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# The impact of immigration on the well-being of natives☆

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ABSTRACT

Combining data from the German Socio-Economic Panel for 1998–2009 with local labor market information, this is the first paper to investigate how the spatial concentration of immigrants affects the life satisfaction of the native Germans. Our results show a positive and robust effect of immigration on natives' well-being, which is not driven by local labor market characteristics. Immigration has only a weak impact on the subjective well-being of immigrant groups, meanwhile. We also examine potential threats to causality and conclude that our findings are not driven by selectivity and reverse causality. Specifically, natives are not crowded out by immigrants and the sorting of immigrants to regions with higher native happiness is negligible. We further find that the positive effect of immigration on natives' life satisfaction is a function of the assimilation of immigrants in the region. Immigration's well-being effect is higher in regions with intermediate assimilation levels and is essentially zero in regions with no or complete assimilation.



## 1. Introduction

There has been substantial concern about the impact of immigration on the welfare of natives (Borjas, 1994; Friedberg and Hunt, 1995; Card, 2005). Traditionally, studies analyzing the impact of migration on natives have employed "objective" measures of welfare such as wages and employment (Borjas, 1994, 2003; Card, 1990, 2001; Butcher and Card, 1991; Dustmann et al., 2005; Ottaviano and Peri, 2012). More recently, part of the migration literature has also focused on the impact of migration on public spending, fiscal effects and prices (Brücker et al., 2002; Dustmann et al., 2010; Dustmann and Frattini, 2013). The objective of this paper is to examine the effect of immigration directly on the welfare of natives using the overall experienced "utility", as proxied by subjectively-reported well-being. To our knowledge, this is the first paper to examine such a nexus.[1]

At a broader level, objective measures are only partially capable of capturing most of the aspects of life that generate welfare or – as more precisely expressed by *utilitarians* such as Jeremy Bentham – pleasure and pain after an experience

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[1] The literature exploring the relationship between migration and well-being is rather scant to date. Recent works exploring the relationship in this area is offered by Simpson (2013).

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0167-2681/

(Kahneman and Sugden, 2005). In recent years, economists have started to focus on using broader – rather than purely objective – measures of welfare to proxy the utility of individuals (Deaton, 2008; Fleurbaey, 2009). As Stiglitz et al. (2009, p.41) state: "Quality of life is a broader concept than economic production and living standards. It includes the full range of factors that influences what we value in living, reaching beyond its material side." To capture the overall welfare of individuals, researchers now study subjective well-being measures (SWB, "happiness" or "life satisfaction") that can complement objective income-based metrics and enhance our understanding.[2]

The number of economic studies investigating the determinants of SWB has increased substantially in recent years (for an overview, see Dolan et al., 2008; Frey and Stutzer, 2002). The use of alternative welfare measures has also stimulated policy debates. For instance, in 2009, the French government convened a group of Nobel laureates including Amartya Sen and Joseph Stiglitz to create an index for the country's well-being that would replace the traditional GDP measure and include subjectively-reported well-being levels. Today, this new branch of the economic literature goes beyond exploring the determinants of well-being, and allows the testing of hypotheses and analysis of various issues that could not have otherwise been achieved using a standard neoclassic economic approach. Arising from these results are findings about the large disutilities from being unemployed (Winkelmann and Winkelmann, 1998; Clark and Oswald, 1994; Clark, 2003), the fact that age and subjective well-being have a U-shaped relationship with a minimum around the age of 40 (Frey and Stutzer, 2002), that married people have higher subjective well-being than singles (Clark and Oswald, 1994), and that both absolute and relative income affect subjective well-being (Easterlin, 1995; Clark et al., 2008; Senik, 2009).

Economists have long focused on the impact of immigration on natives' labor market outcomes such as wages and employment, which are objective measures of "welfare". The typical approach has been to correlate these measures with the share of immigrants in local labor markets. The empirical evidence to date is rather mixed. For instance, while Borjas (2003) finds negative effects of immigration on the wages of natives in the US, others find that the impact of immigration, if any, is negligible (Card, 1990, 2001). More recently, Ottaviano and Peri (2012) document immigration as having a positive effect on the wages of high-skilled natives, and a negative (but negligible) effect on low-skilled natives. A longitudinal study in the UK finds minor impacts on unemployment, participation and wages – both economically and statistically (Dustmann et al., 2005). Conversely, Manacorda et al. (2012) find that since immigrants and natives are complements in production, there is no negative wage effect on the latter. However, the authors also find evidence that newly-arrived immigrants are substitutes in production with immigrants already residing in the UK. Analyzing the impact of immigration on the employment rates of native Germans, Pischke and Velling (1997) find that immigration does not adversely impact natives' employment. More recently, D'Amuri et al. (2010) analyze both the wage and employment effects of immigration in West Germany, finding that immigration has essentially no impact on natives' labor market outcomes, but has an adverse effect on previous immigrants.

Another strand of the literature has explored the impact of immigration on other outcomes while still using objective measures of welfare. For example, Dustmann et al. (2010) analyze whether the immigration stemming from the EU enlargement toward Eastern European countries affected UK public finances. They find that immigrants from the accession countries positively contributed to public finances, since they were found relatively more likely to be in work than natives, and less likely to access social benefits.

Finally a branch of the literature has started to explore the relationship between immigration and natives' attitudes. For example, Card (2005) analyze European Social Survey data and conclude that while attitudes towards immigrants are partially shaped by economic factors, other aspects such as culture, and natives' social status are important in affecting the way in which immigration is perceived. Moreover, Boeri (2010) argues that the business cycle influences natives' opinions towards immigrants. Other studies investigate the determinants of attitudes toward immigrants (Facchini and Mayda, 2009; Mayda, 2006; Rustenbach, 2010; Senik et al., 2009; Bauer et al., 2000).

This paper focuses on Germany for several reasons. First, Germany is a high immigration country. Estimates by Eurostat report that 9.8 million individuals residing in Germany in 2010 were foreign-born (accounting for as much as 12% of total population).[3] Second, we base our study on the German Socio-Economic Panel (GSEOP), which has the unique feature of being a nationally representative dataset with longitudinal information on subjective well-being and identical questions posed to both natives and immigrants. Furthermore, GSOEP can be merged with data from the INKAR, a dataset containing local labor market characteristics such as GDP and unemployment rates.[4] In addition, INKAR provides rich and reliable data on immigration stocks and flows at the local level, upon which our identification strategy hinges.

Utilizing panel data, we estimate several models where the well-being of natives is a function of the immigrant share in the region, controlling for natives' socio-demographic traits and local labor market conditions. Exploiting the panel dimension of our data, we estimate various equations where well-being is expressed as a function of the proportion of the immigrant share in the local labor market, controlling for individual socio-demographic characteristics and local labor market attributes. Our estimations provide robust evidence that higher immigration generates a positive effect on natives' SWB. In other words, natives experience welfare gains as immigration in the local labor market increases. For comparison purposes, we also

[2] Kahneman and Sugden (2005) provide a thorough discussion about how subjective and objective measures compare.
[3] Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/main_tables.
[4] INKAR is the acronym for Indikatoren und Karten zur Raumentwicklung.

conduct a similar analysis for the group of immigrants, finding weak statistical evidence that immigration positively affects their well-being.

We conduct various checks to address potential causality issues, exploring two sources of selection and endogeneity. The first relates to the possibility that less happy natives move out from areas with higher immigration, which would create a spurious positive correlation between immigration and well-being. The second is linked with the internal mobility of immigrants in Germany. If there is a substantial sorting of migrants into areas with higher well-being, issues of reverse causality might arise, i.e., the observed immigrant share could be a function of SWB. Results from our tests suggest that the main results are not driven or strongly influenced by these concerns.

We explore various channels behind our results. First, we investigate whether the impact of immigration on natives' SWB goes through local labor markets. Immigration might positively or negatively affect the labor market, thereby leading to changes in natives' SWB. We then explore immigrants' ethnic composition, finding that the effect of immigration on SWB does not change according to whether natives live in more ethnically diverse regions. When we analyze the role of immigrants' assimilation, we find that the impact of immigration on natives' SWB increases with assimilation, up to a certain threshold. Natives' SWB decreases to effectively zero in those regions where immigrants are fully assimilated. Finally, we explore the main satisfaction domains affected by immigration, finding satisfaction with dwelling and leisure to be relevant.

The remainder of the paper is organized as follows: Section 2 outlines the data and provides summary statistics of the variables used in the analysis. Section 3 outlines the empirical strategy. The results are presented in Section 4, while in Section 5 we examine in detail potential causality issues. Section 6 explores the various channels behind our results. In Section 7, we conclude the paper with a brief discussion of our results.

## 2. Data and summary statistics

### 2.1. Data and variable selection

The empirical analysis of this paper is based on two distinct data sources. We combine a dataset extracted from the German Socio-Economic Panel (GSOEP) and rich regional data from official statistics of Germany. The GSOEP has been extensively used in the SWB literature (Winkelmann and Winkelmann, 1998; Van Praag et al., 2003; Ferrer-i Carbonell and Frijters, 2004). This annual panel survey, patterned after the Panel Study of Income Dynamics (PSID), was first launched in West Germany in 1984, collecting data on 12,000 German and immigrant households that have been followed ever since. The sample has been extended and refreshed over the years, most notably by including around 2000 East German households in 1990 and a sample of Eastern European immigrants who moved to Germany after the demise of the Soviet Block.[5] From the GSOEP, we extract a rich set of socio-economic variables at the individual level. In particular, we obtain information to construct the SWB variable, derived from the question "How satisfied are you at present with your life as a whole?", which allows responses on an ordinal scale from 0 to 10, where 0 stands for "completely dissatisfied" and 10 for "completely satisfied". While our focus is on the native population, for comparison purposes we also include the sample of immigrants from the GSOEP. Our definition of immigration is based on citizenship. Due to the prominence of the law of blood versus the law of soil in Germany, even immigrant children born in the country are not automatically German citizens.[6]

The second data source is the INKAR, from which we extract statistics for the 96 "regional policy regions" of Germany (henceforth, ROR).[7] Since the GSOEP contains information on the ROR of residence of the individual, it is possible to match the microdata with the regional statistics. The advantages of using ROR level data are manifold. First, RORs are well-defined spatial units, designated on the basis of economic attributes and commuting patterns (Knies and Spiess, 2007). This detailed geographical level allows the efficient capturing of the heterogeneity of German local labor markets. Furthermore, indicators are drawn from official statistics, which substantially attenuates measurement error issues. Our key variable is the immigrant share in the ROR, defined as the ratio between the stock of immigrants and the total resident population (for the sake of presenting the results, this ratio is multiplied by 100). Consistent with the GSOEP data, the INKAR immigration definition is based on citizenship. In addition, we extract data on local unemployment rates (for both the total population and immigrants) and GDP. We furthermore derive an index of "ethnic diversity" constructed by using data on citizenship of immigrants.[8]

[5] In order to assemble the dataset and homogenize variables across waves, we have used the Stata Add-On script "Panelwhiz". See Haisken-DeNew and Hahn (2010) for a detailed description.

[6] Labor migration in Germany expanded from the late 1950s until the 1970s through the "guest workers" programs stemming from bilateral agreements between Germany and partner countries, such as Greece, Italy, Spain and Turkey. After the termination of the guest worker programs in November 1973, immigration to guest workers regions continued through other channels, such as family reunification. During the early 1990s, a relatively large wave of immigrants came under the asylum seeker and refugee status. During this time, many "ethnic Germans" also arrived in Germany, as well as many Russians, Poles and other Eastern Europeans. More recently, the enlargement of the European Union (EU) to Central and Eastern Europe countries did not generate a large increase of immigration, perhaps also due to the implementation of transitional rules (which were in force until May 2011 for migrants from the countries which joined in 2004 and until January 1, 2014 for migrants from Bulgaria and Romania), according to which Germany imposed restrictions on the free movement of workers from the new Member States.

[7] ROR stands for "RaumOrdnungsRegionen". The original number of RORs was 97 until July 2008. Since then, the RORs Chemnitz-Erzgebirge and Südwestsachsen were merged into the ROR Südsachsen. Details about these data are available at http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/INKAR/inkar_node.html.

[8] Data on citizenship have been obtained from the Statistical Offices of the Länder for the years 1998–2009.

