- Cobb-Clark, D. A. (2015). Locus of control and the labor market. *IZA Journal of Labor Economics*, 4(1), 3.
- Cobb-Clark, D. A., Kassenboehmer, S. C., & Schurer, S. (2014). Healthy habits: The connection between diet, exercise, and locus of control. *Journal of Economic Behavior & Organization*, 98, 1–28.
- Cobb-Clark, D. A., & Schurer, S. (2012). The stability of big-five personality traits. *Economics Letters*, 115(1), 11–15.
- Cobb-Clark, D. A., & Schurer, S. (2013). Two economists' musings on the stability of locus of control. *The Economic Journal*, 123(570), F358–F400.
- Costa, P. T., & McCrae, R. R. (1988). Personality in adulthood: a six-year longitudinal study of self-reports and spouse ratings on the neo personality inventory. *Journal of personality and social psychology*, 54(5), 853.
- Costa Jr, P. T., & McCrae, R. R. (2008). *The revised neo personality inventory (neo-pi-r)*. Sage Publications, Inc.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika*, 16(3), 297–334.
- Cunha, F., & Heckman, J. J. (2008). Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation. *Journal of human resources*, 43(4), 738–782.
- Cunha, F., Heckman, J. J., & Schennach, S. M. (2010). Estimating the technology of cognitive and noncognitive skill formation. *Econometrica*, 78(3), 883–931.
- Danzer, A. M., & Yaman, F. (2016). Ethnic concentration and language fluency of

- immigrants: Evidence from the guest-worker placement in germany. *Journal of Economic Behavior & Organization*, 131, 151–165.
- Dehne, M., & Schupp, J. (2007). Persönlichkeitsmerkmale im sozio-oekonomischen panel (soep)-konzept, umsetzung und empirische eigenschaften. *Research Notes*, 26(1), 70.
- Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the big five across the life span: evidence from two national samples. *Psychology and aging*, 23(3), 558.
- Dustmann, C., & Fabbri, F. (2003). Language proficiency and labour market performance of immigrants in the uk. *The economic journal*, 113(489), 695–717.
- Dustmann, C., & Glitz, A. (2011). Migration and education. In *Handbook of the economics of education* (Vol. 4, pp. 327–439). Elsevier.
- Fehr, E., & Gächter, S. (2000). Fairness and retaliation: The economics of reciprocity. *Journal of economic perspectives*, 14(3), 159–181.
- Fitzenberger, B., Mena, G., Nimczik, J., & Sunde, U. (2019). Personality traits across the life cycle: Disentangling age, period, and cohort effects.
- Fortin, N., Lemieux, T., & Firpo, S. (2011). Decomposition methods in economics. In *Handbook of labor economics* (Vol. 4, pp. 1–102). Elsevier.
- Fortin, N. M. (2008). The gender wage gap among young adults in the united states the importance of money versus people. *Journal of Human Resources*, 43(4), 884–918.
- Friehe, T., Pannenberg, M., & Wedow, M. (2015). Let bygones be bygones? socialist regimes and personalities in germany.
- Gardeazabal, J., & Ugidos, A. (2004). More on identification in detailed wage decompositions. *Review of Economics and Statistics*, 86(4), 1034–1036.
- Gelbach, J. B. (2016). When do covariates matter? and which ones, and how much? *Journal of Labor Economics*, 34(2), 509–543.
- Grove, W. A., Hussey, A., & Jetter, M. (2011). The gender pay gap beyond human capital heterogeneity in noncognitive skills and in labor market tastes. *Journal*

of *Human Resources*, 46(4), 827–874.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the econometric society*, 153–161.

Heckman, J. J., Stixrud, J., & Urzua, S. (2006). The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. *Journal of Labor economics*, 24(3), 411–482.

Heine, S. J., Buchtel, E. E., & Norenzayan, A. (2008). What do cross-national comparisons of personality traits tell us? the case of conscientiousness. *Psychological Science*, 19(4), 309–313.

Heineck, G., & Anger, S. (2010). The returns to cognitive abilities and personality traits in germany. *Labour economics*, 17(3), 535–546.

Jaeger, D. A., Dohmen, T., Falk, A., Huffman, D., Sunde, U., & Bonin, H. (2010). Direct evidence on risk attitudes and migration. *The Review of Economics and Statistics*, 92(3), 684–689.

Jann, B. (2008). The blinder–oaxaca decomposition for linear regression models. *The Stata Journal*, 8(4), 453–479.

Jokela, M. (2009). Personality predicts migration within and between us states. *Journal of Research in Personality*, 43(1), 79–83.

Kaas, L., & Manger, C. (2012). Ethnic discrimination in germany's labour market: a field experiment. *German economic review*, 13(1), 1–20.

Kaur, S., Kremer, M., & Mullainathan, S. (2010). Self-control and the development of work arrangements. *American Economic Review*, 100(2), 624–28.

Lang, F. R., John, D., Lüdtke, O., Schupp, J., & Wagner, G. G. (2011). Short assessment of the big five: Robust across survey methods except telephone interviewing. *Behavior research methods*, 43(2), 548–567.

Lindqvist, E., & Vestman, R. (2011). The labor market returns to cognitive and noncognitive ability: Evidence from the swedish enlistment. *American Economic Journal: Applied Economics*, 3(1), 101–28.

Löckenhoff, C. E., Terracciano, A., Patriciu, N. S., Eaton, W. W., & Costa Jr, P. T.

- (2009). Self-reported extremely adverse life events and longitudinal changes in five-factor model personality traits in an urban sample. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, 22(1), 53–59.
- McCrae, R. R., Costa, P. T., de Lima, M. P., Simões, A., Ostendorf, F., Angleitner, A., . . . others (1999). Age differences in personality across the adult life span: parallels in five cultures. *Developmental psychology*, 35(2), 466.
- McCrae, R. R., & Costa Jr, P. T. (2008). The five-factor theory of personality.
- McCrae, R. R., Costa Jr, P. T., Del Pilar, G. H., Rolland, J.-P., & Parker, W. D. (1998). Cross-cultural assessment of the five-factor model: The revised neo personality inventory. *Journal of Cross-Cultural Psychology*, 29(1), 171–188.
- McCrae, R. R., Costa Jr, P. T., Ostendorf, F., Angleitner, A., Hřebíčková, M., Avia, M. D., . . . others (2000). Nature over nurture: temperament, personality, and life span development. *Journal of personality and social psychology*, 78(1), 173.
- McGee, A., & McGee, P. (2016). Search, effort, and locus of control. *Journal of Economic Behavior & Organization*, 126, 89–101.
- McGee, A. D. (2015). How the perception of control influences unemployed job search. *ILR Review*, 68(1), 184–211.
- Mundlak, Y. (1978). On the pooling of time series and cross section data. *Econometrica: journal of the Econometric Society*, 69–85.
- Naghsh Nejad, M., & Schurer, S. (2019). Cognitive and non-cognitive abilities of immigrants: New perspectives on migrant quality from a selective immigration country.
- Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International economic review*, 693–709.
- Ottaviano, G. I., & Peri, G. (2006). The economic value of cultural diversity: evidence from us cities. *Journal of Economic geography*, 6(1), 9–44.
- Piatek, R., & Pinger, P. (2016). Maintaining (locus of) control? data combination for the identification and inference of factor structure models. *Journal of Applied*

Econometrics, 31(4), 734–755.

- Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating five factor theory and social investment perspectives on personality trait development. *Journal of Research in Personality*, 39(1), 166–184.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological monographs: General and applied*, 80(1), 1.
- Schmitt, D. P., & Allik, J. (2005). Simultaneous administration of the rosenberg self-esteem scale in 53 nations: exploring the universal and culture-specific features of global self-esteem. *Journal of personality and social psychology*, 89(4), 623.
- Schmitt, D. P., Allik, J., McCrae, R. R., & Benet-Martínez, V. (2007). The geographic distribution of big five personality traits: Patterns and profiles of human self-description across 56 nations. *Journal of cross-cultural psychology*, 38(2), 173–212.
- Scollon, C. N., & Diener, E. (2006). Love, work, and changes in extraversion and neuroticism over time. *Journal of personality and social psychology*, 91(6), 1152.
- Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: the impact of age and major life events on mean-level and rank-order stability of the big five. *Journal of personality and social psychology*, 101(4), 862.
- Thum-Thysen, A. (2016). ? *IZA Journal of Migration*, 5(1), 16.
- Urzua, S. (2008). Racial labor market gaps the role of abilities and schooling choices. *Journal of Human Resources*, 43(4), 919–971.
- Verbeek, M., & Nijman, T. (1992). Testing for selectivity bias in panel data models. *International Economic Review*, 681–703.
- Wagner, G. G., Frick, J. R., & Schupp, J. (2007). *The german socio-economic panel study (soep): Scope, evolution and enhancements* (Tech. Rep.). SOEPpapers on Multidisciplinary Panel Data Research.
- Weber, E. U., & Hsee, C. (1998). Cross-cultural differences in risk perception, but

cross-cultural similarities in attitudes towards perceived risk. *Management science*, 44(9), 1205–1217.

Weinhardt, M., & Schupp, J. (2014). *Multi-itemskalen im soep jugendfragebogen* (Tech. Rep.). SOEP Survey Papers.

