The Impact of Immigration on the Well-Being of Natives *

Alpaslan Akay §
Amelie F. Constant ‡
Corrado Giulietti †

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Abstract

This paper examines the e ect of immigration directly on the utility of natives. Combining information from the German Socio-Economic Panel dataset with detailed local labour market characteristics for the period 1997 to 2007, we investigate how changes in the spatial concentration of immigrants a ect the subjective well-being of German-born population. Our results suggest the existence of a robust, positive e ect of immigration on natives' well-being. The presence of confounding local labour market characteristics has a negligible impact on the estimates. On the other hand, we nd substantial evidence that the assimilation of immigrants in the region matters: the positive effect of immigration increases up to a certain \assimilation threshold" and is essentially zero in areas where immigrants are economically integrated. We further conduct various sensitivity tests to ascertain that our ndings are not driven by the potential endogeneity implied by the spatial sorting of natives and immigrants.

Key Words : immigration, subjective well-being, assimilation.
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§IZA - Institute for the Study of Labor, P.O. Box 7240, 53072 Bonn, Germany - akay@iza.org
‡DIWDC - 1800 K Street, NW Suite 716 Washington DC 20006, US - constant@diwdc.org
†IZA - Institute for the Study of Labor, P.O. Box 7240, 53072 Bonn, Germany - giulietti@iza.org

1 Introduction

There has been a substantial concern about the impact of immigration on the welfare of natives (comprehensive surveys are Borjas 1994; Friedberg and Hunt 1995; Card 2005). Traditionally, studies that analyze the impact of migration employ \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 on public spending and prices Brücker et al., 2002; Dustmann et al., 2010. However, at a broader level all these measures are only partially capable to capture most of the aspects of life which generate welfare or { as more precisely expressed by $utilitarians$ such as Jeremy Bentham { pleasure and pain after an experience (Kahneman and Sugden, 2005).In recent years economists have started focusing on using broader measures of welfare instead than purely objective measures to proxy the utility of individuals (for example 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 in uences what we value in living, reaching beyond its material side." In order to capture the overall welfare of individuals, researchers have shifted towards the adoption of subjective well-being measures (SWB, \happiness" or \life satisfaction"). Although this area has been heavily researched by psychologists over the last decades, the number of studies in economics that investigate the determinants of SWB increasing substantially in recent years (for an overview see, e.g., Dolan et al. 2008; Frey and Stutzer 2002). Today this new branch of the economic literature goes beyond exploring the determinants of well-being and allows testing hypotheses and analyzing various issues that could not otherwise been studied using standard approaches. As a result of this research, we obtain insights that are di cult to gain when using a standard neoclassic economic approach. Among these results are the large dis-utility 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 a ect subjective well-being Easterlin, 1995; Clark et al., 2008. The objective of this paper is to examine the e ect of immigration directly on the welfare of natives using the overall experienced \utility", as proxied by the subjectively reported well-being.

Economists have been focusing for long time on the labor market impact of immigration. The typical approach is to correlate natives' objective measures of \welfare"

such as wages and employment with immigration across local labour markets. The empirical evidence so far is rather mixed. For example, in the US, Borjas (2003) nds negative e ects of immigration on the wages of natives. On the other hand, other studies based on US data nd that the impact of immigration, if any, is very small Card, 1990, 2001. More recently, Ottaviano and Peri (2012) document that immigration had a positive e ect on the wage of high skilled natives and a negative, but negligible e ect on low skilled natives.

In the context of Europe, Dustmann et al. (2005) analyze the impact of immigration on the regional labour markets of the UK for the period 1983-2000. They nd both economically and statistically small impacts on unemployment, participation, and wages. The study of Manacorda et al. (2012) investigates the impact of immigration on the wages of UK males from the mid 1970s to the mid 2000s. Their results suggest that immigrants and natives are complement in production, and hence there is no negative wage e ect for the latter group. On the other hand, they nd evidence that newly arrived immigrants are substitute in production with immigrants already residing in the UK. Pischke and Velling (1997) analyze the impact of immigration in Germany on the employment of natives between 1985 and 1989. They nd that immigration did not impact adversely natives' employment outcomes. More recently, D'Amuri et al. (2010) analyze both wage and employment e ects of immigration in West Germany during the period 1987 to 2001. They nd that immigration had essentially no impact on natives' labour market outcome, but an adverse e ect on previous immigrants as in the study of Manacorda et al. (2012).