**Table 1**
Summary statistics.

| | Low immigration ROR | | | | High immigration ROR | | | | All | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Natives | | Immigrants | | Natives | | Immigrants | | | |
| | Mean | s.d. | Mean | s.d. | Mean | s.d. | Mean | s.d. | Mean | s.d. |
| *SWB* | 6.8422 | (1.7942) | 6.9915 | (1.8347) | 7.0517 | (1.7545) | 6.7539 | (1.8449) | 6.9316 | (1.7869) |
| Age | 42.0353 | (13.0748) | 41.7698 | (12.3706) | 41.8286 | (12.7946) | 42.2824 | (12.2464) | 41.9570 | (12.8523) |
| Males (%) | 0.4992 | (0.5000) | 0.5108 | (0.4999) | 0.4966 | (0.5000) | 0.5042 | (0.5000) | 0.4990 | (0.5000) |
| East Germany (%) | 0.3871 | (0.4871) | 0.0549 | (0.2278) | 0.0370 | (0.1887) | 0.0047 | (0.0685) | 0.1863 | (0.3894) |
| Years of education | 11.9169 | (2.2926) | 10.8372 | (2.2999) | 12.2790 | (2.6828) | 10.8462 | (2.5655) | 11.9342 | (2.5362) |
| Household size (log) | 2.8029 | (1.2094) | 3.3508 | (1.4342) | 2.6857 | (1.2540) | 3.2362 | (1.3682) | 2.8131 | (1.2675) |
| No children (%) | 0.6292 | (0.4830) | 0.4643 | (0.4988) | 0.6349 | (0.4814) | 0.4930 | (0.5000) | 0.6127 | (0.4871) |
| One child (%) | 0.2007 | (0.4005) | 0.2418 | (0.4282) | 0.1866 | (0.3896) | 0.2287 | (0.4200) | 0.1988 | (0.3991) |
| Two children (%) | 0.1318 | (0.3383) | 0.1855 | (0.3887) | 0.1401 | (0.3471) | 0.1988 | (0.3991) | 0.1437 | (0.3508) |
| Three or more children (%) | 0.0383 | (0.1919) | 0.1084 | (0.3109) | 0.0383 | (0.1920) | 0.0796 | (0.2706) | 0.0449 | (0.2070) |
| Married (%) | 0.6123 | (0.4872) | 0.7780 | (0.4156) | 0.5866 | (0.4924) | 0.7701 | (0.4208) | 0.6221 | (0.4849) |
| Separated (%) | 0.0114 | (0.1060) | 0.0102 | (0.1003) | 0.0113 | (0.1055) | 0.0100 | (0.0997) | 0.0111 | (0.1050) |
| Single (%) | 0.2985 | (0.4576) | 0.1360 | (0.3428) | 0.3261 | (0.4688) | 0.1479 | (0.3551) | 0.2904 | (0.4539) |
| Divorced (%) | 0.0533 | (0.2246) | 0.0616 | (0.2404) | 0.0568 | (0.2314) | 0.0515 | (0.2211) | 0.0550 | (0.2279) |
| Widowed (%) | 0.0245 | (0.1547) | 0.0142 | (0.1184) | 0.0193 | (0.1375) | 0.0204 | (0.1412) | 0.0214 | (0.1449) |
| Very good health (%) | 0.1004 | (0.3006) | 0.1214 | (0.3266) | 0.1155 | (0.3197) | 0.1133 | (0.3169) | 0.1090 | (0.3117) |
| Good health (%) | 0.4444 | (0.4969) | 0.4261 | (0.4945) | 0.4430 | (0.4967) | 0.4084 | (0.4915) | 0.4398 | (0.4964) |
| Satisfactory health (%) | 0.3221 | (0.4673) | 0.2927 | (0.4550) | 0.3038 | (0.4599) | 0.3034 | (0.4597) | 0.3112 | (0.4630) |
| Poor health (%) | 0.1092 | (0.3120) | 0.1299 | (0.3362) | 0.1134 | (0.3171) | 0.1379 | (0.3448) | 0.1145 | (0.3184) |
| Bad health (%) | 0.0238 | (0.1523) | 0.0299 | (0.1705) | 0.0243 | (0.1539) | 0.0371 | (0.1890) | 0.0255 | (0.1575) |
| Employed (%) | 0.6921 | (0.4616) | 0.6320 | (0.4823) | 0.7223 | (0.4479) | 0.6217 | (0.4850) | 0.6965 | (0.4598) |
| Not in labour force (%) | 0.2017 | (0.4013) | 0.2294 | (0.4205) | 0.2023 | (0.4017) | 0.2576 | (0.4373) | 0.2082 | (0.4060) |
| In school/training (%) | 0.0294 | (0.1689) | 0.0333 | (0.1795) | 0.0301 | (0.1709) | 0.0217 | (0.1456) | 0.0292 | (0.1683) |
| Unemployed (%) | 0.0768 | (0.2663) | 0.1052 | (0.3069) | 0.0452 | (0.2078) | 0.0990 | (0.2987) | 0.0662 | (0.2486) |
| Wages (log) | 7.5432 | (4.0935) | 6.8058 | (4.3825) | 7.8844 | (4.0795) | 6.7936 | (4.5135) | 7.5943 | (4.1538) |
| Hours worked (log) | 2.3995 | (1.7277) | 2.1341 | (1.7567) | 2.4904 | (1.6795) | 2.1237 | (1.7621) | 2.4034 | (1.7151) |
| Household income (log) | 7.2676 | (2.1592) | 7.3483 | (1.8436) | 7.3750 | (2.1892) | 7.4449 | (1.8389) | 7.3338 | (2.1344) |
| *N* | 81,087 | | 6350 | | 70,714 | | 15,622 | | 17,3773 | |

*Source*: GSOEP waves 1998–2009. Standard deviations in parentheses. High immigration RORs are those in which the immigration rate is above the median (8.3).

Similar to indices that measure ethnic fractionalization (Alesina et al., 2003), our index of ethnic diversity is defined as $ED_{rt} = 1 - \sum_g s_{grt}^2$, where $s_{gr}$ is the share of postulations group $g$ (native German, Turkish, Greek, Italian) in each ROR $r$.

Since the required statistics from INKAR are available for the period 1998–2009, our analysis is restricted to this time period. Furthermore, we focus our analysis on individuals aged between 16 and 64. The final sample obtained by merging GSOEP and INKAR data consists of more than 170,000 individual-year observations.

### 2.2. Summary statistics

Table 1 presents the descriptive statistics of the variables used in the analysis, reported separately for natives and immigrants. The sample is also split by RORs with high and low immigration (i.e., above and below the median ROR immigrant share). The table shows that natives living in low immigration RORs report lower levels of SWB than those in high immigration RORs, with the difference being statistically significant. There are additional differences in demographic characteristics that are statistically different (such as education, household size, and number of children). Major differences arise in the regional composition and labor market outcomes. The share of natives living in East Germany is larger in low immigration areas, reflecting the large differences in the distribution of immigrants between East and West Germany. Furthermore, the unemployment rate is lower in high immigration RORs, whereas wages, hours worked and income are higher, reflecting that immigration is higher in relatively well-off RORs. All these differences are statistically different between the two groups.

Some differences also emerge among immigrants. In contrast to natives, immigrants located in low immigration RORs exhibit lower levels of SWB, with the difference being statistically significant. Another remarkable difference with natives is that it is not so clear that immigrants living in high immigration RORs are relatively better-off in terms of labor market outcomes than those in low immigration RORs. For example, wages, unemployment rates and hours worked are not so dissimilar between high and low immigration areas; in fact the differences are not statistically different.

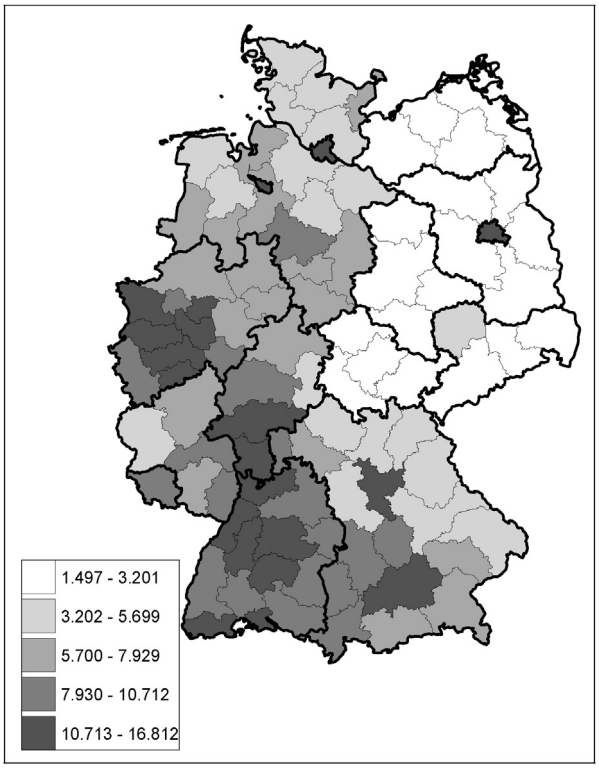


**Fig. 1.** Immigration in the RORs. *Source*: INKAR. Figures refer to averages over the period 1998–2009. Bold lines delimit the 16 Länder (States) of Germany.

In summary, Table 1 reveals that levels of SWB vary across high and low immigration RORs for both natives and immigrants. However, characteristics of individuals and macroeconomic conditions are also remarkably different. Furthermore, macroeconomic conditions are substantially heterogeneous across high and low immigration RORs. The empirical strategy developed in the next section shows how we take into account the substantial heterogeneity across individuals and regions.

The map in Fig. 1 depicts quintiles of the immigration share (averages over the period 1998–2009) for all RORs used in this study. Darker colors represent a higher immigration share. There is a substantial variation in the immigrant share across regions, which also strikingly differs between the East and West of Germany. In West Germany immigrant shares vary from a minimum of 1.5% to a maximum of 16.8%. Despite clusters of high and intermediate immigrant shares, contiguous RORs within the same Federal State exhibit diverse immigration incidences. This suggests that the definition of labor market based on Federal State would tend to underestimate the heterogenous immigration patterns across contiguous areas. As seen in Table 1, high immigration RORs are those where relatively happier natives live. However, these are also areas in which natives are less deprived in labor market outcomes. In turn, these factors can also influence their SWB. The econometric analysis outlined in the following section carefully addresses the potential confounding effects deriving from such regional heterogeneity.

## 3. Econometric specifications

Our dependent variable is measured on an ordinal scale from zero to ten, and thus the appropriate econometric model would be an ordered probit in which well-being is considered to be latent:

$$SWB^*_{it} = \beta IM_{rt} + \mathbf{X}'_{it}\boldsymbol{\gamma} + \mathbf{Z}'_{rt}\boldsymbol{\lambda} + \epsilon_{it}, \tag{1}$$

$$\epsilon_{it} = \alpha_i + \delta_r + \theta_t + \varepsilon_{it}, \tag{2}$$

where $SWB^*$ captures the latent well-being or utility of an individual $i$ at time $t$. The key parameter to identify is $\beta$, which denotes how the immigrant share ($IM$) in ROR $r$ at a certain time $t$ correlates with the SWB of individuals. The matrix $\mathbf{X}$ comprises individual socio-demographic and economic characteristics such as age, marital status and income. The matrix $\mathbf{Z}$ includes time-varying labor market characteristics, such as unemployment rate and GDP per capita in each region $r$ at a given time $t$; $\boldsymbol{\gamma}$ and $\boldsymbol{\lambda}$ are the corresponding vectors of parameters to be estimated.

The error term $\epsilon$ and its components are represented in Eq. (2): $\alpha$ captures individual unobservable heterogeneity; $\delta$ encapsulates region-specific time-invariant attributes; and $\theta$ represents period-specific effects captured in the regression by time dummies; finally, $\varepsilon$ is an error term that is assumed to be normally distributed with a unit variance due to identification

in the ordered probit specifications. While the econometric specification is presented as an ordered probit model due to the metric structure of the dependent variable, in the case of the sample under scrutiny, linear regression provides qualitatively similar results to the ordered probit, and hence we will rely on it throughout the analysis. The advantages of using a linear specification are that it allows an easier interpretation of the parameter estimates and enables controlling for individual unobservable characteristics in simpler fashion. However, we also estimate various alternative specifications, including an ordered probit model.

The estimation of Eq. (1) presents a series of challenges. As discussed by Boyce (2010), the role of unobserved personal characteristics, such as personality traits, is crucial when analyzing subjective well-being. If these factors – as captured by the term $\alpha_i$ in Eq. (2) – are correlated with other regressors ($E(\epsilon_{it}, x_{it}) \neq 0$), then a specification controlling for time-invariant individual attributes is preferred. We address the role of unobserved heterogeneity by estimating our specification with a fixed-effects (FE) model. For comparison purposes, we also estimate OLS, ordered Probit, random effects and correlated random effects models (Ferrer-i Carbonell and Frijters, 2004). The latter (also known as quasi-fixed effects, see Chamberlain, 1984) is a random effects model augmented with means of time-variant individual characteristics (in our case, education, log wage, and weekly working hours for individual characteristics and household size and income for household characteristics). Note that we exclude time invariant controls such as age from the FE regressions.

A second major challenge is related to causality issues. In particular, reverse causality between immigration and SWB and the sorting of individuals across RORs might create endogeneity and selection issues, which could hinder a causal interpretation of our results. After having presented our benchmark results, we devote a whole section to the discussion and testing of such issues.