Wooldridge, J. M. (2019). Correlated random effects models with unbalanced panels. *Journal of Econometrics*, 211(1), 137–150.

Zhao, H., & Seibert, S. E. (2006). The big five personality dimensions and entrepreneurial status: A meta-analytical review. *Journal of applied psychology*, 91(2), 259.

Table A1: SOEP questions and personality traits (FFM, locus of control, reciprocity, life goals and risk) used in the analysis

| | Variable label | Survey years | Cronbach alpha |
|--|----------------|------------------------|----------------|
| Five Factor Model | | | |
| Scale: 1-point 1 (does not apply) to 7 (applies perfectly) | | | |
| I see myself as someone who... | | | |
| <i>Openness to experience</i> | | | |
| is original | | 2005, 2009, 2013, 2017 | |
| values artistic experiences | | 2005, 2009, 2013, 2017 | 0.60 |
| has a lively imagination | | 2005, 2009, 2013, 2017 | |
| <i>Conscientiousness</i> | | | |
| thorough worker | | 2005, 2009, 2013, 2017 | |
| carry out tasks efficiently | | 2005, 2009, 2013, 2017 | 0.59 |
| tends to be lazy (<i>reversed</i>) | | 2005, 2009, 2013, 2017 | |
| <i>Extraversion</i> | | | |
| is communicative | | 2005, 2009, 2013, 2017 | |
| is sociable | | 2005, 2009, 2013, 2017 | 0.69 |
| is reserved (<i>reversed</i>) | | 2005, 2009, 2013, 2017 | |
| <i>Agreeableness</i> | | | |
| is sometimes too coarse with others (<i>reversed</i>) | | 2005, 2009, 2013, 2017 | |

| | | |
|----------------------------|------------------------|------|
| is able to forgive | 2005, 2009, 2013, 2017 | 0.48 |
| is friendly with others | 2005, 2009, 2013, 2017 | |
| <i>Emotional stability</i> | | |
| worries a lot | 2005, 2009, 2013, 2017 | |
| is somewhat nervous | 2005, 2009, 2013, 2017 | 0.63 |
| deals well with stress | 2005, 2009, 2013, 2017 | |

Locus of Control

Scale: 1-point 1 (does not apply) to 7 (applies perfectly)

The following statements apply to different attitudes towards life and the future.

38

To what degree do you personally agree with the following statements:

Internal

My life course depends on me

2005, 2010, 2015

If a person is socially or politically active, he/she can have an effect on social conditions

2005, 2010, 2015

One has to work hard in order to succeed

2005, 2010, 2015

External

Compared to other people, I have not achieved what I deserve

2005, 2010, 2015

I frequently have the experience that other people have a controlling influence over my life

2005, 2010, 2015

If I run up against difficulties in my life, I often doubt my own abilities

2005, 2010, 2015

The opportunities that I have in life are determined by the social conditions

2005, 2010, 2015

0.55

| | |
|--|--|
| Innate abilities are more important than any efforts one can make | 2005, 2010, 2015 |
| I have little control over the things that happen in my life | 2005, 2010, 2015 |
| Reciprocity | |
| Scale: 1-point 1 (does not apply) to 7 (applies perfectly) | |
| To what degree do the following statements apply to you personally | |
| <i>Positive</i> | |
| Willingness to return favours | 2005, 2010, 2015 |
| Help those who help me | 2005, 2010, 2015 |
| Help those who have helped me in the past | 2005, 2010, 2015 |
| <i>Negative</i> | |
| Get revenge for severe injustices | 2005, 2010, 2015 |
| Cause similar problems to those who cause me problems | 2005, 2010, 2015 |
| Insult those who insult me | 2005, 2010, 2015 |
| Life Goals | |
| Scale: 1-point 1 (not at all important) to 4 (very important) | |
| Are the following things currently...for you | |
| <i>Success</i> | |
| to be able to afford something | 1990, 1992, 1995, 2004, 2008, 2012, 2016 |
| to fulfill one's potential | 1990, 1992, 1995, 2004, 2008, 2012, 2016 |

| | | |
|--|--|------|
| to have success in the job | 1990, 1992, 1995, 2004, 2008, 2012, 2016 | |
| to be able to travel and see the world | 1990, 1992, 1995, 2004, 2008, 2012, 2016 | |
| <i>Family</i> | | |
| having a happy marriage/relationship | 1990, 1992, 1995, 2004, 2008, 2012, 2016 | |
| having children | 1990, 1992, 1995, 2004, 2008, 2012, 2016 | 0.52 |
| having own house | 1990, 1992, 1995, 2004, 2008, 2012, 2016 | |
| <i>Altruism</i> | | |
| being there for the others | 1990, 1992, 1995, 2004, 2008, 2012, 2016 | 0.24 |
| being politically and/or socially involved | 1990, 1992, 1995, 2004, 2008, 2012, 2016 | |

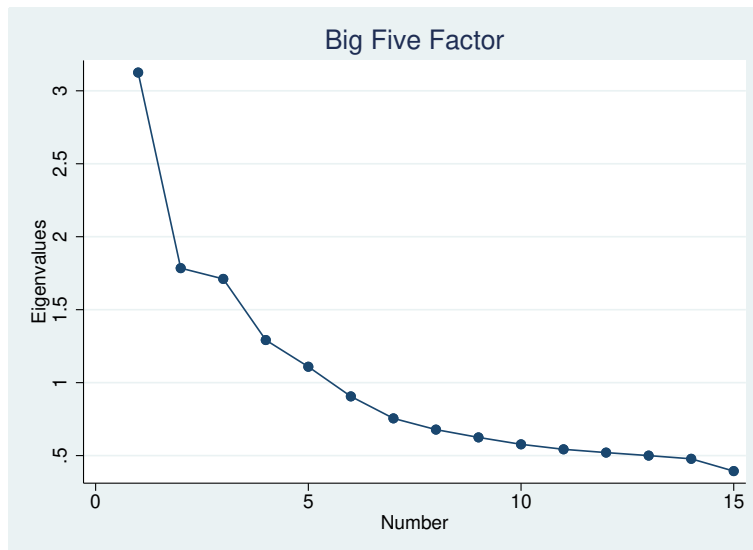
A Exploratory Factor Analysis

I conduct exploratory factor analysis (EFA) for each personality trait (Big Five Factor, locus of control, reciprocity, and life goals) and determine the number of factors that should be extracted from the data. I did not joint all items, given that the SOEP tries to analyze each personality trait in different years. Hence, I let the data indicate the potential factor structure and related latent traits. To determine the underlying dimension of each personality trait, I conduct a scree plot analysis and use the Kaiser criterion that recommends dropping all components with eigenvalues under 1.0.

A.1 Big Five Factor

The scree plot confirms that the factor model is correctly composed of five trait dimensions. From the result of the factor analysis, factor loadings have been found, shown in Table A2; it is seen that three variables are strongly correlated with each factor (in bold), meaning that my conclusions are under the SOEP.

Figure A.1: Scree plot: Big Five Factor



Source: SOEP.

Table A2: Factor loadings of Big Five Factor Model

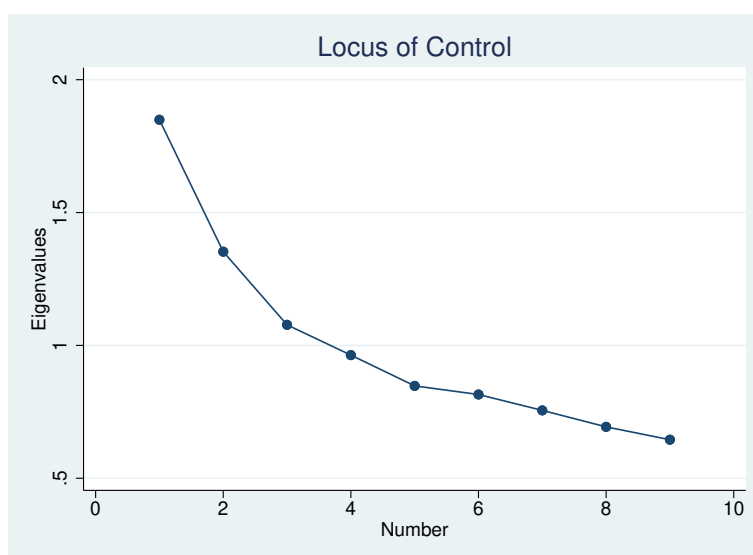
| Item | Extraversion | Conscientiousness | Openness | Emotional stability | Agreeableness |
|---------------|-----------------|-------------------|-----------------|---------------------|-----------------|
| original | .2713396 | .2375869 | .6726329 | .1125457 | -.1595809 |
| imagination | .1764442 | -.0139132 | .7456181 | -.0278203 | .0540466 |
| artistic | .032979 | -.0213525 | .6499491 | -.0390763 | .1932738 |
| efficient | .0644586 | .7568355 | .1953783 | .0816525 | .0828652 |
| thorough | .0453806 | .8259931 | .0454709 | .0007831 | .0499977 |
| lazy | .130122 | .6274982 | -.23251 | .0367873 | .1706307 |
| communicative | .7606782 | .2088011 | .2344115 | -.0148259 | .109209 |
| sociable | .7551641 | .0968769 | .2693432 | .0388816 | .1402784 |
| reserved | .784287 | -.0887648 | -.0980238 | .1372872 | -.1810359 |
| coarse | -.0826841 | .0303022 | -.1753213 | .1443058 | .7564795 |
| forgive | .1478577 | .0628289 | .1551181 | .0113941 | .5717168 |
| friendly | .0825679 | .2367127 | .2212529 | -.0505029 | .7164275 |
| worry | .058874 | -.1507387 | -.0860345 | .7438296 | -.0279177 |
| nervous | .0882537 | .0951494 | -.0605941 | .8006399 | .0333847 |
| stress | .0218781 | .1745756 | .2592505 | .7005945 | .1122915 |

Respective factor items in bold.
Source: SOEP.