Another strand of the literature has explored the impact of immigration on other outcomes, yet still using objective measures of welfare. For example Dustmann et al. (2010) analyze whether the immigration stemming from the EU enlargement towards Eastern European countries impacted UK public nances. They nd that immigrants from the accession countries positively contributed to public nances, since they were found relatively more likely to be in work than natives, and less likely to access social bene ts. Another branch of studies has started exploring the impact of immigration on natives' attitudes. For example Card et al. (2005) analyze data from the European Social Survey and conclude that while attitudes towards immigrants are partially shaped by economic factors, other aspects such as culture, of natives' social status are important in a ecting the way immigration is perceived. Boeri (2010) discusses that opinions towards immigrants are a ected by the business cycle.

To our knowledge, this is the rst paper examining the impact of immigration using subjectively reported well-being, i.e., directly on the utility of individuals. The

paper focuses on Germany and there are various reasons behind this choice. First, Germany is a high immigration country. Estimates by Eurostat show that in 2010, 9.8 million individuals residing in Germany were foreign-born. This accounts for as much as 12% of total population.[1] Second, we base our study on the German Socio-Economic Panel (GSEOP), which has the unique feature of being a highly representative dataset with longitudinal information on subjective well-being. Furthermore, GSOEP can be merged with local labour market data from the INKAR, a dataset containing local labour market characteristics, such as GDP and unemployment rate.[2] In addition, INKAR provides rich and reliable data on immigration stocks and flows at the local level, information on which our identification strategy hinges on.

We estimate various hybrid equations where well-being is expressed as function of the the proportion of immigrants in the local labour market; our specifications control for individual socio-demographic characteristics, local labour market attributes, as well as regional and time fixed effects. Our estimations provide very robust evidence that a higher immigration rate in a local labour market generates a highly significant and positive effect on well-being. In other words, natives experience welfare gains as immigration in the local labour market increases. For comparison purposes, we conducted a similar analysis for the group of immigrants as well. The result is very similar, that is, immigration positively affect the well-being of immigrants. However, the estimates are not as statistically robust as those for natives. The impact of immigration on well-being is found to vary substantially along socio-demographic characteristics. In particular the effect is larger for females, for younger individuals, for persons who are not married and for those who are relatively less wealthy.

We further examine the role of local labour market characteristics. We find that controlling for local unemployment rate and GDP does not essentially affect our estimates. On the contrary, the effect of immigration on well-being is found to be a function of immigrants' economic assimilation in the local labour market. In particular, the effect increases up to a certain \assimilation threshold" and decreases to essentially zero in those regions where economic outcomes of immigrants fully converge to those of natives. Finally, we conducted various robustness checks to address potential endogeneity issues related to the internal mobility of natives and the regional sorting of immigrants. These tests confirm that our results are not driven or strongly influenced by concerns such as reverse causality or omitted variable bias.

[1] Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/main_tables.

[2] INKAR is the acronym for Indikatoren und Karten zur Raumentwicklung.

The remaining of the paper is organized as follows: Section 2 summarises the data used in this study, and provides a detailed description of the local labour market attributes. Section 3 outlines the empirical strategy. The benchmark results of our analysis are presented in Section 4, while in Section 5 we examine the impact of local labour market characteristics. Section 6 explores in detail the effect of immigrants' assimilation on the well-being of natives. Section 7 provides results from the robustness checks and from the detailed examination on the endogeneity issues. In Section 8 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 dataset (GSOEP) with rich regional data from official statistics of Germany. The GSOEP has been extensively used in the SWB literature (e.g., Winkelmann and Winkelmann 1998; Van Praag et al. 2003; Ferrer-i Carbonell and Frijters 2004). This annual panel survey was first launched in 1984 in West Germany collecting data on 12,000 households, which have been followed since then. The sample has been extended over the years, most notably by including about 2,000 East German households in 1990. 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. This is 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.".