In order to account for serial correlation in the error term, we cluster the standard errors at the individual level. Furthermore, we weight observations using the average over time of the individual cross-sectional weights provided in the GSOEP.[9]

## 4. Results

### 4.1. Effect of migration on the well-being of natives: benchmark results

In this section, we first outline the estimates from our benchmark model, before providing results for various groups. In Table 2 we report the results of the estimation using alternative specifications. For sake of exposition, the table only reports the coefficients of interest – namely the $\beta$ of Eq. (1). However, before discussing these results, it is important to highlight how the estimates of our model compare with those from existing literature. The full estimates of Table 2, which include all socio-economic characteristics listed in Table 1, are reported in Tables A1–A3 in the Appendix. As one can see from a quick investigation of these tables, our results are consistent with previous literature concerning the study of SWB in Germany (Ferrer-i Carbonell, 2005; Winkelmann and Winkelmann, 1998). For example, the pattern of SWB over the life cycle exhibits the "classic" U-shaped behavior, meaning that well-being decreases into an age "dip" around the age of 40–45, and then increases again (see Frey and Stutzer, 2002; Dolan et al., 2008). Being married is positively correlated with well-being; the same applies for possessing more years of education, being healthy and earning higher wages. As remarkably established in the SWB literature, being unemployed is negatively associated with life satisfaction (Wilson and Walker, 1993; Clark and Oswald, 1994; Frey and Stutzer, 2002 and Dolan et al., 2008 for a review).

In reference to the parameters of interest, Table 2 reports benchmark results separately for the groups of natives, immigrants, and of the two groups together. Starting from natives, the ordinary least squares (OLS) specification in the first column shows that a higher immigrant share in the ROR is positively and significantly correlated with the SWB level of both natives and immigrants, albeit it is statistically significant only for the former group. In terms of standardized coefficient (i.e., in which we set the variances of all independent variables equal to 1), an increase of one standard deviation in the immigrant share is associated with an increase of 0.142 standard deviations in natives' SWB. This is rather a large effect if one considers that the standardized coefficient for being unemployed is −0.112 and for wage is 0.017.

The second column presents results from the ordered probit (OP) specification. The only difference from the first column is that the dependent variable is considered to be an ordered (rather than continuous) outcome. The estimates are somewhat smaller than the OLS: in fact, the magnitude between the two models is only partially comparable. However, the pattern of the results does not change: namely, there is an economically and statistically significant positive effect of immigration on natives' SWB. The presence of unobservable time-invariant individual heterogeneity is addressed by estimating random-, quasi-fixed and fixed effects (RE, QFE and FE) models in the last columns of the table. The estimates of the RE and QFE models are also somewhat smaller than the OLS specification, but are very similar to each other. On the other hand, point estimates

[9] Our decision of using weights relates to the different design probabilities for different subsamples in the GSOEP (such as foreigners, residents in East Germany, high income individuals). Without weights, the coefficients of certain regressors would be distorted to the extent that these regressors are not adjusted by the over/under representation of certain groups. Unweighted estimates for the benchmark model are not dissimilar from those in column 6 of Table 2, but tend to be somewhat smaller in terms of magnitude (for natives the coefficient is 0.042, s.e. 0.017; for immigrants it is −0.009, s.e. 0.048; for the all population it is 0.036, s.e. 0.016). Furthermore, the pattern of results across different methods is substantially unchanged.

**Table 2**
Benchmark results.

| | OLS | OP | RE | QFE | FE | FE |
|---|---|---|---|---|---|---|
| | Natives | | | | | |
| Immigrant share | 0.0558** | 0.0404*** | 0.0434*** | 0.0425*** | 0.0532** | 0.0559** |
| | (0.0219) | (0.0148) | (0.0150) | (0.0150) | (0.0224) | (0.0231) |
| Additional ROR controls | N | N | N | N | N | Y |
| $R^2$ | .26 | .076 | .328 | .327 | .167 | .167 |
| $N$ | 151,801 | 151,801 | 151,801 | 151,801 | 151,801 | 151,801 |
| | Immigrants | | | | | |
| Immigrant share | 0.0439 | 0.0310 | 0.0169 | 0.0182 | 0.0278 | 0.0211 |
| | (0.0633) | (0.0398) | (0.0434) | (0.0434) | (0.0710) | (0.0727) |
| Additional ROR controls | N | N | N | N | N | Y |
| $R^2$ | .276 | .08 | .313 | .311 | .033 | .043 |
| $N$ | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 |
| | All | | | | | |
| Immigrant share | 0.0465** | 0.0346** | 0.0382*** | 0.0384*** | 0.0500** | 0.0508** |
| | (0.0206) | (0.0137) | (0.0140) | (0.0140) | (0.0213) | (0.0221) |
| Additional ROR controls | N | N | N | N | N | Y |
| $R^2$ | .257 | .074 | .321 | .32 | .169 | .169 |
| $N$ | 173,773 | 173,773 | 173,773 | 173,773 | 173,773 | 173,773 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the question "How satisfied are you at present with your life as a whole?" (values range from 0 to 10). *Indicates significance at the 0.1 level. OLS: ordinary least-squares; OP: ordered probit; RE: random effects; QFE: quasi fixed effects (correlated random effects); FE: fixed effects. All models includes the control variables listed in Table 1 (except SWB) and indicators for RORs and years. Additional ROR controls include log GDP, male unemployment rate and the index for ethnic diversity defined in Section 2. See Appendix for related estimates. Fixed effects models exclude time invariant regressors such as: age and age squared, sex, East Germany and years of education. $R^2$ in column II refers to pseudo $R^2$ and in column V and VI refers to within-group $R^2$.

** Indicates significance at the 0.05 level.

*** Indicates significance at the 0.01 level.

for our preferred model – the FE – are remarkably similar to the OLS case, even after accounting for unobserved individual heterogeneity.[10]

In the last column, we further control for additional characteristics at the ROR level. Since identification comes from variation over time in the immigrant share at the ROR level, it seems important to control for additional time-varying regional aspects. For example, if unemployment is rising as immigration increases in a ROR, natives and immigrants might end up competing for the same jobs, which could generate a welfare loss among either or both groups. If such an effect is particularly strong, the estimated impact is likely to be the by-product of omitting local characteristics rather than the consequence of immigration. To address this issue, we add to the regression the male unemployment rate and the GDP obtained from the INKAR data and the index of ethnic diversity defined in Section 2.1. Estimated coefficients of these additional characteristics are reported in Tables A1–A3 in the Appendix.[11] Remarkably, the estimate of the immigrant share is unaffected by the introduction of these additional characteristics. The model in the last column of the table will be our baseline specification throughout the analysis.

Even though the pattern of results for immigrants is generally similar to that of natives, the estimates are smaller economically and never statistically significant. On the other hand, as one would expect, estimates for the whole sample are similar to those of natives. We also estimate all models by clustering standard errors at the ROR level rather than the individual level. The estimated standard errors are only slightly different.[12]

[10] Our tests show that the estimates from the various specifications are not statistically different from each other. However, results from the Hausman tests performed between the FE model and the random effects models (RE and QFE) clearly reject the hypothesis that the latter are consistent, suggesting the appropriateness of the former.

[11] An interesting result emerges with the estimate of the regional GDP per capita, as we find that it is negatively correlated with natives' SWB. While this appears to be a puzzling result, it is important to emphasize the interpretation of the estimate: since we already control for unobserved regional factors, the estimate represents the correlation between changes over time in the GDP and SWB. A plausible explanation for this negative correlation can be attributed to the "positional" or "relative" concerns hypothesis. Changes in the mean income in a region can be considered to represent a shift in the level of income that natives would like to achieve (i.e., the income of the "reference group"). As such threshold increases, the income position of the average native would decrease relative to the relevant others. In other words, it becomes more difficult for the average native to reach the income level of the reference group, thereby generating disutility. While this is just one of the possible explanations, it is in line with findings from recent literature (Ferrer-i Carbonell, 2005; Clark et al., 2008; Akay and Martinsson, 2011). Furthermore, we find a positive – although statistically insignificant – correlation between SWB and GDP for immigrants. Furthermore, this result can be interpreted by the relative concern hypothesis, with natives entering the reference group of immigrants. An increase in natives' income (as proxied by GDP) can be seen by immigrants as a signal of better economic prospects. This would be the case, in particular, if natives' income represents the level that is potentially attainable by immigrants once they are fully assimilated.

[12] For example, for our baseline specification, the standard errors for natives, immigrants and for the whole sample are, respectively, 0.0268, 0.0635 and 0.0223

**Table 3**
Heterogeneity analysis: results by subgroup.

| | Sex | | Age | | | Income | | |
|---|---|---|---|---|---|---|---|---|
| | Males | Females | Age < 35 | Age 35–50 | Age > 50 | 1st Q. | 2nd–3rd Q. | 4th Q. |
| Natives | 0.0703** | 0.0443 | 0.1065** | 0.0766** | 0.0094 | 0.0448 | 0.1071*** | 0.0269 |
| | (0.0311) | (0.0337) | (0.0448) | (0.0386) | (0.0443) | (0.0617) | (0.0341) | (0.0458) |
| $R^2$ | 0.153 | 0.123 | 0.112 | 0.058 | 0.036 | 0.094 | 0.076 | 0.030 |
| $N$ | 73,946 | 77,855 | 46,849 | 58,162 | 46,790 | 37,523 | 74,393 | 39,885 |
| Immigrants | −0.1471 | 0.1633* | 0.0786 | −0.1147 | 0.1463 | 0.0290 | −0.0264 | 0.1812 |
| | (0.1030) | (0.0964) | (0.1127) | (0.1491) | (0.1136) | (0.1817) | (0.1006) | (0.1501) |
| $R^2$ | 0.027 | 0.016 | 0.003 | 0.001 | 0.057 | 0.024 | 0.028 | 0.007 |
| $N$ | 10,751 | 11,221 | 6476 | 8414 | 7082 | 5925 | 11,840 | 4207 |
| | Marital status | | Region | | Education | | Employment | |
| | Married | Not married | West | East | < 11 years | ≥ 11 years | Employed | Not employed |
| Natives | 0.0829*** | 0.0085 | 0.0518** | 0.0926 | 0.0900* | 0.0324 | 0.0676*** | 0.0293 |
| | (0.0269) | (0.0411) | (0.0262) | (0.0919) | (0.0471) | (0.0266) | (0.0252) | (0.0594) |
| $R^2$ | 0.071 | 0.175 | 0.137 | 0.130 | 0.081 | 0.152 | 0.135 | 0.080 |
| $N$ | 96,802 | 54,999 | 109,678 | 42,123 | 48,726 | 103,075 | 114,116 | 37,685 |
| Immigrants | −0.0095 | 0.0418 | 0.0361 | −1.1969 | −0.0254 | 0.0705 | −0.0343 | 0.0408 |
| | (0.0842) | (0.1509) | (0.0742) | (0.7293) | (0.0952) | (0.1158) | (0.0816) | (0.1494) |
| $R^2$ | 0.024 | 0.053 | 0.037 | 0.004 | 0.025 | 0.030 | 0.032 | 0.014 |
| $N$ | 17,638 | 4334 | 21,544 | 428 | 12,953 | 9019 | 15,054 | 6918 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the question "How satisfied are you at present with your life as a whole?" (values range from 0 to 10). Robust standard errors clustered at the individual level in parentheses. All specifications are estimated with fixed-effects and include the covariates of Table 2 except time invariant regressors such as: age and age squared, sex, East Germany and years of education. Log income divided into first (between 0 and 7.597), second-third (between 7.597 and 8.3894) and fourth quantile (above 8.3894). $R^2$ refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

### 4.2. Which groups are affected?

In Table 3, we present the estimation results of Eq. (2) by partitioning the data along several observable characteristics of individuals. This allows us to examine whether the effect of immigration on SWB differs across groups. The dimensions considered are gender, age (divided into three equally-sized groups), income (divided into three groups: 1st quartile, 2nd and 3rd quartiles, 4th quartile), marital status, region of residence, education (divided into low and high educated, with the threshold being 11 years of schooling or above) and employment.

While further tests reveal that coefficients are not statistically different from each other, the point estimates show that the effect of immigration on SWB is economically stronger for certain groups than others, revealing an interesting pattern. For example, the point estimate is larger for natives who are males, younger, married, with high education, employed, those who live in West Germany and those who have an intermediate level of income. Furthermore, the heterogeneity analysis reveals an important aspect about the group of immigrants: the estimate is large and statistically significant (at the 10% level) for females, while it is negative, equal in size, yet statistically insignificant for males.[13] In most cases, the pattern of the remaining estimates for immigrants is different from that of natives, although none of the coefficients are statistically different from zero.