A.2 Locus of Control

Conducting a scree plot analysis displayed in Figure A.2, one can see that this analysis suggests three factors with three eigenvalues larger than one. Table A3 shows that the external locus of control measures load very highly on factor 1 (external locus of control).

Figure A.2: Scree plot: Locus of Control



Source: SOEP.

Table A3: Factor loadings of Locus of Control

| | Factor1 | Factor2 | Factor3 |
|-------------|-----------------|-----------------|-----------------|
| life course | -.3530264 | .6491434 | .1816449 |
| influence | -.0224613 | .0509586 | .8130535 |
| hard work | .0829938 | .6959214 | -.1261346 |
| deserve | .6505367 | -.0287504 | -.1213054 |
| luck | .6822424 | .1107368 | -.0034785 |
| doubt | .6033012 | -.1312268 | .1090813 |
| social | .5949288 | .0880339 | .1296227 |
| effort | .3006279 | .6280885 | .0073955 |
| control | .1256172 | -.1174912 | .5714721 |

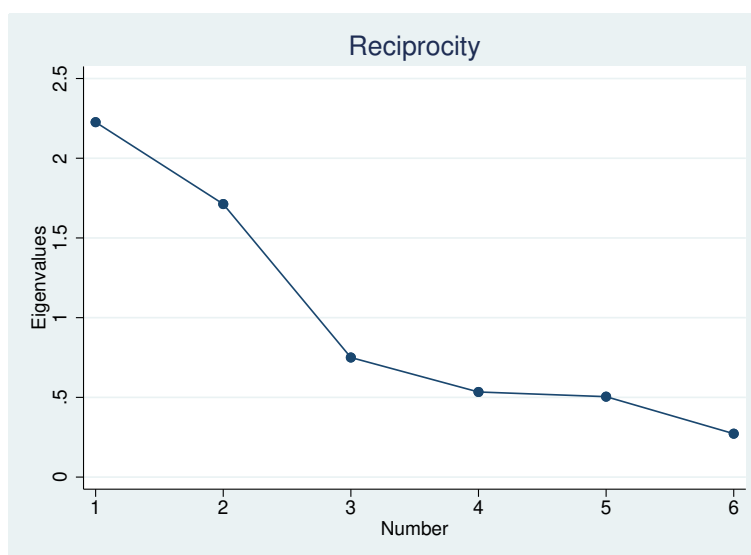
Respective factor items in bold.

Source: SOEP.

A.3 Reciprocity

The scree plot analysis displayed in Figure A.3 suggests two factors, two eigenvalues larger than one. The factor loadings found in Table A4 demonstrate that three variables are mainly related to each factor (in bold). The first factor mostly captures negative reciprocity and the second factor captures mostly positive reciprocity.

Figure A.3: Scree plot: Reciprocity



Source: SOEP.

Table A4: Factor loadings of Reciprocity

| | Negative | Positive |
|-----------|-----------------|-----------------|
| favours | -.0969368 | .6915756 |
| help who | .046841 | .8220389 |
| help past | .0336083 | .7437042 |
| revenge | .8785169 | .0282004 |
| payback | .8961892 | -.0133624 |
| insult | .7993971 | -.0023259 |

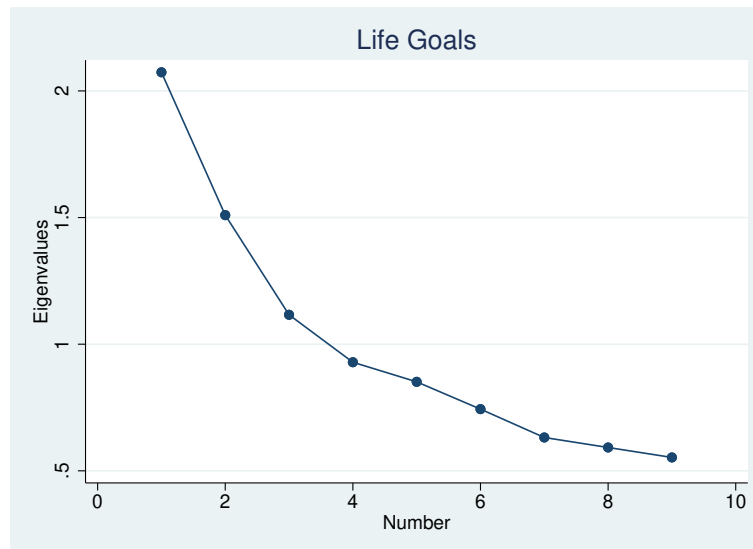
Respective factor items in bold.

Source: SOEP.

A.4 Life Goals

With three eigenvalues larger than one, the scree plot displayed in Figure A.4 suggests three underlying factors. The factor loadings found, in Table A5, demonstrate that the first factor has four variables strongly correlated with the importance of success; the second factor shows that three variables are associated with the importance of family, and the third factor shows two variables strongly related with the importance of altruism.²² I decided not to include the factor altruism given its low Cronbach alpha, only 0.2376.

Figure A.4: Scree plot: Life Goals



Source: SOEP.

²²The names of the factors were given after the computation and analyzing which measures did they capture.

Table A5: Factor loadings of Life Goals

| | Success | Family | Altruism |
|------------------|-----------------|-----------------|-----------------|
| afford | .6777116 | .1160742 | -.3161942 |
| help others | .100984 | .3786754 | .5035712 |
| potential | .6895485 | -.0370729 | .2942466 |
| success | .7149203 | .0483197 | .0803813 |
| happy marriage | .1084534 | .716369 | .0731103 |
| have children | -.1319574 | .7824328 | .1361936 |
| political active | .1057 | .0651268 | .7671652 |
| travel | .5215244 | -.0981819 | .2615573 |
| own house | .2714691 | .5920771 | -.2819703 |

Respective factor items in bold.

Source: SOEP.

A.5 Tucker's Congruent Coefficient

One of the possible concerns in this paper is reference bias. Self-report questions can be misleading when comparing levels of personality skills across different groups of people. For example, the SOEP asks respondents to rate themselves how much they consider lazy (from 1 to 7). Furthermore, immigrants can opt from completing the survey in German or their native language. Answering this question forces them to interpret the definition of "lazy" which likely involves comparing themselves to others. Comparing traits across groups can be misleading if the two groups have different standards or reference points. I believe that this is not such a concern in this paper as is typical in the cross-country papers in psychology. Immigrants live, work, and interact with Germans and probably compare themselves with a majority of Germans. Even though I test how much the reference bias is a concern in the paper using Tucker's congruent coefficient.

Tucker's congruent coefficient (congruence coefficient) is an index of the similarity between factors that have been derived from a factor analysis applied to two different populations.

After applying the EFA to West Germans and immigrants, I calculate the con-

gruence coefficient using the following formula:

$$\varphi(\mathbf{x}, \mathbf{y}) = \frac{\sum_i x_i y_i}{\sqrt{(\sum_i x_i^2)(\sum_i y_i^2)}} \quad (6)$$

where $x_{i,j}$ and $y_{i,j}$ are the loadings of item i on factors x and y , respectively (each one extracted from applying the EFA of the same items to West Germans and immigrants).