The second data source is the INKAR, from which we extract statistics for the 96 "regional policy regions" of Germany (henceforth, ROR).[3] 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 using ROR level data are multiple. First, RORs are well defined spatial units, which are designated on the basis of economic attributes and commuting patterns (Knies and Spiess, 2007). This detailed geographical level allows to capture efficiently the heterogeneity of German local labour markets. Second, indicators are drawn from official statistics, which

[3] 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 this data are available at http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/INKAR/inkar_node.html.

substantially attenuates measurement error issues. Our key regional variable is the proportion of immigrants in each ROR, that is the percentage of immigrants on the total resident population. Furthermore, we also extract data on local unemployment rate (both for total population and for immigrants) and GDP.

Since INKAR data are available for the period 1997 to 2007 only, our analysis will be limited to this time period. Furthermore, we restrict the sample to individuals aged between 16 and 65. The nal sample obtained by merging GSOEP and INKAR data consists of more than 160,000 individual-year observations.

2.2 Regional patterns

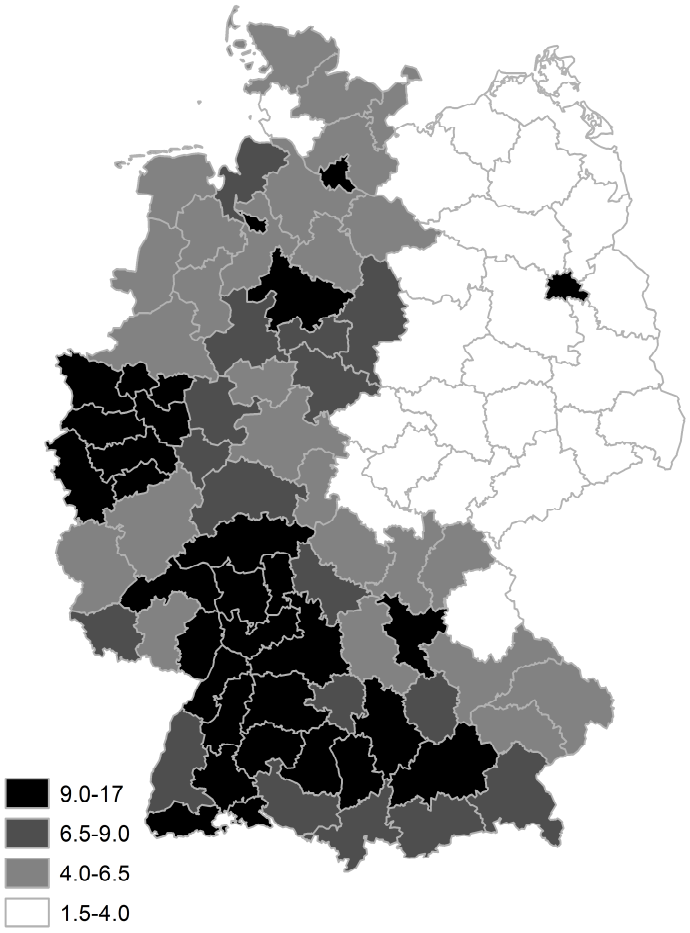
One of the key source of variation for our analysis lies in the spatial distribution of immigrants across RORs. In this section we provide a detailed account about the regional variation in immigration patterns in Germany. The map in Figure 1 depicts average immigration rate over the period 1997-2007 for all RORs used in this study. Darker colors represent an higher immigration rate (de ned as the proportion of foreign born individuals in the region over the total population.[4]

There is a substantial variation in the immigration rate across regions, which also strikingly di ers between the East and the West of Germany. In West Germany immigration rates vary from a minimum of 1.5% to a maximum of 16.8%. Furthermore, although on the one hand it is possible to observe clusters of high and intermediate immigration rates, on the other hand contiguous RORs within the same Federal State exhibit diverse immigration incidence. This suggests that a de nition of labour market based on Federal State would tend to underestimate the heterogenous immigration patterns across contiguous areas.