## 5. Causality

The identification of the impact of immigration on natives' outcomes is often challenged by causality issues, especially in studies that rely on the spatial correlation approach (Borjas, 1999), i.e., on regional variation of the migration variable. One of the main threats to causality is that immigrants are typically not randomly distributed across labor markets. This is mainly because immigrants decide their locations in function of the characteristics of the local labor market of destination. If such characteristics correspond to (or are correlated with) the outcome of interest and cannot be controlled for in the analysis, then omitted variable or simultaneity bias might arise. Another challenge is represented by natives responding to immigration by moving to regions with lower immigration. This could create a spurious correlation between immigration and natives' outcomes (Filer, 1992). In the absence of an exogenous variation (see for example Card, 1990), analysis of the impact of immigration on outcomes such as earnings and employment are hence subject to the problem of causal interpretation. In the literature, the standard approach to addressing causality issues has been to seek an instrumental variable which

[13] Tests show that the two estimates are not statistically different, with a p-value for the difference between the two coefficients of 0.16.

only affects the outcome of interest through the immigration variable. For example, Hatton and Tani (2005) use lagged immigration as an instrument for current immigration; Pischke and Velling (1997) use the past level of unemployment rate; Card (2001) constructs an instrument based on the flows by country of birth; while Ortega and Peri (2009) use a similar "country of origin" approach, whereby immigration in the destination region is instrumented by the "pushing" migration factors exerted at the source region.

Our analysis is not exempt from causality issues, since, similarly to the studies above, we adopt a spatial correlation approach. However, the panel structure of our data allows us to control for ROR fixed effects. This means that any unobservable time-invariant factor correlated with immigration and SWB is already absorbed by the regional indicators. Furthermore, controlling for additional time-varying local characteristics mitigates the role of unobservable factors which can influence both immigration and SWB. While we are confident that our econometric strategy already addresses many of the problems discussed above, we do not know a priori if the extent and severity of such issues are similar when the outcome variable is subjective rather than an objective. Therefore, in this section we empirically investigate the extent to which causality problems affect our results, focusing on issues of selection bias and endogeneity. First, we investigate whether natives respond to immigration by moving to regions where there are fewer immigrants. Second, we examine whether immigrants sort into regions where natives are happier.[14]

### 5.1. Do unhappy natives vote with their feet?

As the number of immigrants increases in a region, natives might decide to move to a different one. If natives who move are actually those who experience a decrease in their utility as a consequence of immigration, then the remaining sample of non-movers observed in the data will possess a relatively higher level of well-being. If natives' displacement is substantial, the estimated positive correlation could be the artifact of selection bias rather than the causal effect of immigration. In particular, our coefficient will be biased upward. Fortunately, we can empirically test the extent of this problem.

If there is a displacement effect, the decision of natives to move away from a ROR should be positively correlated with the number of immigrants in that ROR. In other words, the probability of out-migration increases with immigration. In order to test this hypothesis, we extract a sub-sample of natives who changed ROR during the period of analysis, and then model the decision of internal migration as a function the immigrant share. In practice, we estimate the following regression model:

$$move_{it} = 1[\,\mathbf{X}'_{it}\boldsymbol{\gamma} + \beta^o IM^o_{rt} + \beta^d IM^d_{rt} + \mathbf{Z}'^o_{rt}\boldsymbol{\lambda}^o + \mathbf{Z}'^d_{rt}\boldsymbol{\lambda}^d + \epsilon_{it} > 0\,] \tag{3}$$

$$\epsilon_{it} = \alpha_i + \delta_r + \theta_t + \varepsilon_{it} \tag{4}$$

where *move* is an indicator for whether a native individual moves from the ROR of origin $o$ to the ROR of destination $d$. In addition to all individual covariates considered in the analysis so far ($\mathbf{X}$), we add the characteristics of the ROR of origin ($\mathbf{Z}^o$) and destination ($\mathbf{Z}^d$). These include the male unemployment rate, the GDP per capita, the ethnic diversity index and, importantly, the immigrant shares ($IM^o$ and $IM^d$). The error structure is identical to that in Eq. (2), and hence the model includes dummies for the ROR of residence ($\delta$) and the time periods ($\theta$). The probability of migrating is estimated with a fixed effects estimator, very much in line with the econometric strategy adopted so far. We report the results of these regressions in Table 4, where we estimate various alternatives of Eq. (3). We are particularly interested in the role of immigration in the ROR of origin ($\beta^o$).

The first column in Table 4 only includes the immigrant share. The estimates show that the probability of moving is negatively correlated with immigration in the ROR of origin, while it is positively correlated with immigration in the destination area. This result is remarkable since, if anything, natives' redistribution within Germany generates a downward bias in our estimated coefficient. In the second to fourth columns, we progressively add local unemployment rates, regional per capita GDP and the ethnic diversity indicator. While the effects of income and ethnic diversity appear to be irrelevant, the unemployment rate is a strong predictor for the probability of natives' migration. In particular – and as predicted by economic theory – higher local unemployment in the ROR of origin induces natives to out-migrate, while higher unemployment in the destination reduces the probability of changing ROR. Remarkably, after controlling for these additional origin and destination local market characteristics, the immigrant share is essentially uncorrelated with the probability of out-migration. In view of these tests, we conclude that natives are not crowded out by immigration, and hence a causal interpretation of our results is unlikely to be affected by this type of self-selection.

### 5.2. Do migrants move to happier regions?

One potential source of endogeneity is that immigrants sort themselves in regions where well-being is higher. If this is the case, reverse causality could potentially arise since the observed immigrant share would itself be a function of SWB, leading to an upward bias in our estimates. Characteristics that determine the sorting of immigrants into a particular region, and are

[14] Indeed, the testing of these two hypothesis hinges on important assumptions - we thank one of the referees for pointing this out. For example, natives' internal migration assumes that we can measure the cost of internal migration for natives. Furthermore, testing the internal migration of immigrants assumes that immigrants have perfect information about the well-being of natives in different regions. The presence of both ROR and individual effects allows us to require milder assumptions for identification, i.e. that the cost of migration and the degree of information do not vary substantially within each ROR and over time for the same individual.

**Table 4**
Causality: native out-migration and immigrant sorting.

| | Native out-migration | | | | Immigrant sorting | | | |
|---|---|---|---|---|---|---|---|---|
| Immigrant share (o) | −0.0131*** | −0.0041 | −0.0045 | −0.0048 | 0.0119 | 0.0228 | 0.0657** | 0.0654** |
| | (0.0044) | (0.0039) | (0.0062) | (0.0063) | (0.0226) | (0.0169) | (0.0283) | (0.0285) |
| Immigrant share (d) | 0.0150*** | 0.0078** | 0.0067 | 0.0068 | 0.0000 | −0.0097 | −0.0452* | −0.0450* |
| | (0.0042) | (0.0035) | (0.0057) | (0.0057) | (0.0214) | (0.0162) | (0.0267) | (0.0268) |
| Unemployment rate (o) | | 0.0270*** | 0.0272*** | 0.0278*** | | −0.0132 | −0.0359 | −0.0352 |
| | | (0.0043) | (0.0047) | (0.0049) | | (0.0215) | (0.0227) | (0.0229) |
| Unemployment rate (d) | | −0.0250*** | −0.0246*** | −0.0249*** | | −0.0031 | 0.0137 | 0.0129 |
| | | (0.0041) | (0.0045) | (0.0046) | | (0.0200) | (0.0206) | (0.0209) |
| Per capita log GDP (o) | | | 0.0134 | 0.0159 | | | −1.0017** | −1.0175** |
| | | | (0.1162) | (0.1162) | | | (0.4713) | (0.4805) |
| Per capita log GDP (d) | | | 0.0250 | 0.0249 | | | 0.8175* | 0.8279* |
| | | | (0.1049) | (0.1049) | | | (0.4386) | (0.4431) |
| Ethnic diversity (o) | | | | 0.0652 | | | | 0.2455 |
| | | | | (0.0928) | | | | (0.6727) |
| Ethnic diversity (d) | | | | −0.0249 | | | | −0.1670 |
| | | | | (0.0913) | | | | (0.6335) |
| Happiness (o) | | | | | −0.0622 | −0.0684 | −0.0495 | −0.0544 |
| | | | | | (0.2396) | (0.2023) | (0.1955) | (0.1957) |
| Happiness (d) | | | | | 0.1851 | 0.1087 | 0.0842 | 0.0888 |
| | | | | | (0.2244) | (0.1991) | (0.1927) | (0.1931) |
| $R^2$ | 0.001 | 0.006 | 0.006 | 0.006 | 0.072 | 0.071 | 0.078 | 0.078 |
| $N$ | 12,142 | 12,142 | 12,142 | 12,142 | 1143 | 1143 | 1143 | 1143 |

*Source*: GSOEP waves 1998–2009. The dependent variable is the probability that a native (panel I) or a migrant (panel II) moves from the ROR of origin *o* to the ROR of destination *d* and the probability of that an immigrant moves from the ROR of origin *o* to the ROR of destination *d*. Robust standard errors clustered at the individual level in parentheses. The sample is restricted to individuals who change RORs between year *t* and *t* + 1. (o) refers to variable measured in the ROR of origin and (d) refers to the variable measured in the ROR of destination. All specifications are estimated with fixed-effects and include the covariates of Table 2 except time invariant regressors such as: age and age squared, sex, East Germany and years of education. $R^2$ refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

usually unobservable to the researcher, are often correlated with the outcome of interest (in our case SWB). By controlling for ROR fixed effects, our estimation strategy allows to account for all regional time-invariant characteristics. The time-varying local characteristics further contribute mitigating the role of potential shocks in the region that might drive the location decision of immigrants. We consider our empirical strategy is particularly helpful for mitigating sorting issues related to the initial location of immigrants upon arrival in Germany. However, it is possible that immigrants decide to migrate internally after having been in the country for a few years, and that regional differences in SWB could be a determinant of such a decision, giving rise to reverse causality.

To investigate this issue, we mimic our tests conducted for natives in Table 4 and select a sub-sample of immigrants who changed ROR during 1998–2009. We estimate the same model as in Eq. (3), with the exception that we also add the average level of SWB in the ROR of origin and destination as control variables. If well-being is a significant determinant of the internal sorting of immigrants, one would expect to find strong positive correlation between the decision to migrate and the average SWB level in the ROR of destination. Our results in the fifth to eight column of Table 4 show that such worries are unfounded, given that the SWB is not found to be a strong determinant of internal migration in any of the specifications. Instead, another interesting result emerges: immigrants tend to leave regions where more immigrants live, moving where there is less immigration. While such a results goes against a network hypothesis, it is compatible with immigrants being close substitutes in the labor market (Manacorda et al., 2012). Increasing immigration in a ROR would hence lead to a displacement of previous immigrants. Among the additional regional controls, only GDP in the ROR of origin is statistically significant, with an expected sign (i.e., internal migration is less likely to occur if immigrants live in richer RORs). Based on these results, immigrants' sorting according to regional differences in SWB does not appear to influence a causal interpretation of our results.

### 5.3. Further tests

Sections 5.1 and 5.2 highlight that natives' and immigrants' internal migrations do not raise particular concerns for our estimation strategy. To further ensure a causal interpretation of our results, we conduct additional tests in which we: (a) restrict our analysis to individuals who have never moved between RORs; (b) estimate the baseline regression by excluding top immigration and SWB RORs; and (c) use an instrumental variable approach. Table 5 reports the results of these additional tests. The first column shows that excluding internal migrants does not change the pattern of the estimates, in a result that corroborates what we found in Table 4. In the second and third columns, we exclude the top 10 RORs in terms of immigrant share and SWB, finding that our results are not driven by regions that absorb large inflows of immigrants or by particularly

**Table 5**
Further tests.

| | Excl. Movers | Excl. top IR ROR | Excl. top SWB ROR | Instr. Var. |
|---|---|---|---|---|
| | Natives | | | |
| Immigrant share | 0.0625** | 0.0879*** | 0.0549** | 0.0311* |
| | (0.0243) | (0.0309) | (0.0239) | (0.0188) |
| $R^2$ | 0.017 | 0.149 | 0.162 | 0.179 |
| $N$ | 139,659 | 122,076 | 140,464 | 123,651 |
| | Immigrants | | | |
| Immigrant share | 0.0184 | 0.0553 | 0.0138 | −0.0475 |
| | (0.0741) | (0.1130) | (0.0739) | (0.0506) |
| $R^2$ | 0.060 | 0.026 | 0.035 | 0.016 |
| $N$ | 20,829 | 14,886 | 20,449 | 17,834 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the question "How satisfied are you at present with your life as a whole?" (values range from 0 to 10). Robust standard errors clustered at the individual level in parentheses. All specifications are estimated with fixed-effects and include the covariates of Table 2 except time invariant regressors such as: age and age squared, sex, East Germany and years of education. Col I: Only individuals who never changed ROR; Col II/III: Exclude top ten RORs in terms immigration/SWB; Col IV, instrument is the lagged Immigrant share: first stage $F$ stat is 380366.08 for natives and 45332.62 for immigrants, and the partial $R^2$ are, respectively, 0.788 and 0.755. $R^2$ refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

"happy" areas, which could influence the sorting of individuals.[15] These results are also in line with those in Table 4. Finally, in the fourth column we instrument current immigrant share in the ROR by the lagged immigrant share. Using lagged values is a standard procedure in the absence of a more reliable instrument (Hatton and Tani, 2005), and hence we also adopted this strategy, bearing in mind the potential limitations in terms of the instrument validity. While the estimated coefficient is somewhat lower than the baseline model in Table 2, the confidence intervals of the two estimates remarkably overlap.