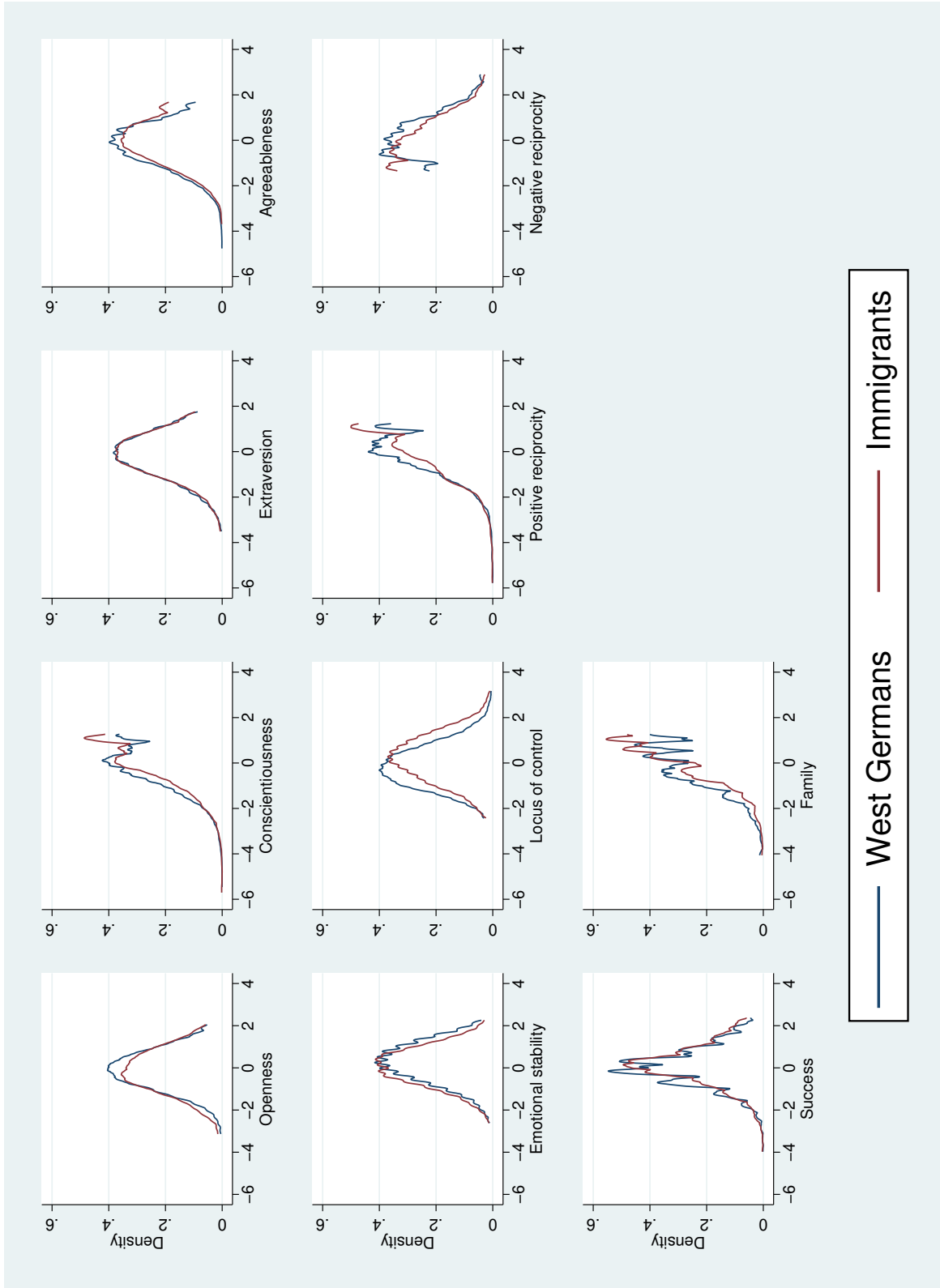
Table A6 presents the obtained values of the congruence coefficient. All the values obtained are above 0.95, indicating that the factors can be considered equal, except for success higher than 0.9, meaning a high degree of factor similarity.

Table A6: Congruence coefficient

| Big Five Factor | |
|---------------------|-----------|
| Conscientiousness | 0.9913346 |
| Extraversion | 0.9866058 |
| Openness | 0.9804552 |
| Emotional stability | 0.9873428 |
| Agreeableness | 0.9744042 |
| Locus of Control | |
| | 0.9994504 |
| Reciprocity | |
| Negative | 0.9942785 |
| Positive | 0.9982447 |
| Life Goals | |
| Success | 0.9384268 |
| Family | 0.9637710 |

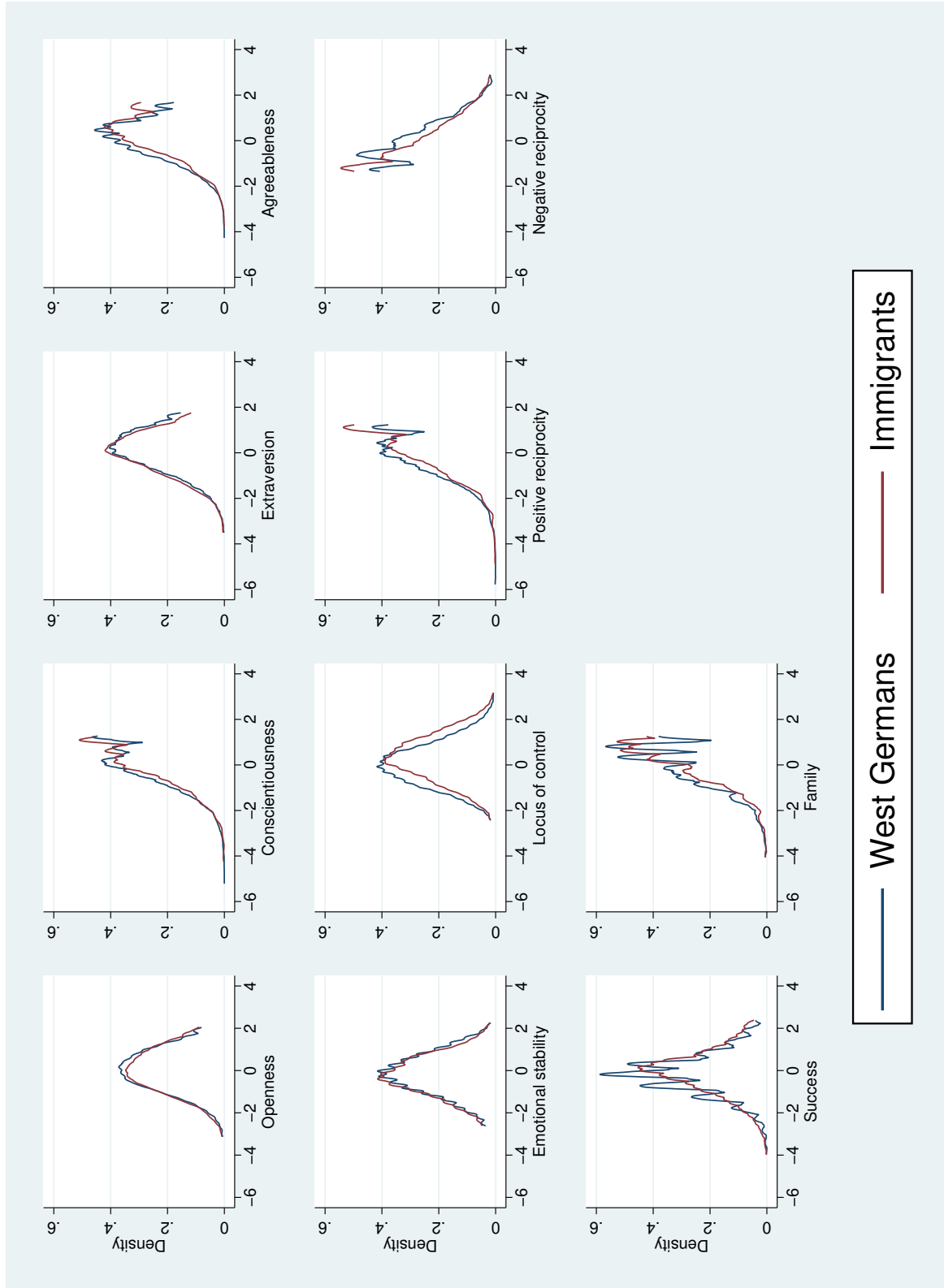
Source: SOEP.

Figure A.5: Distribution of personality traits by origin - males



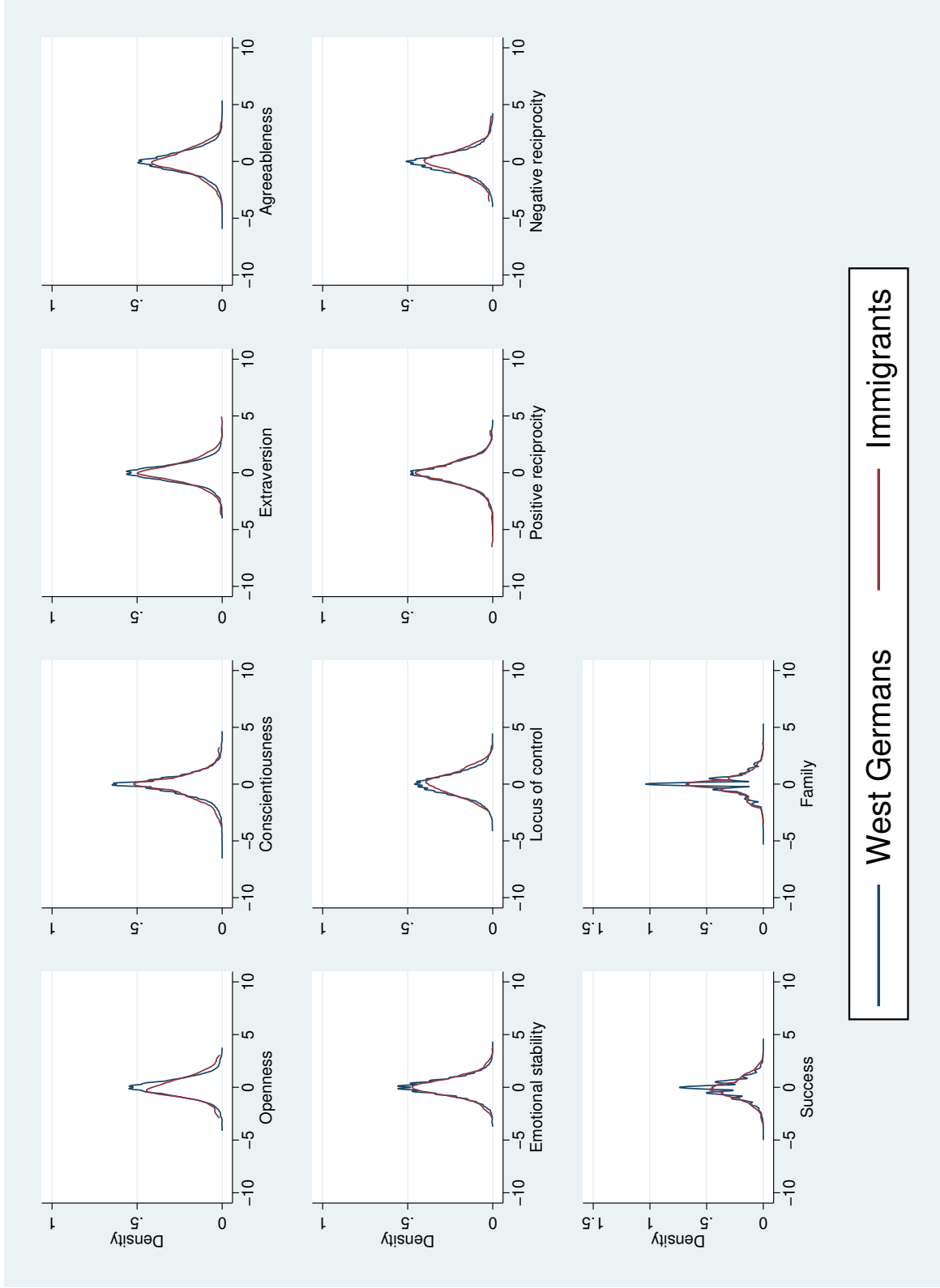
Source: SOEP.