In order to provide a preliminary evidence of the relationship of interest, the top panels of Figure 2 depicts the bivariate correlation between immigration rate and SWB for both natives and immigrants. The gures refer to averages at the ROR level over time. Albeit the scatter plot is constructed using aggregated values, it reveals the existence of a positive relationship between immigration rate and SWB, at least for the group of natives. The pattern for immigrants seems also positive, but relatively noisy, especially at low level of immigration rates. This is the conse-

[4] Immigration expanded during the 1960s and 1970s through the \guest workers" programs stemming from bilateral agreements between Germany and partner countries, such as Greece, Italy and Turkey. After the termination of guest worker programs, a relative large wave of immigration came through asylum seeker and refugees, mainly during the early 1990s. More recently, the enlargement of the European Union (EE) to Central and Eastern Europe countries did not generate a large increase of immigration, perhaps also due to the implementation until recently (May 2011) of transitional rules, according to which Germany can still impose restrictions on the free movement of workers from the new Member States joining the EU.

Figure 1: Immigration rate in the RORs



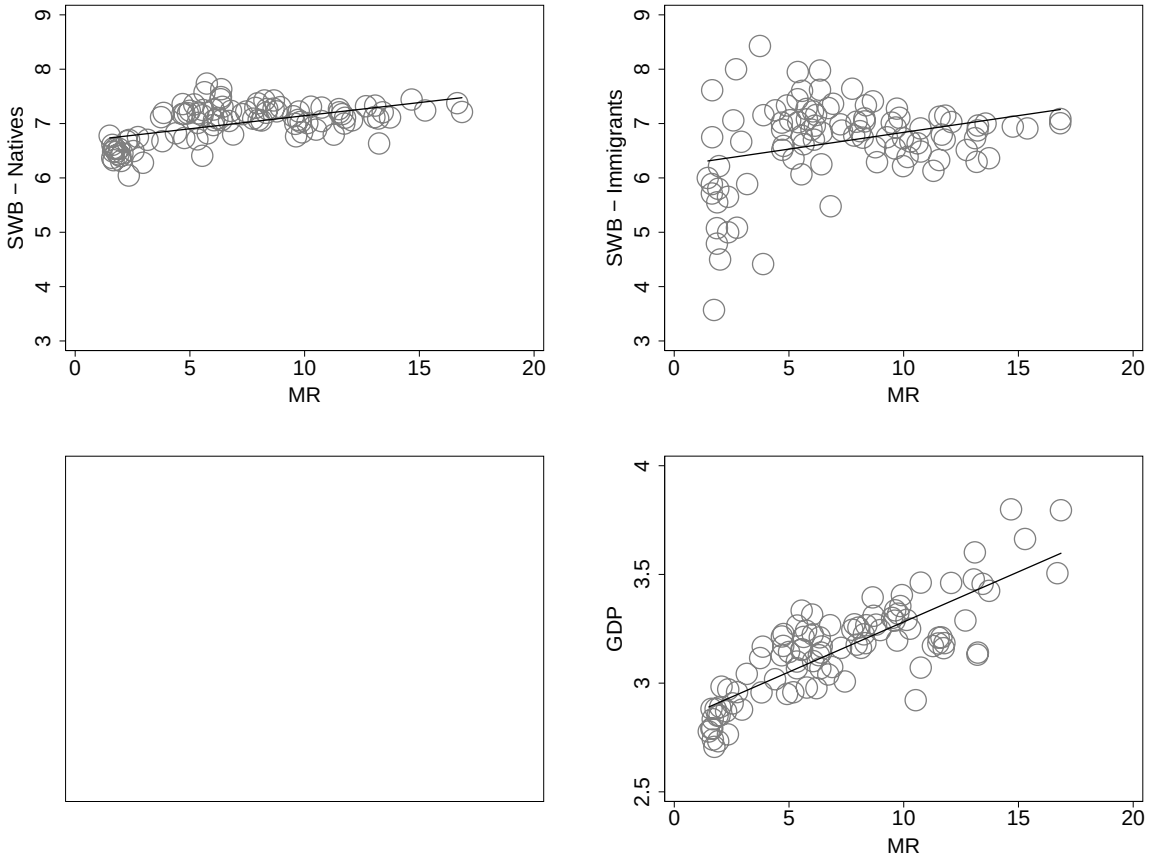
Source: INKAR 1997-2007. Digital boundaries from Raumordnungsregionen ©BKG/BBSR 2011 (http://www.bbsr.bund.de). Immigration rates refer to averages over time.