## 6. Where is this result coming from?

In this section, we investigate potential channels behind our results. To achieve this, we estimate models in which the immigrant share is interacted with quartiles of indicators that capture aspects we hypothesize to differentially influence the effect of immigration on well-being. Our specification in such cases builds upon the benchmark model, and is given by the following:

$$SWB^*_{it} = \sum_{j=1}^{4} \beta_j (IM_{rt} \times Q_j) + \sum_{j=1}^{3} \kappa_j Q_j + \mathbf{X}'_{it}\boldsymbol{\gamma} + \mathbf{Z}'_{rt}\boldsymbol{\lambda} + \epsilon_{it}, \tag{5}$$

$$\epsilon_{it} = \alpha_i + \delta_r + \theta_t + \varepsilon_{it}, \tag{6}$$

where $Q_j$ represents the $j$th quartile of the indicators we outline below.[16] In this regression model, we absorb the main effect of $IM$ in the interaction terms. This allows us to compare how the estimated coefficient varies across the four quartiles. We report the results from this analysis in Table 6. Below, we describe in detail the channels that we have investigated.

### 6.1. Local labor markets

The first channel that we explore is the role of labor markets. Results from Table 2 suggest that controlling for these characteristics does not affect the main result. Yet, how immigration affects natives' SWB could well be a function of attributes such as the local unemployment rate or GDP per capita. For example, if immigration contributes to the expansion of the local aggregate demand, unemployment (GDP) could decrease (increase), leading to a rise in natives' SWB. On the other hand, if immigration depresses wages and crowds out jobs in a region, this might lead to an overall decrease in natives' SWB. Whether immigration will have positive or negative effects depend on the substitutability of natives' and immigrants' skills in the labor market. To the extent that immigrants are closer substitutes in production with natives, more competitive pressures will be generated in the labor market. The opposite will occur if immigrants and natives are complement. Likewise, effects could be ambiguous for the group of immigrants, although immigrants are often found to be closer substitutes among themselves. Estimating the interaction terms $IM_{rt} \times Q_j$ from Eq. (5) allows testing whether local labor markets are a channel behind our

[15] Top ten RORs in terms of immigrant share are those which includes major metropolitan areas such as Berlin, Hamburg, Munich, Cologne and Stuggart. Top ten RORs in terms of SWB include Oberfranken-Ost, Osnabrück, Hamburg and Schleswig-Holstein Mitte.

[16] We set the fourth quartile as the reference category. We do not report the estimates of the main effects of $Q_j$ as the choice of the category does not affect the estimates of the interaction terms.

**Table 6**
Channels.

| | Labor market | | Composition | Assimilation | | | | |
|---|---|---|---|---|---|---|---|---|
| | ROR Unempl. | ROR GDP | Ethnic diversity | Wage | Empl. | Feel German | Write German | Speak German |
| IM × Q1 | 0.0495** | 0.0537** | 0.0750*** | 0.0310 | 0.0197 | 0.0672 | 0.0502 | 0.1501*** |
| | (0.0240) | (0.0250) | (0.0245) | (0.0477) | (0.0536) | (0.0462) | (0.0528) | (0.0532) |
| IM × Q2 | 0.0506** | 0.0490* | 0.0688*** | 0.1273** | 0.1302*** | 0.1013** | 0.1626*** | 0.0682** |
| | (0.0235) | (0.0252) | (0.0246) | (0.0540) | (0.0473) | (0.0411) | (0.0416) | (0.0338) |
| IM × Q3 | 0.0558** | 0.0501** | 0.0543** | 0.0528 | 0.0713 | 0.0262 | −0.0079 | −0.0049 |
| | (0.0234) | (0.0240) | (0.0248) | (0.0380) | (0.0470) | (0.0401) | (0.0375) | (0.0524) |
| IM × Q4 | 0.0599** | 0.0467* | 0.0678*** | 0.0696 | 0.0428 | 0.0326 | 0.0691 | −0.0203 |
| | (0.0237) | (0.0242) | (0.0235) | (0.0443) | (0.0358) | (0.0587) | (0.0590) | (0.0485) |
| $R^2$ | 0.167 | 0.167 | 0.167 | 0.167 | 0.167 | 0.167 | 0.166 | 0.167 |
| $N$ | 151,801 | 151,801 | 151,801 | 148,965 | 148,965 | 151,801 | 151,801 | 151,801 |
| IM × Q1 | 0.0169 | −0.0020 | 0.0188 | 0.2889* | 0.2662 | −0.0685 | −0.1218 | 0.0083 |
| | (0.0741) | (0.0869) | (0.0708) | (0.1498) | (0.1776) | (0.1485) | (0.1527) | (0.1278) |
| IM × Q2 | 0.0296 | 0.0754 | 0.0280 | 0.0562 | 0.0594 | −0.1191 | −0.0188 | −0.0279 |
| | (0.0730) | (0.0783) | (0.0694) | (0.1378) | (0.1458) | (0.1036) | (0.0982) | (0.0927) |
| IM × Q3 | 0.0100 | 0.0805 | 0.0320 | −0.0130 | 0.1060 | 0.0696 | 0.0850 | 0.1725 |
| | (0.0732) | (0.0783) | (0.0730) | (0.1035) | (0.0951) | (0.1095) | (0.1086) | (0.1469) |
| IM × Q4 | 0.0282 | −0.0001 | 0.0758 | −0.1235 | −0.1413 | 0.3742** | 0.1443 | 0.0800 |
| | (0.0785) | (0.0714) | (0.0763) | (0.1133) | (0.1148) | (0.1645) | (0.2239) | (0.2495) |
| $R^2$ | 0.043 | 0.042 | 0.042 | 0.040 | 0.042 | 0.041 | 0.040 | 0.035 |
| $N$ | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the question "How satisfied are you at present with your life as a whole?" (values range from 0 to 10). Robust standard errors clustered at the individual level in parentheses. All specifications are estimated with fixed-effects and include the covariates of Table 2 except time invariant regressors such as: age and age squared, sex, East Germany and years of education. Estimates represent coefficients of interaction models between the immigrant share and quartiles of the variables reported in the column headings. See text for detailed definitions. $R^2$ refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

results. In this case, the $Q_j$ are quartiles of the male unemployment rate and the GDP in the ROR. Each quartile is derived by first averaging the values of unemployment and GDP over time, ranking them in increasing order, and then subsetting them in four equal groups. Hence, $Q_1$ corresponds to an indicator that captures the RORs with the lowest unemployment rate and GDP, and so on.

The first two columns of Table 6 indicate a remarkable stable pattern across quartiles of the regional variables. While point estimates appear to be larger as unemployment (GDP) increases (decreases), these are not statistically different from each other. The pattern for immigrants is much less clear; yet, none of the estimates is statistically significant. These results suggest that the local labor market does not appear to be an important channel in explaining our results.

### 6.2. Ethnic diversity

The second channel that we explore is the ethnic compositions of migrants in the area. Country of origin as well as other socio-cultural traits have provided powerful explanations in the literature studying the native-immigrant wage gaps and the impact of immigration on natives' outcomes. Ethnic diversity of immigrants might be a relevant channel explaining the impact of immigration on natives' SWB. However, it is uncertain a priori whether and how more ethnic diversity in a region can influence the impact of migration on SWB. For example, more diverse areas are those in which there are more "ethnic" goods and services brought by immigrants, or more generally where immigrants have brought "ethnic capital" from their countries of origin.[17] In this case, immigration could lead to an increase in well-being. However, the more ethnically diverse an area, the lower economic outcomes could be if, for example, diversity reduces social trust or the provision of public goods, aspects that ultimately could negatively affect natives' SWB. In fact, evidence from cross-country studies does not reach a clear conclusion on whether ethnic fractionalization affects economic outcomes (see Alesina et al., 2003, 2013).

Results in the third column of Table 6 show that estimates of the interaction terms are not substantially different from each other. In fact, estimates appear to follow a U-shaped pattern. For immigrants, none of the coefficients is statistically different from zero. Interestingly, though, the point estimates rise with increasing diversity in the ROR.

[17] In this context, ethnic capital encompasses skills, education, knowledge, way-of-doing things, information-sharing, availability of resources, support by families and friends, and other unobservables that are common to immigrants or co-ethnics. Unlike human capital, but similar to social capital, ethnic capital can also be directly translated into monetary rewards such as the case of direct co-ethnic hiring.

### 6.3. Immigrants' assimilation

The third channel that we explore is the level of assimilation of immigrants in the region. We hypothesize that the effect of immigration on natives' SWB depends on the economic and cultural integration of immigrants. While there are several potential reasons, the results in the first two columns of Table 6 lead us to think that these are not related with how assimilation interacts with the labor markets. Hence, we conjecture two alternative possible reasons. First, natives could have a "taste for assimilation", i.e., they might have preferences to live in a society in which immigrants are integrated, are not discriminated in jobs, speak the language, etc. In this case, immigration increases well-being, provided, for example, that it is not detrimental to existing immigrants' assimilation. Another potential reason relates to the presence of positional concerns: immigrants might enter the reference group of natives depending on their degree of assimilation. In the presence of scarce assimilation, natives might not compare themselves to immigrants. However, as immigrants' socio-economic status improves, they could enter natives' reference group. In this case, immigration might positively or negatively influence natives' well-being, depending on whether these positional concerns are large enough to generate an "envy" or a "status" effect.

We explore this channel by deriving several measures of assimilation. We first consider two "objective measures" of assimilation based on the relative earnings and on the relative employment probabilities of immigrants and natives. We then consider "pseudo-objective" measures of assimilation, capturing the level of cultural and social attachment of immigrants to the region of residence.

#### 6.3.1. Objective measures of assimilation

The first step to construct the two objective measures consists on estimating earnings and employment assimilation models, in line with Borjas (1985, 1999). The second involves averaging individuals' predicted values from the two equations in each ROR to derive a regional indicator.

For the first step, we assume that the outcome $y$ (alternately employment probability and earnings) of each individual $i$ belonging to the group of natives ($n$) or immigrants ($m$) follows the data-generating functions below:

$$\log(y_{it}^{n}) = \mathbf{X}_{it}'\boldsymbol{\gamma}^{n} + \sum_{h}\eta_{h}^{n}P_{h}^{n} + \alpha_{i}^{n} + \delta_{r}^{n} + \mathbf{Z}_{rt}' + \upsilon_{it}^{n}, \tag{7}$$

$$\log(y_{it}^{m}) = \mathbf{X}_{it}'\boldsymbol{\gamma}^{m} + \pi^{m}ysm_{it}^{m} + \sum_{k}\psi_{k}C_{k} + \sum_{h}\eta_{h}^{m}P_{h}^{m} + \alpha_{i}^{m} + \delta_{r}^{m} + \mathbf{Z}_{rt}' + \upsilon_{it}^{m}, \tag{8}$$

where $\mathbf{X}$ represents the same socio-economic characteristics as in Eq. (1); $\alpha$ is the unobserved individual effects; $\delta$ is the region of residence (ROR); and $\upsilon$ is the usual error term. We estimate these equations with both random effects and fixed effects model. The former has the advantage of estimating additional variables in the migrant equations, namely *ysm*, representing the years since migration variable, $C$, which are dummies for the cohort of arrival and $P$, the period-effects.[18] In fact, even in a random effects model, the three parameters $\pi$, $\psi$ and $\eta$ cannot all simultaneously be identified, because the three variables above are perfectly collinear. To bypass this issue, we resort to two approaches identified in the literature.[19] On the other hand, the fixed effects model has the advantage of better controlling for individual unobserved heterogeneity, but does not allow to estimate time-invariant characteristics – such as years arrival cohort indicators – in the immigrant equation. For comparison we estimated both random and fixed effects models, obtaining very similar effects.