Figure A.6: Distribution of personality traits by origin - females



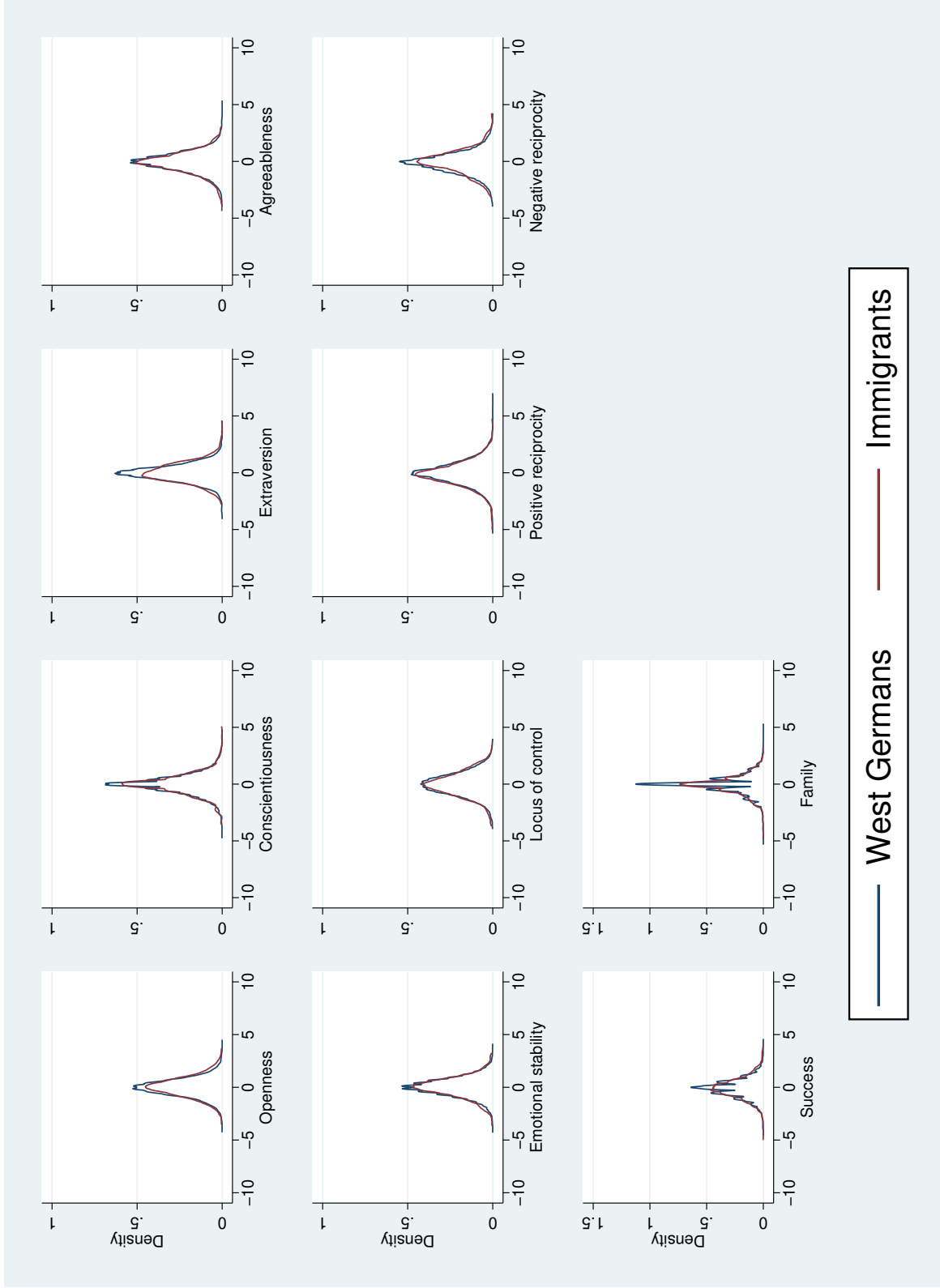
Source: SOEP.

Figure A.7: Distribution of changes in personality traits by origin - males



Notes. For FFM and life goals measures, changes are in a four-year period; for locus of control and reciprocity changes are in a five-year period. Panel analysis.

Figure A.8: Distribution of changes in personality traits by origin - females



Notes. For FFM and life goals measures, changes are in a four-year period; for locus of control and reciprocity changes are in a five-year period. Panel analysis.

Table A7: Native-migrant gap in personality traits for males

| | Openness | Conscientiousness | Extraversion | Agreeableness | Neuroticism | Locus of control | Positive reciprocity | Negative reciprocity | Success | Family |
|-------------------------|------------------------|----------------------------|-------------------------|---------------------------|--------------------------|------------------------|---------------------------|-------------------------|-------------------------|-----------------------------|
| immigrants | 0.0463 (0.0595) | 0.289+++ (0.0593) | -0.0117 (0.0587) | 0.191+++ (0.0598) | -0.216+++ (0.0542) | 0.309+++ (0.0697) | -0.0140 (0.0755) | -0.0281 (0.0706) | 0.389+++ (0.0453) | 0.238+++ (0.0387) |
| years of migration | 0.0113 (0.0102) | -0.0142 (0.00981) | 0.0123 (0.00901) | 0.00822 (0.0104) | 0.000838 (0.00910) | 0.0279++ (0.0122) | 0.00900 (0.0148) | 0.00338 (0.0127) | -0.00210 (0.00570) | -0.00439 (0.00526) |
| age | -0.0136 (0.0151) | 0.0652+++ (0.0173) | 0.00662 (0.0146) | 0.00410 (0.0170) | -0.0198 (0.0142) | -0.0312 (0.0208) | 0.0273 (0.0236) | 0.0185 (0.0216) | -0.0424+++ (0.0102) | 0.0271++ (0.0111) |
| age squared | 0.000178 (0.000131) | -0.000314+++ (0.000147) | 0.0000672 (0.000130) | -0.00000886 (0.000153) | 0.000279++ (0.000128) | 0.000125 (0.000178) | -0.000439++ (0.000202) | -0.000145 (0.000190) | 0.000116 (0.0000893) | -0.000299+++ (0.0000951) |
| married | -0.0641 (0.0419) | -0.0559 (0.0460) | -0.0476 (0.0407) | -0.0201 (0.0509) | 0.00883 (0.0450) | -0.0991+ (0.0602) | 0.0122 (0.0660) | 0.0143 (0.0623) | -0.147+++ (0.0338) | 0.507+++ (0.0395) |
| divorced | 0.0215 (0.0673) | -0.0897 (0.0724) | 0.0231 (0.0624) | 0.123 (0.0802) | 0.151++ (0.0675) | -0.103 (0.0949) | 0.110 (0.104) | -0.0709 (0.0989) | -0.152+++ (0.0499) | 0.0710 (0.0626) |
| vocational training | -0.0689 (0.138) | 0.194 (0.248) | -0.471++ (0.222) | -0.524++ (0.219) | 0.163 (0.172) | -0.112 (0.321) | -0.361 (0.278) | -0.142 (0.202) | 0.0110 (0.0589) | 0.0511 (0.0680) |
| higher education | -0.0605 (0.152) | 0.319 (0.265) | -0.570++ (0.233) | -0.426+ (0.227) | 0.100 (0.179) | 0.0293 (0.333) | -0.241 (0.292) | -0.220 (0.224) | -0.0379 (0.0691) | 0.119 (0.0783) |
| part-time | -0.0130 (0.0525) | 0.171+++ (0.0631) | -0.0316 (0.0558) | -0.0254 (0.0621) | 0.166+++ (0.0525) | 0.102 (0.0732) | 0.114 (0.0767) | 0.0749 (0.0806) | 0.0783+ (0.0440) | 0.104++ (0.0446) |
| full-time | -0.0281 (0.0380) | 0.108++ (0.0478) | 0.0311 (0.0416) | -0.0710 (0.0451) | 0.0762+ (0.0407) | 0.0195 (0.0599) | -0.0111 (0.0623) | 0.0244 (0.0598) | 0.122+++ (0.0306) | 0.0559+ (0.0318) |
| full-time experience | -0.00807 (0.0107) | -0.0273++ (0.0130) | -0.0210+ (0.0108) | -0.0140 (0.0121) | -0.00217 (0.00969) | 0.0179 (0.0143) | 0.0129 (0.0162) | 0.0105 (0.0143) | 0.0142+ (0.00795) | -0.0129 (0.00842) |
| part-time experience | 0.00185 (0.0127) | -0.0151 (0.0152) | -0.00989 (0.0120) | -0.000799 (0.0133) | 0.0147 (0.0119) | -0.00115 (0.0166) | 0.00251 (0.0206) | 0.0130 (0.0192) | 0.0138 (0.0102) | -0.0287+++ (0.0111) |
| unemployment Experience | 0.000558 (0.0175) | -0.0291 (0.0212) | -0.0244 (0.0202) | 0.00118 (0.0233) | -0.0382++ (0.0161) | 0.0141 (0.0222) | 0.0148 (0.0263) | -0.0251 (0.0263) | 0.00888 (0.0135) | -0.0322++ (0.0155) |
| (log) household income | 0.00529 (0.0301) | -0.00153 (0.0339) | 0.0113 (0.0287) | -0.0647+ (0.0353) | 0.0487 (0.0299) | -0.0317 (0.0418) | -0.0632 (0.0462) | 0.0440 (0.0456) | 0.0511++ (0.0215) | 0.0779+++ (0.0236) |
| health satisfaction | 0.0445+++ (0.0127) | 0.0870+++ (0.0145) | 0.0601+++ (0.0124) | 0.0680+++ (0.0143) | 0.154+++ (0.0126) | -0.0865+++ (0.0185) | 0.0418++ (0.0197) | -0.0345++ (0.0174) | 0.0499+++ (0.00960) | 0.0171+ (0.00939) |
| Observations | 14318 | 14318 | 14318 | 14318 | 14318 | 11320 | 11320 | 11320 | 23756 | 23756 |