quence of the smaller sample size of this group in low immigration RORs. Indeed, it is necessary to account for many other factors which are potentially correlated with both SWB and immigration. For example, as shown in the bottom panel of the gure, high immigration RORs are also relatively less deprived, as they exhibit low unemployment and high income. These two economic factors, in turn, are also major determinants of SWB. The econometric analysis in the next section carefully addresses the potential confounding e ect deriving from such regional heterogeneity.

2.3 Summary statistics

Table 1 summarizes the descriptive statistics of the sample used in the analysis. The statistics are reported for the groups of natives and immigrants and decomposing the sample into regions with high and low immigration, that is above and below

Figure 2: Regional characteristics



Source: all statistics from INKAR 1997-2007, except SWB, obtained from GSOEP 1997-2007. SWB=Subjective well-being; MR=Immigration rate; UR=Unemployment rate; GDP=Log of per capita GDP. Figures refer to averages over time.

the median immigration rate in the ROR, respectively. The group of natives in low immigration RORs report slightly lower levels of well-being than those in RORs with high immigration. Immigrants in low immigration regions exhibit higher levels of SWB than natives, while the opposite is true in high immigration RORs.

Across high and low immigration RORs, natives exhibit di erences in few socio-economic characteristics; their education level, as well their household income and individual wages are slightly higher in high immigration RORs. On the contrary, immigrants in high immigration RORs are somewhat over-represented in the lowest education category and exhibit lower individual wages. However, they also have slightly higher household income than immigrants in low immigration RORs. In summary, Table 1 reveals that levels of SWB for natives and immigrants vary across high and low immigration RORs; however, characteristics of individuals are also di erent. Furthermore, it is important to recall that macroeconomic conditions are substantially heterogenous across high and low immigration RORs, as showed in Figure 2. The empirical strategy developed in the next section shows how we will

take into account of the substantial heterogeneity across individuals and RORs.