For the second step, we predict the outcome variable $y_{it}$ for both immigrants and natives. We then construct a regional indicator by averaging the predicted values in each ROR for both immigrants and natives, and taking the ratio between the two values:

$$A_{r} = \frac{\sum_{it}\hat{y}_{irt}^{m}/M}{\sum_{it}\hat{y}_{irt}^{n}/N}, \tag{9}$$

where $\hat{y}$ represents the fitted values from Eqs. (7) and (8) and $N$ and $M$ are the total numbers of natives and immigrants in the region, respectively. Values of $A_r$ close to (or above) 1 indicate that, in a given ROR, immigrants' outcomes converge to

[18] The estimation of the assimilation equations could be affected by self-selection (we are grateful to one of the referees for pointing this out). To assess the extent of this issue, we explore two potential sources of self-selection. First if "unsuccessful" migrants leave our initial sample to return to their home countries, the estimation of Eq. (8) would overestimate the actual success of migrants. Such bias would be particularly problematic if return migration is related to natives' SWB. To explore this, we have estimate the probability that a migrant "leaves" the sample as a function of a rich set of covariates and the average value of natives' SWB in the region, finding a correlation which is statistically and economically insignificant. We also explore standard sources of self-selection by estimating Eqs. 7 and 8 using Heckman selection model, in which we use the number of children as exclusion restriction for the equation about participation in the labor market, finding very similar estimates to the model without selection correction.

[19] One method is to estimate the equations for natives and immigrants jointly and achieve identification by imposing the restriction that the period-effects are the same for the two groups (i.e, $P_h^n = P_h^m, \forall h$ see Borjas, 1985). Another method is the "wage-curve", which imposes the restriction that period-effects have the same impact for natives and immigrants conditional on labor market characteristics (Barth et al., 2004). This is achieved by estimating an assimilation model which controls for regional characteristics (represented by $\mathbf{Z}$ in Eq. (8)). In addition, instead of using the year of entry in Germany, we group arrival cohorts into intervals of five years. This further reduces the issues of collinearity described above.

those of natives. Values below unity indicate that immigrants are less assimilated. We then determine quartiles of $A_r$ and estimate Eq. (5). Results are reported in the fourth and fifth columns of Table 6.

The results show an interesting pattern. The effect of immigration on well-being is essentially zero in RORs where immigrants are less assimilated. It increases and peaks in RORs where immigrants are intermediately assimilated (the second quartile), with the estimate being sizeable and statistically significant. It then decreases again to values that are economically small and statistically insignificant in the last two quartiles. For immigrants, most estimates are insignificant or marginally statistically significant. However, they follow a different pattern than that of natives, since point estimates appear to decrease with the degree of assimilation in the ROR. Before providing a possible explanation, we explore whether the same pattern is observed with pseudo-objective measures of assimilation.

*6.3.2. Pseudo-objective and socio-cultural measures of assimilation*

Besides exhibiting different degrees of economic assimilation, regions could also differ depending on the level of social and cultural integration of immigrants. To explore this point, we derive three additional indicators of assimilation, the first concerning "German identity" and the other two relating to language ability.[20] The literature has shown that ethnic identity, along with socio-cultural and linguistic assimilation, can influence not only the labor market performance of immigrants (Constant et al., 2009; Constant and Zimmermann, 2011), but also other outcomes such as home ownership (Constant et al., 2011). The measure of identity is constructed using information from the question *"Feeling like a German"*, which allows five possible answers: (1) Completely, (2) Mostly, (3) In some respects, (4) Barely and (5) Not at all. We define a dichotomous variable that is equal to 1 for those individuals who responded "Completely", "Mostly" or "In some respects" (this last being the median value) and equal to 0 for those who feel "Barely" or "Not at all" German. We then calculate the mean value of this indicator in the ROR by averaging over time and across individuals in the same ROR. Similar to the analysis of economic assimilation, we derive the quartiles of this variable and interact them with the immigrant share. A similar procedure is carried out for the language ability indicators. In particular, we consider the variable *"Own opinion of the respondent on the degree of spoken and written German"*. There are five possible answers for the speaking and writing abilities of the immigrant: (1) Very good, (2) Good, (3) Not bad, (4) Fairly bad, and (5) Not at all. As in the case of the identity indicator, we derive a dichotomous variable equal to 1 if the individual reports a median value or above and 0 otherwise. We then average the values to obtain a ROR indicator and its quartiles. We report the estimates of the regressions using these three measures of assimilation in the last three columns of Table 6.

The pattern of the results is very similar to that of economic assimilation, especially with reference to the identity and writing ability variables. The effect of immigration on natives' SWB increases with the degree of socio-cultural assimilation in the region, and is substantially high in regions with a moderate degree of assimilation. However, in RORs where immigrants are fully assimilated, estimates decrease to essentially zero. Results are slightly different when focusing on the speaking ability measure of assimilation, in that the impact of SWB is highest when assimilation is lowest. Yet, again, the effect is zero in the last two quartiles. For immigrants, we observe an interesting pattern. While, and very much in line with the results so far, most of the estimates are not statistically distinguishable from zero, in the case of identity and writing ability they appear to increase with the level of assimilation.

*6.3.3. A potential interpretation of the assimilation channel*

The results in Table 6 suggest that assimilation is a likely channel through which immigration affects well-being. While formal tests only weakly reject the hypothesis that the coefficients of the interaction terms are statistically different from each other, the consistency of the pattern across various assimilation measures is remarkable. The relationship between immigration and natives' SWB follows an "inverted-U" pattern. As discussed above, this pattern is unlikely to be related to a labor market effect. Instead, it might be linked to the taste for assimilation or positional concerns hypotheses, as well as which of the two prevails.

In regions where assimilation is low, an increase in immigration is found to have a zero effect on SWB. The positive effect of having more immigrants in the region could be annihilated by immigration reducing the assimilation of previous immigrants. This would be the case if, for example, newly arrived immigrants cluster in enclaves, which would lead to them interacting less with natives and being less prone to learn the language. If natives have preferences for assimilation, increased immigration could lead to a reduction in SWB. On the other hand, in moderately assimilated RORs, assimilation and immigration appear to work in the same direction, i.e., they both contribute to an increase in SWB. One possibility is that rising immigration in these regions increases the network size of immigrants, making them more likely to find a job. This synergic effect between assimilation and immigration could be behind the large positive effect on SWB in these RORs.

If taste for assimilation were the only explanation, we would probably not observe a decline in SWB in correspondence of the two last quartiles. Therefore, we conjecture that another factor comes into play: positional concerns. The existence of positional concerns is also a plausible hypothesis if one considers that the wage/employment assimilation indices are constructed as the ratio of immigrants' and natives' outcomes, which itself can be thought to be a measure of a relative income. In fully assimilated regions, the increased socio-economic status of immigrants might imply that they enter into

[20] The construction of the variables is performed by considering only the group of immigrants. These questions are also asked to a subset of natives, mostly second generation immigrants, who are excluded from the calculations.

**Table 7**
Domain-specific SWB.

| | Job | Health | Income | Dwelling | Leisure |
|---|---|---|---|---|---|
| | Natives | | | | |
| Immigrant share | −0.0312 | 0.0100 | −0.0082 | 0.0839*** | 0.0541* |
| | (0.0392) | (0.0212) | (0.0310) | (0.0285) | (0.0304) |
| $R^2$ | 0.098 | 0.694 | 0.104 | 0.016 | 0.060 |
| $N$ | 111,730 | 151,539 | 149,342 | 150,943 | 151,309 |
| | Immigrants | | | | |
| Immigrant share | 0.0796 | 0.0591 | −0.0420 | 0.0202 | 0.1330* |
| | (0.1077) | (0.0623) | (0.0854) | (0.0781) | (0.0795) |
| $R^2$ | 0.025 | 0.258 | 0.029 | 0.005 | 0.005 |
| $N$ | 14,611 | 21,930 | 21,793 | 21,901 | 21,892 |

*Source*: GSOEP waves 1998–2009. The dependent variable is "Satisfaction with job" (Column I), "Satisfaction with health" (Column II), "Satisfaction with income" (Column III), "Satisfaction with dwelling" (Column IV) and "Satisfaction with leisure" (Columns V). Values range from 0 to 10. Robust standard errors clustered at the individual level in parentheses. **Indicates significance at the 0.05 level. Sample size varies depending on the availability of the variables. All specifications are estimated with fixed-effects and include the covariates of Table 2 except time invariant regressors such as: age and age squared, sex, East Germany and years of education. $R^2$ refers to within-group $R^2$.

* Indicates significance at the 0.1 level.

*** Indicates significance at the 0.01 level.

the reference group of natives, making the two groups closer substitutes. This could generate an "envy" or "status" effect on natives, leading to a sufficiently large reduction in their well-being that it compensates the positive effects generated by assimilation (for which natives still have a taste). In other words, having more immigration in fully assimilated regions does not increase natives' SWB since the utility generated by assimilation is annihilated by the disutility of living with more individuals – immigrants – who have an income or social status similar to natives.

While we recognize that what we outlined above is just one of the possible interpretations, we think that it is remarkably consistent with the pattern of our results so far (e.g., the absence of a labor market effect or diversity channel), as well as the results from the domain satisfaction that we present below. Indeed, it would be desirable to be able to disentangle the part of the estimated effect attributable to pure preferences and the part related to positional concerns, although this is an arduous task. The main reason is that we do not have information concerning who precisely is the reference group (see, for recent discussions Clark and Senik, 2010 and Akay and Martinsson, 2011).

### 6.4. Domain specific well-being

To provide further insight into which channels are behind our results, we explore our measure of well-being in more depth. We are interested in understanding what dimensions of well-being are particularly affected by immigration, namely whether our results differ across specific "satisfaction domains". These could be interpreted as components of the SWB measure used so far. In practice, we consider five satisfaction dimensions: job, health, income, dwelling and leisure.[21] It is important to emphasize that the scope of this analysis is not to "exhaust" all potential aspects of well-being. Indeed there are many more domains of satisfaction beyond those that we can analyze with our data. Furthermore, the exact interactions between various domains are hard to disentangle. Instead, our aim is to explore the relevance of various aspects of well-being in light of the interesting results obtained so far. To explore which of these domains is most relevant, we estimate Eq. (1), substituting the dependent variable with that related to a certain satisfaction domain. We report the results of the regressions in Table A4.

Natives' job satisfaction appears not to be influenced by immigration. This result is not surprising, after having ascertained that local labor markets exert no effect on the immigration/SWB relationship. Similarly, results in the second and third columns suggest that health and income are not relevant domains. On the other hand, natives' satisfaction with dwelling and leisure appear to be the most affected domains. Remarkably, the leisure aspect also appears to be relevant for immigrants, although estimates are only weakly statistically significant. One possibility is that immigration affects the housing market, thereby influencing dwelling satisfaction. Another possibility is that immigration influences the supply of housing services such as children and elderly care, cooking, gardening and cleaning. In terms of the satisfaction with leisure, immigration could affect the amount of natives' free time if, for example, immigration increases the supply of services for certain activities that would otherwise require individuals' time (including the housing services listed above, but not only). However, it is also possible that immigration does not affect the quantity of leisure but rather its "quality", for example by increasing the supply of ethnic goods in the area.

[21] The wording of each question is "How satisfied are you today with the following areas of your life?". As in the case of SWB, responses vary between 0 and 10. See Van Praag et al. (2003) for detailed description of the various domains.

We explore these aspects further by accessing additional data from the GSOEP concerning housing and time use. In particular we obtain information on whether the individual is the house owner and lives in a good neighborhood (a self-reported variable), as well as the amount of time he/she spends on leisure during weekdays and on the weekend. In Table 7, we present the results of models in which we interact the immigrant share with each of these variables. In the case of the dwelling satisfaction, the variable is an indicator for house ownership or for living in a good neighborhood, while in the case of the leisure satisfaction, the variable is continuous and corresponds to the amount of leisure in hours during weekdays, Saturday and Sunday. If housing or time use are relevant in explaining the dwelling and leisure satisfaction, we would expect the estimate of the interaction term to be statistically different from zero.

Indeed, owning a house and living in a good area are positively correlated with well-being. However, the economic and statistical insignificance of the interaction term suggests that the impact of immigration on natives' SWB is similar for house owners and house renters and irrespective of the perceived quality of the neighborhood. At a broader level, it does not appear that immigration affects well-being through the housing market. Despite being speculative and only one of the possible explanations, it is possible that immigration increases the quantity, quality or price of certain services, leading to an overall improvement in the dwelling satisfaction for both house renters and owners. When we explore the role of free time, we find that having more hours of leisure increases well-being, in a finding consistent with Van Praag et al. (2003). However, the interaction term is only statistically significant for leisure on Saturdays. While drawing conclusions from these results requires caution, it appears that the "quantity" element of leisure is relevant on Saturdays, while it is less so during weekdays or Sundays. Since we do not have additional data to further explore this aspect, we can only conclude that both quality and quality of leisure are perhaps at work, with immigration making more and better free time available for natives.