Correlated random effects model. All regressions include state and year effects.

Standard errors clustered at the individual level in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

Table A8: Native-migrant gap in personality traits for females

| | Openness | Conscientiousness | Extraversion | Agreeableness | Neuroticism | Locus of control | Positive reciprocity | Negative reciprocity | Success | Family |
|-------------------------|-------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|-------------------------|------------------------|----------------------------|----------------------------|
| immigrants | 0.0846 (0.0558) | 0.194+++ (0.0498) | -0.121++ (0.0508) | 0.221+++ (0.0513) | -0.0539 (0.0501) | 0.341+++ (0.0555) | 0.180+++ (0.0594) | -0.0453 (0.0618) | 0.451+++ (0.0418) | 0.190+++ (0.0368) |
| years of migration | 0.00964 (0.00798) | 0.00908 (0.00751) | 0.0129+ (0.00733) | -0.0135+ (0.00773) | -0.00771 (0.00777) | -0.00396 (0.0109) | -0.00394 (0.0115) | 0.00623 (0.0107) | -0.00382 (0.00558) | -0.00910++ (0.00442) |
| age | -0.0351+++ (0.0118) | 0.0262++ (0.0126) | 0.00932 (0.0112) | 0.00511 (0.0124) | 0.0121 (0.0126) | 0.0131 (0.0165) | -0.00310 (0.0179) | -0.000684 (0.0161) | -0.0446+++ (0.00762) | 0.00633 (0.00723) |
| age squared | 0.000222+ (0.000117) | -0.000363+++ (0.000126) | -0.000237++ (0.000108) | -0.0000539 (0.000125) | -0.000239+ (0.000123) | -0.0000220 (0.000168) | -0.000136 (0.000181) | 0.000139 (0.000162) | 0.000325+++ (0.0000837) | -0.000178++ (0.0000782) |
| married | -0.107++ (0.0456) | -0.0446 (0.0513) | -0.0635 (0.0441) | -0.0459 (0.0561) | -0.0625 (0.0487) | -0.0761 (0.0674) | 0.00601 (0.0733) | 0.137++ (0.0682) | -0.129+++ (0.0374) | 0.279+++ (0.0361) |
| divorced | -0.0496 (0.0681) | -0.0784 (0.0754) | -0.0350 (0.0625) | 0.0430 (0.0793) | -0.00818 (0.0701) | -0.156+ (0.0917) | -0.127 (0.101) | 0.0982 (0.0915) | -0.104++ (0.0518) | 0.0268 (0.0478) |
| vocational training | -0.0417 (0.0951) | 0.0384 (0.121) | -0.101 (0.119) | -0.0333 (0.132) | -0.137 (0.151) | 0.149 (0.269) | 0.0217 (0.264) | -0.246 (0.159) | -0.0472 (0.0540) | 0.170+++ (0.0479) |
| higher education | 0.0224 (0.107) | 0.163 (0.136) | -0.198 (0.125) | 0.0944 (0.147) | -0.206 (0.164) | 0.0887 (0.271) | 0.265 (0.280) | -0.415+++ (0.174) | -0.0716 (0.0666) | 0.260+++ (0.0606) |
| part-time | 0.0647++ (0.0268) | 0.0775+++ (0.0296) | 0.0357 (0.0249) | 0.00636 (0.0287) | 0.00336 (0.0282) | 0.0152 (0.0399) | -0.00764 (0.0424) | 0.0109 (0.0352) | 0.220+++ (0.0208) | -0.0359+++ (0.0180) |
| full-time | 0.0467 (0.0314) | 0.126+++ (0.0341) | 0.0356 (0.0297) | -0.0185 (0.0342) | -0.000528 (0.0341) | -0.00293 (0.0483) | 0.00602 (0.0505) | 0.0458 (0.0437) | 0.343+++ (0.0249) | -0.108+++ (0.0221) |
| full-time experience | 0.00364 (0.00632) | 0.00975 (0.00676) | -0.0127++ (0.00607) | -0.00597 (0.00662) | 0.0109+ (0.00663) | -0.0103 (0.00862) | 0.00649 (0.00953) | -0.00268 (0.00845) | -0.00387 (0.00395) | -0.000724 (0.00386) |
| part-time experience | 0.00547 (0.00603) | 0.0121+ (0.00648) | -0.000711 (0.00556) | 0.00168 (0.00610) | 0.0130++ (0.00602) | 0.00000896 (0.00796) | 0.00667 (0.00889) | 0.000579 (0.00794) | 0.00835++ (0.00394) | -0.00152 (0.00373) |
| unemployment experience | -0.00130 (0.0177) | 0.0185 (0.0167) | -0.00648 (0.0140) | 0.00948 (0.0162) | 0.0175 (0.0161) | 0.00176 (0.0191) | -0.00414 (0.0293) | -0.0367+ (0.0214) | -0.00138 (0.0118) | -0.000507 (0.0103) |
| (log) household income | 0.0145 (0.0259) | -0.0179 (0.0291) | 0.0174 (0.0243) | -0.0172 (0.0259) | 0.0282 (0.0263) | -0.0772++ (0.0394) | 0.0809+ (0.0437) | 0.0168 (0.0364) | 0.0353+ (0.0205) | 0.159+++ (0.0204) |
| health satisfaction | 0.0537+++ (0.0112) | 0.0435+++ (0.0118) | 0.0647+++ (0.0103) | 0.0438+++ (0.0122) | 0.146+++ (0.0116) | -0.0766+++ (0.0168) | 0.0181 (0.0181) | -0.0147 (0.0170) | 0.0446+++ (0.00878) | 0.0120 (0.00756) |
| Observations | 16781 | 16781 | 16781 | 16781 | 16781 | 13226 | 13226 | 13226 | 26889 | 26889 |

Correlated random effects model. All regression include state and year effects.

Standard errors clustered at the individual level in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

Table A9: Native-migrant gap in personality traits by gender - permanent immigrants

| | Openness | Conscientiousness | Extraversion | Agreeableness | Emotional stability | Locus of control | Positive reciprocity | Negative reciprocity | Success | Family |
|--------------------|----------------------|----------------------|----------------------|-----------------------|------------------------|----------------------|----------------------|----------------------|-----------------------|-------------------------|
| Male | | | | | | | | | | |
| Immigrants | 0.0460 (0.0605) | 0.293+++ (0.0598) | -0.0187 (0.0596) | 0.194+++ (0.0606) | -0.213+++ (0.0550) | 0.298+++ (0.0703) | -0.0343 (0.0765) | -0.0274 (0.0719) | 0.399+++ (0.0461) | 0.230+++ (0.0398) |
| years of migration | 0.0112 (0.0102) | -0.0148 (0.00982) | 0.0131 (0.00902) | 0.00744 (0.0104) | 0.0000461 (0.00910) | 0.0297++ (0.0122) | 0.00820 (0.0149) | 0.00446 (0.0127) | -0.00319 (0.00575) | -0.00490 (0.00528) |
| Observations | 14244 | 14244 | 14244 | 14244 | 14244 | 11244 | 11244 | 11244 | 23543 | 23543 |
| Female | | | | | | | | | | |
| immigrants | 0.0854 (0.0567) | 0.196+++ (0.0500) | -0.128++ (0.0516) | 0.217+++ (0.0519) | -0.0599 (0.0509) | 0.337+++ (0.0570) | 0.194+++ (0.0602) | -0.0533 (0.0632) | 0.467+++ (0.0429) | 0.195+++ (0.0380) |
| years of migration | 0.00979 (0.00800) | 0.00941 (0.00754) | 0.0133+ (0.00736) | -0.0132+ (0.00777) | -0.00737 (0.00780) | -0.00463 (0.0110) | -0.00313 (0.0115) | 0.00586 (0.0108) | -0.00424 (0.00565) | -0.00967++ (0.00446) |
| Observations | 16678 | 16678 | 16678 | 16678 | 16678 | 13126 | 13126 | 13126 | 26631 | 26631 |

Correlated random effects model. Controls included in all regressions are age, age squared, married, divorced, (single is the omitted category); vocational training, higher education, (elementary education is the omitted category); part-time, full-time, (unemployed is the omitted category); experience in full-time, part-time and unemployment; (log) household income and health satisfaction. Standard errors clustered at the individual level in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

Table A10: Native-migrant gap in personality traits by gender - control for cohort

| | Openness | Conscientiousness | Extraversion | Agreeableness | Emotional stability | Locus of control | Positive reciprocity | Negative reciprocity | Success | Family |
|--------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|--------------------------------|---------------------------------|----------------------------------|------------------------------------|
| Male | | | | | | | | | | |
| migrated before 1996 | -0.386 ⁺⁺⁺ (0.141) | 0.00738 (0.144) | -0.493 ⁺⁺⁺ (0.136) | 0.214 (0.142) | -0.518 ⁺⁺⁺ (0.113) | 0.253 ⁺ (0.136) | -0.0578 (0.139) | -0.148 (0.144) | 0.146 ⁺⁺ (0.0733) | 0.141 ⁺⁺ (0.0616) |
| migrated before 1996*YSM | 0.00471 (0.0105) | -0.0180 ⁺ (0.0103) | 0.00825 (0.00992) | 0.00611 (0.0108) | 0.00304 (0.0100) | 0.0148 (0.0126) | 0.0175 (0.0154) | 0.00593 (0.0133) | -0.00476 (0.00599) | -0.00200 (0.00559) |
| migrated after 1995 | 0.244 ⁺⁺⁺ (0.0791) | 0.350 ⁺⁺⁺ (0.0788) | 0.153 ⁺⁺ (0.0764) | 0.247 ⁺⁺⁺ (0.0811) | -0.202 ⁺⁺⁺ (0.0736) | 0.322 ⁺⁺⁺ (0.113) | 0.0756 (0.129) | -0.254 ⁺⁺ (0.114) | 0.500 ⁺⁺⁺ (0.0678) | 0.389 ⁺⁺⁺ (0.0575) |
| migrated after 1995*YSM | 0.0346 (0.0268) | -0.000542 (0.0251) | 0.0264 (0.0198) | 0.0157 (0.0275) | -0.00688 (0.0204) | 0.0785 ⁺⁺ (0.0318) | -0.0240 (0.0390) | -0.00701 (0.0324) | 0.0213 (0.0175) | -0.0231 ⁺ (0.0134) |
| Observations | 14318 | 14318 | 14318 | 14318 | 14318 | 11320 | 11320 | 11320 | 23756 | 23756 |
| Female | | | | | | | | | | |
| migrated before 1996 | -0.0685 (0.130) | 0.228 ⁺⁺ (0.114) | -0.343 ⁺⁺⁺ (0.125) | 0.682 ⁺⁺⁺ (0.119) | -0.0423 (0.111) | 0.253 ⁺⁺ (0.113) | 0.257 ⁺⁺ (0.121) | -0.197 (0.136) | 0.260 ⁺⁺⁺ (0.0722) | 0.140 ⁺⁺ (0.0596) |
| migrated before 1996*YSM | 0.0128 (0.00849) | 0.00867 (0.00834) | 0.0110 (0.00771) | -0.00786 (0.00880) | -0.00489 (0.00857) | -0.00699 (0.0113) | -0.00886 (0.0130) | 0.00403 (0.0120) | -0.00531 (0.00607) | -0.00592 (0.00470) |
| migrated before 1995 | 0.0223 (0.0753) | 0.160 ⁺⁺ (0.0677) | -0.186 ⁺⁺⁺ (0.0679) | 0.0713 (0.0681) | -0.0334 (0.0694) | 0.336 ⁺⁺⁺ (0.0896) | 0.128 (0.0933) | 0.0262 (0.0940) | 0.434 ⁺⁺⁺ (0.0616) | 0.200 ⁺⁺⁺ (0.0536) |
| migrated before 1995*YSM | -0.00145 (0.0191) | 0.0105 (0.0161) | 0.0197 (0.0183) | -0.0334 ⁺⁺ (0.0152) | -0.0176 (0.0173) | 0.00991 (0.0305) | 0.0191 (0.0227) | 0.0162 (0.0216) | 0.00935 (0.0130) | -0.0329 ⁺⁺⁺ (0.0121) |
| Observations | 16678 | 16678 | 16678 | 16678 | 16678 | 13126 | 13126 | 13126 | 26631 | 26631 |

Correlated random effects model. Controls included in all regressions are age, age squared; married, divorced, (single is the omitted category); vocational training, higher education, (elementary education is the omitted category); part-time, full-time, (unemployed is the omitted category); experience in full-time, part-time and unemployment; (log) household income and health satisfaction. Standard errors clustered at the individual level in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

Table A11: Native-migrant gap in personality traits by gender - control for origin

| | Openness | Conscientiousness | Extraversion | Agreeableness | Emotional stability | Locus of control | Positive reciprocity | Negative reciprocity | Success | Family |
|--------------|---------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|----------------------|----------------------------------|-------------------------------------|
| Male | | | | | | | | | | |
| EU | 0.0830 (0.135) | 0.132 (0.149) | 0.0636 (0.126) | -0.0518 (0.131) | -0.279 ⁺⁺ (0.126) | 0.173 (0.197) | 0.107 (0.183) | -0.137 (0.195) | 0.409 ⁺⁺⁺ (0.114) | 0.291 ⁺⁺⁺ (0.0906) |
| EU*YSM | 0.0160 (0.0176) | -0.0235 (0.0294) | 0.00375 (0.0208) | 0.0164 (0.0298) | -0.00226 (0.0219) | 0.0338 (0.0309) | 0.0332 (0.0277) | -0.00876 (0.0268) | -0.0164 (0.0165) | -0.0124 (0.0148) |
| Non-EU | 0.0488 (0.0642) | 0.322 ⁺⁺⁺ (0.0626) | -0.0214 (0.0640) | 0.233 ⁺⁺⁺ (0.0647) | -0.203 ⁺⁺⁺ (0.0584) | 0.326 ⁺⁺⁺ (0.0748) | -0.0163 (0.0823) | -0.00606 (0.0759) | 0.371 ⁺⁺⁺ (0.0483) | 0.225 ⁺⁺⁺ (0.0420) |
| Non-EU*YSM | 0.0106 (0.0113) | -0.0127 (0.0103) | 0.0136 (0.00982) | 0.00698 (0.0110) | 0.00132 (0.00986) | 0.0270 ⁺⁺ (0.0132) | 0.00528 (0.0164) | 0.00521 (0.0139) | 0.000417 (0.00601) | -0.00302 (0.00556) |
| Observations | 14314 | 14314 | 14314 | 14314 | 14314 | 11317 | 11317 | 11317 | 23723 | 23723 |
| Female | | | | | | | | | | |
| EU | 0.330 ⁺⁺⁺ (0.127) | -0.0149 (0.115) | -0.165 (0.121) | 0.166 (0.108) | 0.0207 (0.123) | 0.159 (0.120) | 0.0754 (0.141) | 0.0630 (0.171) | 0.355 ⁺⁺⁺ (0.0960) | 0.0454 (0.0908) |
| EU*YSM | -0.0121 (0.0132) | 0.0127 (0.0153) | 0.0358 ⁺⁺ (0.0149) | -0.0111 (0.0204) | -0.0144 (0.0177) | 0.0289 (0.0189) | -0.00574 (0.0284) | -0.00445 (0.0217) | -0.0209 (0.0142) | 0.0109 (0.0115) |
| Non-EU | 0.0354 (0.0598) | 0.238 ⁺⁺⁺ (0.0541) | -0.106 ⁺ (0.0543) | 0.223 ⁺⁺⁺ (0.0563) | -0.0658 (0.0538) | 0.385 ⁺⁺⁺ (0.0608) | 0.221 ⁺⁺⁺ (0.0648) | -0.0519 (0.0661) | 0.466 ⁺⁺⁺ (0.0458) | 0.214 ⁺⁺⁺ (0.0394) |
| Non-EU*YSM | 0.0138 (0.00905) | 0.00811 (0.00835) | 0.00936 (0.00813) | -0.0134 (0.00831) | -0.00838 (0.00837) | -0.00888 (0.0122) | -0.00445 (0.0125) | 0.00848 (0.0119) | -0.00109 (0.00598) | -0.0124 ⁺⁺⁺ (0.00472) |
| Observations | 14314 | 14314 | 14314 | 14314 | 14314 | 11317 | 11317 | 11317 | 23723 | 23723 |