## 7. Conclusion

This paper provides an innovative approach to directly testing the impact of immigration on the "utility" of natives. To the best of our knowledge, this is the first paper to explore such a nexus. We exploit techniques developed in the well-being literature to answer a question at the heart of the economics of immigration: "What is the impact of immigration on the native population?". Hence we go beyond traditional approaches only analyzing labor market outcomes, and consider the impact of immigration on a more comprehensive measure of utility, namely overall subjective well-being.

Merging panel data from Germany with detailed information on local labor markets for the period 1998–2009, we estimate several regression models in which we correlate natives' (and immigrants') subjective well-being variable with the immigrant share in the region, as well as a wealth of other control variables. Our major finding is that an increase in immigration positively affects natives' SWB. In other words, native Germans obtain welfare gains as immigration in their region of residence increases. We find a similar pattern of results for immigrants, albeit such estimates are smaller economically and rarely statistically significant. We thoroughly explore potential threats to a causal interpretation of our results, concluding that issues of selection and reverse causality are unlikely to affect our results.

We explore potential channels behind our results, finding that neither the labor market nor ethnic diversity are relevant explanations. On the other hand we find that the immigration effect is particularly strong in those regions in which immigrants are intermediately assimilated, while it is essentially zero in regions in which immigrants are scarcely or fully assimilated. We further explore several satisfaction domains, concluding that satisfaction with dwelling and leisure represent two relevant dimensions.

Our finding has several policy implications. First, our results suggest that immigration influences the welfare of natives beyond its objective dimension (e.g., labor market outcomes), and hence public interventions aiming at tempering (or amplifying) the effects of immigration should take this key aspect into account. Second, the degree of socio-economic assimilation of immigrants is related to natives' well-being. Full assimilation appears to annihilate the positive effects of immigration, potentially due to natives' positional concerns. This does not mean that integration/assimilation policies are not efficient or undesirable. On the contrary, we highlight that there are complex trade-offs, also involving non-monetary dimensions of immigration, that such policies should consider.

Indeed, it is important to be cautious about the validity of our finding in other contexts. It is arduous to conjecture whether our results would hold in other contexts, for example in other countries. However, recent evidence seems to point in this direction. A paper by Betz and Simpson (2013), which was conducted after the first draft of this study (Akay et al., 2012) uses the European Social Survey, finds a positive correlation between immigration and SWB in the 26 countries covered in the analysis. Indeed, we are cautious in comparing their results with ours, since the data and the overall econometric approach differ. Nonetheless, we are hopeful that more future studies will explore those aspects that we were not able to cover in our paper. For example, if migration data at a more detailed level in terms of geography and socio-demographic characteristics could be made available, it would be possible to understand whether our results still hold at a more "local" level. Last but not least, we think that there is much more to discover about the channels behind our results, especially concerning the exact mechanisms of the assimilation process, and we are hopeful that future research will help us to shedding further light on this issue.

## Appendix A.

See Tables A1–A4.

**Table A1**
Benchmark results – natives.

| | OLS | OP | RE | QFE | FE | FE |
|---|---|---|---|---|---|---|
| Immigrant share | 0.0558** | 0.0404*** | 0.0434*** | 0.0425*** | 0.0532** | 0.0559** |
| | (0.0219) | (0.0148) | (0.0150) | (0.0150) | (0.0224) | (0.0231) |
| Age | −0.0797*** | −0.0512*** | −0.0753*** | −0.0741*** | | |
| | (0.0058) | (0.0039) | (0.0039) | (0.0041) | | |
| Age squared | 0.0010*** | 0.0007*** | 0.0009*** | 0.0009*** | | |
| | (0.0001) | (0.0000) | (0.0000) | (0.0000) | | |
| Female (D) | 0.1608*** | 0.1119*** | 0.1352*** | 0.1361*** | | |
| | (0.0209) | (0.0139) | (0.0151) | (0.0156) | | |
| East Germany (D) | −0.3231*** | −0.1995*** | −0.2229*** | −0.2210*** | | |
| | (0.1074) | (0.0648) | (0.0706) | (0.0707) | | |
| Years of education | 0.0346*** | 0.0227*** | 0.0494*** | 0.0095 | | |
| | (0.0042) | (0.0029) | (0.0028) | (0.0068) | | |
| Log household size | 0.0132 | 0.0117* | 0.0129** | 0.0121 | 0.0275** | 0.0287** |
| | (0.0105) | (0.0070) | (0.0066) | (0.0079) | (0.0113) | (0.0113) |
| One child (D) | −0.0121 | −0.0131 | 0.0205 | 0.0196 | 0.0680*** | 0.0663*** |
| | (0.0241) | (0.0162) | (0.0144) | (0.0144) | (0.0220) | (0.0220) |
| Two children (D) | −0.0009 | −0.0146 | 0.0454** | 0.0441** | 0.0682** | 0.0654** |
| | (0.0319) | (0.0215) | (0.0200) | (0.0201) | (0.0317) | (0.0317) |
| Three or more children (D) | −0.0605 | −0.0449 | 0.0349 | 0.0355 | 0.0359 | 0.0341 |
| | (0.0536) | (0.0352) | (0.0325) | (0.0328) | (0.0532) | (0.0532) |
| Separated (D) | −0.7527*** | −0.4671*** | −0.5879*** | −0.5901*** | −0.4979*** | −0.4977*** |
| | (0.0758) | (0.0462) | (0.0529) | (0.0529) | (0.0721) | (0.0720) |
| Single (D) | −0.3651*** | −0.2425*** | −0.2664*** | −0.2664*** | −0.1586*** | −0.1595*** |
| | (0.0330) | (0.0219) | (0.0213) | (0.0215) | (0.0408) | (0.0409) |
| Divorced (D) | −0.5381*** | −0.3450*** | −0.2721*** | −0.2740*** | −0.0723 | −0.0696 |
| | (0.0497) | (0.0300) | (0.0335) | (0.0335) | (0.0666) | (0.0665) |
| Widowed (D) | −0.3033*** | −0.1875*** | −0.3425*** | −0.3377*** | −0.4362*** | −0.4330*** |
| | (0.0698) | (0.0474) | (0.0574) | (0.0575) | (0.1338) | (0.1342) |
| Good health (D) | −0.6227*** | −0.5261*** | −0.4319*** | −0.4307*** | −0.3426*** | −0.3429*** |
| | (0.0229) | (0.0179) | (0.0124) | (0.0124) | (0.0191) | (0.0191) |
| Satisfactory health (D) | −1.4481*** | −1.1003*** | −0.9742*** | −0.9718*** | −0.7825*** | −0.7824*** |
| | (0.0270) | (0.0205) | (0.0149) | (0.0149) | (0.0232) | (0.0232) |
| Poor health (D) | −2.3074*** | −1.6038*** | −1.6210*** | −1.6178*** | −1.3633*** | −1.3632*** |
| | (0.0357) | (0.0247) | (0.0205) | (0.0205) | (0.0326) | (0.0326) |
| Bad health (D) | −3.6420*** | −2.2819*** | −2.6871*** | −2.6819*** | −2.2942*** | −2.2948*** |
| | (0.0830) | (0.0459) | (0.0456) | (0.0457) | (0.0653) | (0.0653) |
| Not in labour force (D) | 0.0679 | 0.0402 | 0.0139 | 0.0178 | −0.0319 | −0.0318 |
| | (0.0421) | (0.0286) | (0.0246) | (0.0246) | (0.0373) | (0.0373) |
| In school/training (D) | 0.2410*** | 0.1422*** | 0.2099*** | 0.1825*** | 0.1140** | 0.1141** |
| | (0.0546) | (0.0379) | (0.0339) | (0.0340) | (0.0513) | (0.0513) |
| Unemployed (D) | −0.7414*** | −0.4408*** | −0.5540*** | −0.5453*** | −0.5328*** | −0.5318*** |
| | (0.0534) | (0.0346) | (0.0313) | (0.0313) | (0.0469) | (0.0468) |
| Log wage | 0.0143*** | 0.0092*** | 0.0090*** | 0.0080*** | 0.0033 | 0.0032 |
| | (0.0030) | (0.0019) | (0.0018) | (0.0019) | (0.0026) | (0.0026) |
| Log working hours | 0.0339*** | 0.0155** | 0.0382*** | 0.0409*** | 0.0283*** | 0.0282*** |
| | (0.0112) | (0.0076) | (0.0063) | (0.0064) | (0.0096) | (0.0096) |
| Log household income | 0.0144*** | 0.0078*** | 0.0142*** | 0.0116*** | 0.0055 | 0.0056 |
| | (0.0039) | (0.0028) | (0.0023) | (0.0026) | (0.0035) | (0.0035) |
| ROR unemployment rate | | | | | | −0.0291*** |
| | | | | | | (0.0063) |
| ROR log GDP | | | | | | −0.4005* |
| | | | | | | (0.2228) |
| ROR ethnic diversity | | | | | | 0.1010 |
| | | | | | | (0.0679) |
| $R^2$ | .26 | .076 | .328 | .327 | .167 | .167 |
| $N$ | 151,801 | 151,801 | 151,801 | 151,801 | 151,801 | 151,801 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the question "How satisfied are you at present with your life as a whole?" (values range from 0 to 10). Robust standard errors clustered at the individual level in parentheses. OLS: ordinary least-squares; OP: ordered probit; RE: random effects; QFE: quasi fixed effects (correlated random effects); FE: fixed effects. All models include indicators for RORs and years. (D) refers to dummy variables. Reference groups: for having children is No children; for marital status is Married; for health status is Excellent health; for employment is Employed. Fixed effects models exclude time invariant regressors such as: age and age squared, sex, East Germany and years of education. $R^2$ in column II refers to pseudo $R^2$ and in columns V and VI refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