EU stands for immigrants from European Union member countries, while Non-EU stands for immigrants from non-European Union member countries. Correlated random effects model. Controls included in all regressions are age, age squared; married, divorced, (single is the omitted category); vocational training, higher education, (elementary education is the omitted category); part-time, full-time, (unemployed is the omitted category); experience in full-time, part-time and unemployment; (log) household income and health satisfaction. Standard errors clustered at the individual level in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

Table A12: Native-migrant gap in personality traits by gender - control for origin

| | Male | Female |
|--------------------------------------|------------------------|-------------------------|
| immigrants | -0.166+++ (0.0336) | -0.321+++ (0.0312) |
| years of migration | 0.000316 (0.00164) | 0.00751+++ (0.00163) |
| openness bottom 25% | 0.00939 (0.0127) | 0.00342 (0.0138) |
| openness top 25% | -0.00193 (0.0142) | -0.0579+++ (0.0135) |
| conscientiousness bottom 25% | 0.0201 (0.0132) | -0.0145 (0.0133) |
| conscientiousness top 25% | -0.0359++ (0.0140) | -0.0327++ (0.0137) |
| extraversion bottom 25% | 0.0112 (0.0123) | 0.0231 (0.0147) |
| extraversion top 25% | -0.0350++ (0.0145) | 0.0209 (0.0130) |
| agreeableness bottom 25% | 0.0348+++ (0.0122) | 0.0278+ (0.0147) |
| agreeableness top 25% | -0.0330++ (0.0146) | -0.0386+++ (0.0129) |
| emotional stability bottom 25% | -0.0295++ (0.0145) | -0.0359+++ (0.0126) |
| emotional stability top 25% | 0.0300++ (0.0120) | 0.0481+++ (0.0145) |
| external locus of control bottom 25% | 0.114+++ (0.0127) | 0.0558+++ (0.0142) |
| external locus of control top 25% | -0.123+++ (0.0136) | -0.0979+++ (0.0130) |
| positive reciprocity bottom 25% | -0.0317++ (0.0127) | -0.0233+ (0.0130) |
| positive reciprocity top 25% | -0.0289++ (0.0135) | 0.0128 (0.0134) |
| negative reciprocity bottom 25% | -0.0368++ (0.0144) | -0.0257++ (0.0127) |
| negative reciprocity top 25% | -0.0312++ (0.0125) | -0.0142 (0.0148) |
| success bottom 25% | -0.0560+++ (0.0139) | -0.0747+++ (0.0131) |
| success top 25% | 0.0674+++ (0.0130) | 0.0784+++ (0.0141) |
| family bottom 25% | -0.0410+++ (0.0132) | 0.0128 (0.0134) |
| family top 25% | 0.0513+++ (0.0126) | 0.000846 (0.0135) |
| State effects | Yes | Yes |
| Year effects | Yes | Yes |
| Observations | 40594 | 40979 |
| R^2 | 0.285956 | 0.182192 |

Controls included in all regressions are age, age squared and married. Standard errors clustered at the individual level in parenthesis. + $p < 0.1$, ++ $p < 0.05$, +++ $p < 0.01$

Table A13: Robustness check for males - OLS vs Correlated random effects vs Structural equation model

| | FFM | | | Locus of control and reciprocity | | | Life goals | | |
|---------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|
| | OLS | CRE | SEM | OLS | CRE | SEM | OLS | CRE | SEM |
| immigrants | -0.301 ⁺⁺⁺ (0.0315) | -0.319 ⁺⁺⁺ (0.0293) | -0.309 ⁺⁺⁺ (0.0273) | -0.258 ⁺⁺⁺ (0.0257) | -0.250 ⁺⁺⁺ (0.0261) | (0.0339) | -0.321 ⁺⁺⁺ (0.0274) | -0.243 ⁺⁺⁺ (0.0338) | -0.304 ⁺⁺⁺ (0.0200) |
| years of migration | 0.00417 ⁺⁺ (0.00164) | -0.00182 (0.00429) | 0.00425 ⁺⁺⁺ (0.00144) | 0.00358 ⁺⁺ (0.00143) | 0.00461 (0.00707) | 0.00605 ⁺⁺⁺ (0.00178) | 0.00446 ⁺⁺⁺ (0.00154) | -0.00305 (0.00399) | 0.00528 ⁺⁺⁺ (0.00114) |
| openness | 0.00481 (0.00693) | -0.000457 (0.00655) | 0.00400 (0.00475) | | | | | | |
| conscientiousness | -0.00300 (0.00699) | 0.00671 (0.00654) | -0.00533 (0.00461) | | | | | | |
| extraversion | -0.00500 (0.00664) | -0.00188 (0.00620) | -0.000881 (0.00452) | | | | | | |
| agreeableness | -0.0257 ⁺⁺⁺ (0.00648) | -0.0266 ⁺⁺⁺ (0.00602) | -0.0219 ⁺⁺⁺ (0.00429) | | | | | | |
| emotional stability | 0.0534 ⁺⁺⁺ (0.00665) | 0.0465 ⁺⁺⁺ (0.00621) | 0.0463 ⁺⁺⁺ (0.00453) | | | | | | |
| external locus of control | | | | -0.0950 ⁺⁺⁺ (0.00657) | -0.0909 ⁺⁺⁺ (0.00630) | -0.0786 ⁺⁺⁺ (0.00510) | | | |
| positive reciprocity | | | | 0.00242 (0.00610) | 0.00287 (0.00589) | 0.00573 (0.00480) | | | |
| negative reciprocity | | | | 0.0129 ⁺⁺ (0.00622) | 0.0134 ⁺⁺ (0.00591) | 0.00846 ⁺ (0.00490) | | | |
| importance of success | | | | | | | 0.0404 ⁺⁺⁺ (0.00627) | 0.0405 ⁺⁺⁺ (0.00689) | 0.0278 ⁺⁺⁺ (0.00345) |
| importance of family | | | | | | | 0.0331 ⁺⁺⁺ (0.00607) | 0.0267 ⁺⁺⁺ (0.00692) | 0.0267 ⁺⁺⁺ (0.00357) |
| State effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 12723 | 13699 | 12120 | 10478 | 10478 | 9586 | 15387 | 13366 | 20141 |

Standard errors in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$

Table A14: Robustness check for females - OLS vs Correlated random effects vs Structural equation model

| | FFM | | Locus of control and reciprocity | | | | Life goals | |
|---------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|
| | OLS | CRE | OLS | CRE | SEM | OLS | CRE | SEM |
| immigrants | -0.344 ⁺⁺⁺ (0.0305) | -0.326 ⁺⁺⁺ (0.0303) | -0.257 ⁺⁺⁺ (0.0271) | -0.225 ⁺⁺⁺ (0.0319) | -0.333 ⁺⁺⁺ (0.0349) | -0.368 ⁺⁺⁺ (0.0277) | -0.310 ⁺⁺⁺ (0.0340) | -0.363 ⁺⁺⁺ (0.0231) |
| years of migration | 0.00838 ⁺⁺⁺ (0.00164) | 0.00470 (0.00408) | 0.00551 ⁺⁺⁺ (0.00153) | 0.000354 (0.00442) | 0.00795 ⁺⁺⁺ (0.00178) | 0.00716 ⁺⁺⁺ (0.00155) | -0.00204 (0.00435) | 0.00864 ⁺⁺⁺ (0.00125) |
| openness | -0.0144 ⁺⁺ (0.00647) | -0.0128 ⁺⁺ (0.00623) | | | | | | |
| conscientiousness | 0.00755 (0.00720) | 0.00798 (0.00685) | | | | | | |
| extraversion | -0.00611 (0.00678) | -0.00615 (0.00648) | | | | | | |
| agreeableness | -0.0250 ⁺⁺⁺ (0.00689) | -0.0190 ⁺⁺⁺ (0.00644) | | | | | | |
| emotional stability | 0.0457 ⁺⁺⁺ (0.00634) | 0.0424 ⁺⁺⁺ (0.00606) | | | | | | |
| external locus of control | | | -0.0622 ⁺⁺⁺ (0.00665) | -0.0568 ⁺⁺⁺ (0.00651) | -0.0471 ⁺⁺⁺ (0.005248) | | | |
| positive reciprocity | | | 0.00733 (0.00620) | 0.00855 (0.00609) | 0.00491 (0.00488) | | | |
| negative reciprocity | | | 0.00570 (0.00667) | 0.00310 (0.00653) | 0.00402 (0.00545) | | | |
| importance of success | | | | | | 0.0589 ⁺⁺⁺ (0.00640) | 0.0587 ⁺⁺⁺ (0.00705) | 0.0318 ⁺⁺⁺ (0.00392) |
| importance of family | | | | | | -0.00220 (0.00647) | -0.00150 (0.00719) | 0.0111 ⁺⁺⁺ (0.00406) |
| State effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 12894 | 12894 | 10270 | 10270 | 9497 | 15308 | 13278 | 18438 |

Standard errors in parenthesis. $+p < 0.1$, $++p < 0.05$, $+++p < 0.01$