**Table A2**
Benchmark results – immigrants.

| | OLS | OP | RE | QFE | FE | FE |
|---|---|---|---|---|---|---|
| Immigrant share | 0.0439 | 0.0310 | 0.0169 | 0.0182 | 0.0278 | 0.0211 |
| | (0.0633) | (0.0398) | (0.0434) | (0.0434) | (0.0710) | (0.0727) |
| Age | −0.0781*** | −0.0476*** | −0.0698*** | −0.0718*** | | |
| | (0.0151) | (0.0100) | (0.0115) | (0.0117) | | |
| Age squared | 0.0010*** | 0.0006*** | 0.0009*** | 0.0009*** | | |
| | (0.0002) | (0.0001) | (0.0001) | (0.0001) | | |
| Female (D) | 0.2787*** | 0.1701*** | 0.2515*** | 0.2698*** | | |
| | (0.0547) | (0.0350) | (0.0412) | (0.0433) | | |
| East Germany (D) | −0.6396** | −0.4362** | −0.4530 | −0.4703 | | |
| | (0.2873) | (0.1726) | (0.3216) | (0.3244) | | |
| Years of education | 0.0137 | 0.0103 | 0.0356*** | −0.0041 | | |
| | (0.0108) | (0.0069) | (0.0077) | (0.0162) | | |
| Log household size | 0.0115 | 0.0017 | 0.0109 | 0.0143 | 0.0234 | 0.0240 |
| | (0.0250) | (0.0160) | (0.0155) | (0.0193) | (0.0293) | (0.0293) |
| One child (D) | −0.0256 | −0.0197 | 0.0529 | 0.0512 | −0.0404 | −0.0404 |
| | (0.0655) | (0.0427) | (0.0400) | (0.0401) | (0.0564) | (0.0565) |
| Two children (D) | −0.1007 | −0.0731 | 0.0883* | 0.0842* | −0.0357 | −0.0360 |
| | (0.0837) | (0.0537) | (0.0510) | (0.0511) | (0.0837) | (0.0836) |
| Three or more children (D) | −0.0505 | −0.0447 | 0.0717 | 0.0702 | −0.0230 | −0.0254 |
| | (0.1244) | (0.0793) | (0.0728) | (0.0731) | (0.1348) | (0.1348) |
| Separated (D) | −0.8135*** | −0.5051*** | −0.4605*** | −0.4581*** | −0.5671** | −0.5661** |
| | (0.1974) | (0.1109) | (0.1561) | (0.1562) | (0.2448) | (0.2450) |
| Single (D) | −0.2441*** | −0.1629*** | −0.1296** | −0.1316** | −0.1052 | −0.1070 |
| | (0.0844) | (0.0537) | (0.0619) | (0.0629) | (0.1230) | (0.1223) |
| Divorced (D) | −0.7334*** | −0.4533*** | −0.5306*** | −0.5327*** | −0.5648*** | −0.5632*** |
| | (0.1415) | (0.0779) | (0.0959) | (0.0960) | (0.1805) | (0.1800) |
| Widowed (D) | −0.3936** | −0.2229** | −0.4548*** | −0.4502*** | −0.0689 | −0.0747 |
| | (0.1720) | (0.1047) | (0.1327) | (0.1323) | (0.1662) | (0.1669) |
| Good health (D) | −0.6097*** | −0.4744*** | −0.4292*** | −0.4277*** | −0.3444*** | −0.3448*** |
| | (0.0589) | (0.0443) | (0.0332) | (0.0333) | (0.0476) | (0.0476) |
| Satisfactory health (D) | −1.3899*** | −1.0018*** | −0.9074*** | −0.9035*** | −0.7215*** | −0.7220*** |
| | (0.0704) | (0.0503) | (0.0393) | (0.0395) | (0.0594) | (0.0594) |
| Poor health (D) | −2.0849*** | −1.4121*** | −1.4723*** | −1.4665*** | −1.1580*** | −1.1584*** |
| | (0.0927) | (0.0619) | (0.0502) | (0.0504) | (0.0765) | (0.0765) |
| Bad health (D) | −3.2506*** | −2.0201*** | −2.4826*** | −2.4741*** | −1.9991*** | −2.0003*** |
| | (0.1438) | (0.0854) | (0.0940) | (0.0943) | (0.1255) | (0.1255) |
| Not in labour force (D) | 0.0536 | 0.0292 | −0.0310 | −0.0199 | 0.0354 | 0.0354 |
| | (0.1160) | (0.0733) | (0.0674) | (0.0675) | (0.0926) | (0.0926) |
| In school/training (D) | 0.1990 | 0.1113 | 0.1964* | 0.1701 | 0.3174** | 0.3146** |
| | (0.1667) | (0.1108) | (0.1093) | (0.1095) | (0.1579) | (0.1574) |
| Unemployed (D) | −0.5098*** | −0.3415*** | −0.4160*** | −0.4085*** | −0.3217*** | −0.3215*** |
| | (0.1319) | (0.0814) | (0.0781) | (0.0779) | (0.1070) | (0.1068) |
| Log wage | 0.0174** | 0.0116*** | 0.0162*** | 0.0134*** | 0.0083 | 0.0083 |
| | (0.0069) | (0.0043) | (0.0047) | (0.0051) | (0.0066) | (0.0066) |
| Log working hours | 0.0764** | 0.0405* | 0.0550*** | 0.0551*** | 0.0784*** | 0.0781*** |
| | (0.0335) | (0.0209) | (0.0182) | (0.0185) | (0.0276) | (0.0276) |
| Log household income | −0.0027 | −0.0051 | 0.0091 | 0.0076 | 0.0046 | 0.0046 |
| | (0.0112) | (0.0076) | (0.0071) | (0.0079) | (0.0144) | (0.0144) |
| ROR unemployment rate | | | | | | −0.0188 |
| | | | | | | (0.0245) |
| ROR log GDP | | | | | | 0.1563 |
| | | | | | | (0.8401) |
| ROR ethnic diversity | | | | | | −0.0256 |
| | | | | | | (1.1434) |
| $R^2$ | .276 | .08 | .313 | .311 | .033 | .043 |
| $N$ | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 | 21,972 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the question "How satisfied are you at present with your life as a whole?" (values range from 0 to 10). Robust standard errors clustered at the individual level in parentheses. OLS: ordinary least-squares; OP: ordered probit; RE: random effects; QFE: quasi fixed effects (correlated random effects); FE: fixed effects. All models include indicators for RORs and years. (D) refers to dummy variables. Reference groups: for having children is No children; for marital status is Married; for health status is Excellent health; for employment is Employed. Fixed effects models exclude time invariant regressors such as: age and age squared, sex, East Germany and years of education. $R^2$ in column II refers to pseudo $R^2$ and in columns V and VI refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

**Table A3**
Benchmark results – all.

| | OLS | OP | RE | QFE | FE | FE |
|---|---|---|---|---|---|---|
| Immigrant share | 0.0465** | 0.0346** | 0.0382*** | 0.0384*** | 0.0500** | 0.0508** |
| | (0.0206) | (0.0137) | (0.0140) | (0.0140) | (0.0213) | (0.0221) |
| Age | −0.0797*** | −0.0508*** | −0.0756*** | −0.0748*** | | |
| | (0.0054) | (0.0036) | (0.0037) | (0.0039) | | |
| Age squared | 0.0010*** | 0.0007*** | 0.0009*** | 0.0009*** | | |
| | (0.0001) | (0.0000) | (0.0000) | (0.0000) | | |
| Female (D) | 0.1754*** | 0.1189*** | 0.1499*** | 0.1526*** | | |
| | (0.0198) | (0.0130) | (0.0142) | (0.0147) | | |
| East Germany (D) | −0.3024*** | −0.1847*** | −0.2098*** | −0.2089*** | | |
| | (0.1014) | (0.0608) | (0.0687) | (0.0688) | | |
| Years of education | 0.0347*** | 0.0230*** | 0.0505*** | 0.0075 | | |
| | (0.0039) | (0.0026) | (0.0026) | (0.0062) | | |
| Log household size | 0.0143 | 0.0103 | 0.0122** | 0.0130* | 0.0267** | 0.0281*** |
| | (0.0097) | (0.0064) | (0.0060) | (0.0073) | (0.0106) | (0.0106) |
| One child (D) | −0.0229 | −0.0190 | 0.0238* | 0.0224* | 0.0561*** | 0.0546*** |
| | (0.0228) | (0.0152) | (0.0135) | (0.0135) | (0.0205) | (0.0205) |
| Two children (D) | −0.0258 | −0.0288 | 0.0507*** | 0.0486*** | 0.0553* | 0.0530* |
| | (0.0304) | (0.0202) | (0.0186) | (0.0187) | (0.0298) | (0.0298) |
| Three or more children (D) | −0.0620 | −0.0469 | 0.0388 | 0.0399 | 0.0359 | 0.0328 |
| | (0.0498) | (0.0324) | (0.0294) | (0.0296) | (0.0500) | (0.0500) |
| Separated (D) | −0.7548*** | −0.4657*** | −0.5726*** | −0.5739*** | −0.5040*** | −0.5039*** |
| | (0.0726) | (0.0435) | (0.0502) | (0.0502) | (0.0691) | (0.0690) |
| Single (D) | −0.3477*** | −0.2300*** | −0.2505*** | −0.2516*** | −0.1606*** | −0.1615*** |
| | (0.0309) | (0.0203) | (0.0200) | (0.0202) | (0.0390) | (0.0390) |
| Divorced (D) | −0.5498*** | −0.3493*** | −0.2944*** | −0.2965*** | −0.1210* | −0.1184* |
| | (0.0482) | (0.0285) | (0.0317) | (0.0317) | (0.0625) | (0.0624) |
| Widowed (D) | −0.3127*** | −0.1910*** | −0.3526*** | −0.3471*** | −0.4034*** | −0.4010*** |
| | (0.0649) | (0.0434) | (0.0532) | (0.0533) | (0.1209) | (0.1212) |
| Good health (D) | −0.6211*** | −0.5166*** | −0.4312*** | −0.4298*** | −0.3453*** | −0.3455*** |
| | (0.0216) | (0.0167) | (0.0116) | (0.0116) | (0.0178) | (0.0178) |
| Satisfactory health (D) | −1.4459*** | −1.0856*** | −0.9652*** | −0.9624*** | −0.7772*** | −0.7773*** |
| | (0.0256) | (0.0192) | (0.0139) | (0.0139) | (0.0217) | (0.0217) |
| Poor health (D) | −2.2811*** | −1.5738*** | −1.6004*** | −1.5963*** | −1.3367*** | −1.3367*** |
| | (0.0337) | (0.0232) | (0.0190) | (0.0190) | (0.0301) | (0.0301) |
| Bad health (D) | −3.5921*** | −2.2378*** | −2.6581*** | −2.6518*** | −2.2514*** | −2.2520*** |
| | (0.0745) | (0.0413) | (0.0410) | (0.0411) | (0.0584) | (0.0584) |
| Not in labour force (D) | 0.0649 | 0.0379 | 0.0069 | 0.0118 | −0.0229 | −0.0229 |
| | (0.0399) | (0.0267) | (0.0231) | (0.0231) | (0.0347) | (0.0347) |
| In school/training (D) | 0.2463*** | 0.1449*** | 0.2142*** | 0.1842*** | 0.1358*** | 0.1356*** |
| | (0.0528) | (0.0361) | (0.0324) | (0.0325) | (0.0490) | (0.0490) |
| Unemployed (D) | −0.7125*** | −0.4322*** | −0.5350*** | −0.5258*** | −0.5038*** | −0.5033*** |
| | (0.0495) | (0.0317) | (0.0290) | (0.0289) | (0.0429) | (0.0428) |
| Log wage | 0.0155*** | 0.0102*** | 0.0104*** | 0.0091*** | 0.0041* | 0.0040 |
| | (0.0027) | (0.0018) | (0.0017) | (0.0018) | (0.0025) | (0.0025) |
| Log working hours | 0.0393*** | 0.0184** | 0.0400*** | 0.0423*** | 0.0341*** | 0.0339*** |
| | (0.0108) | (0.0072) | (0.0059) | (0.0060) | (0.0091) | (0.0091) |
| Log household income | 0.0126*** | 0.0064** | 0.0138*** | 0.0111*** | 0.0057 | 0.0058* |
| | (0.0037) | (0.0026) | (0.0022) | (0.0025) | (0.0035) | (0.0035) |
| ROR unemployment rate | | | | | | −0.0295*** |
| | | | | | | (0.0061) |
| ROR log GDP | | | | | | −0.3515 |
| | | | | | | (0.2164) |
| ROR ethnic diversity | | | | | | 0.1022 |
| | | | | | | (0.0677) |
| $R^2$ | .257 | .074 | .321 | .32 | .169 | .169 |
| $N$ | 173,773 | 173,773 | 173,773 | 173,773 | 173,773 | 173,773 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the question "How satisfied are you at present with your life as a whole?" (values range from 0 to 10). Robust standard errors clustered at the individual level in parentheses. OLS: ordinary least-squares; OP: ordered probit; RE: random effects; QFE: quasi fixed effects (correlated random effects); FE: fixed effects. All models include indicators for RORs and years. (D) refers to dummy variables. Reference groups: for having children is No children; for marital status is Married; for health status is Excellent health; for employment is Employed. Fixed effects models exclude time invariant regressors such as: age and age squared, sex, East Germany and years of education. $R^2$ in column II refers to pseudo $R^2$ and in columns V and VI refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

**Table A4**
Dwelling and leisure.

| | Dwelling | | Leisure | | |
|---|---|---|---|---|---|
| | House | Neighborhood | Weekdays | Saturday | Sunday |
| | Natives | | | | |
| Immigrant share | 0.0969*** | 0.1135** | 0.0530* | 0.1140*** | 0.1138*** |
| | (0.0283) | (0.0565) | (0.0301) | (0.0398) | (0.0398) |
| Main effect | 0.7607*** | 0.9773*** | 0.1414*** | 0.0694*** | 0.0495*** |
| | (0.0604) | (0.1278) | (0.0121) | (0.0113) | (0.0092) |
| Interaction term | −0.0056 | −0.0127 | −0.0001 | 0.0025** | 0.0012 |
| | (0.0058) | (0.0124) | (0.0013) | (0.0012) | (0.0010) |
| $R^2$ | 0.070 | 0.007 | 0.097 | 0.055 | 0.048 |
| $N$ | 150,943 | 52,917 | 146,883 | 70,855 | 70,866 |
| | Immigrants | | | | |
| Immigrant share | 0.0101 | 0.1128 | 0.1129 | 0.1835* | 0.1672 |
| | (0.0783) | (0.1338) | (0.0802) | (0.1115) | (0.1126) |
| Main effect | 1.6489*** | 1.2556*** | 0.1530*** | 0.1386*** | 0.0795** |
| | (0.2471) | (0.3455) | (0.0417) | (0.0475) | (0.0390) |
| Interaction term | −0.0842*** | −0.0421 | 0.0008 | −0.0019 | −0.0002 |
| | (0.0220) | (0.0290) | (0.0035) | (0.0038) | (0.0031) |
| $R^2$ | 0.016 | 0.007 | 0.007 | 0.009 | 0.006 |
| $N$ | 21,901 | 7401 | 20,949 | 9924 | 9914 |

*Source*: GSOEP waves 1998–2009. The dependent variable corresponds to answers to the questions "How satisfied are you today with your dwelling" (Columns I and II) and "How satisfied are you today with your free time" (Columns III–V). Values range from 0 to 10. Robust standard errors clustered at the individual level in parentheses. All specifications are estimated with fixed-effects and include the covariates of Table 2 except time invariant regressors such as: age and age squared, sex, East Germany and years of education. Main effects are: indicator for home ownership (Col I); indicator for living in a good neighbor (Col II); hours of leisure in weekdays (Col III); hours of leisure on Saturday (Col IV); hours of leisure on Sunday (Col V). The interaction term is the interaction between the main effect and the immigrant share. $R^2$ refers to within-group $R^2$.

* Indicates significance at the 0.1 level.
** Indicates significance at the 0.05 level.
*** Indicates significance at the 0.01 level.

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