Table 1: Summary statistics - individual characteristics

	Low immigration RORs				High immigration RORs			
	Natives		Immigrants		Natives		Immigrants	
Characteristics	mean	s.dev	mean	s.dev	mean	s.dev	mean	s.dev
SWB	6.819	(1.777)	7.031	(1.773)	7.118	(1.717)	6.825	(1.789)
Demographics								
Age	42.033	(13.141)	41.921	(12.501)	42.113	(12.854)	42.735	(12.315)
Males (%)	0.489	(0.500)	0.484	(0.500)	0.486	(0.500)	0.491	(0.500)
East Germany (%)	0.490	(0.500)	0.051	(0.221)	0.052	(0.222)	0.005	(0.074)
Completed education								
less than 10 yrs	0.079	(0.269)	0.298	(0.457)	0.096	(0.294)	0.407	(0.491)
10 yrs	0.251	(0.434)	0.255	(0.436)	0.255	(0.436)	0.206	(0.405)
11 yrs	0.274	(0.446)	0.189	(0.391)	0.216	(0.412)	0.141	(0.349)
12 yrs	0.115	(0.318)	0.088	(0.284)	0.094	(0.291)	0.071	(0.257)
13 or above yrs	0.281	(0.450)	0.170	(0.375)	0.340	(0.474)	0.173	(0.379)
Household and children								
Household size (log)	0.975	(0.454)	1.159	(0.467)	0.936	(0.486)	1.110	(0.467)
No children (%)	0.616	(0.486)	0.446	(0.497)	0.616	(0.486)	0.487	(0.500)
One child (%)	0.207	(0.405)	0.235	(0.424)	0.191	(0.393)	0.223	(0.416)
Two children (%)	0.137	(0.344)	0.187	(0.390)	0.146	(0.353)	0.197	(0.398)
Three or more (%)	0.040	(0.196)	0.132	(0.339)	0.047	(0.212)	0.093	(0.291)
Marital status								
Married (%)	0.613	(0.487)	0.784	(0.411)	0.604	(0.489)	0.769	(0.422)
Separated (%)	0.018	(0.134)	0.018	(0.131)	0.023	(0.149)	0.026	(0.160)
Single (%)	0.269	(0.444)	0.126	(0.332)	0.273	(0.446)	0.120	(0.325)
Divorced (%)	0.076	(0.265)	0.053	(0.225)	0.081	(0.273)	0.058	(0.234)
Widowed (%)	0.024	(0.152)	0.015	(0.122)	0.020	(0.138)	0.022	(0.147)
Spouse abroad (%)	0.000	(0.000)	0.003	(0.058)	0.000	(0.014)	0.005	(0.068)
Health								
No Answer/ NA (%)	0.002	(0.039)	0.001	(0.031)	0.001	(0.035)	0.001	(0.031)
Very good (%)	0.093	(0.290)	0.106	(0.308)	0.114	(0.318)	0.104	(0.305)
Good (%)	0.454	(0.498)	0.425	(0.494)	0.459	(0.498)	0.430	(0.495)
Satisfactory (%)	0.323	(0.468)	0.309	(0.462)	0.297	(0.457)	0.291	(0.454)
Poor (%)	0.105	(0.306)	0.131	(0.338)	0.105	(0.307)	0.136	(0.343)
Bad (%)	0.024	(0.152)	0.028	(0.164)	0.023	(0.150)	0.038	(0.190)
Labour market								
Employed (%)	0.687	(0.464)	0.635	(0.482)	0.719	(0.449)	0.616	(0.486)
Not in labour force (%)	0.201	(0.401)	0.233	(0.423)	0.207	(0.405)	0.266	(0.442)
Retired (%)	0.005	(0.068)	0.003	(0.055)	0.004	(0.064)	0.004	(0.062)
In school or training (%)	0.025	(0.156)	0.025	(0.157)	0.027	(0.162)	0.017	(0.128)
Unemployed (%)	0.082	(0.275)	0.104	(0.305)	0.043	(0.202)	0.097	(0.296)
Self-employed (%)	0.064	(0.245)	0.031	(0.174)	0.076	(0.265)	0.045	(0.207)
Wages (log)	7.519	(4.115)	6.841	(4.392)	7.894	(4.101)	6.758	(4.567)
Hours worked (log)	2.412	(1.734)	2.175	(1.749)	2.498	(1.678)	2.125	(1.769)
Household income (log)	7.963	(0.596)	7.896	(0.568)	8.104	(0.607)	7.971	(0.571)
N	72,359		6,156		66,681		16,384	

Source: own computations from GSOEP 1997-2007.

3 Econometric Specifications

SWB is measured in an ordinal scale and the appropriate econometric model is an ordered probit. Hence, our default specification is presented as the ordered probit model in which well-being is considered to be latent, that is unobserved:

$$SWB^*_{it} = \beta MR_{rt} + \mathbf{X}'_{it}\boldsymbol{\gamma} + \mathbf{Z}'_{rt}\boldsymbol{\lambda} + \epsilon_{it}, \quad (1)$$

$$\epsilon_{it} = \alpha_i + \delta_r + \theta_t + \varepsilon_{it}, \quad (2)$$

where SWB^*_{it} captures the latent well-being or utility of individuals i at time t. The key parameter to identify is β, which captures how the immigration rate (MR_{rt}) in region r at a certain time t affects the SWB of individuals. The matrix $\mathbf{X}$ comprises of individual socio-demographic and economic characteristics such as age, marital status and income; $\mathbf{Z}$ includes time-varying labour market characteristics, such as unemployment rate and GDP per capita in each region at a given time; $\boldsymbol{\gamma}$ and $\boldsymbol{\lambda}$ are the corresponding vectors of parameters to be estimated. The error term ϵ_{it} and its components are represented in (2): α_i captures individual unobservable heterogeneity; δ_r encapsulates region-specific, time-invariant attributes, and θ_t represents time dummies; finally, ε_{it} is an error term which is assumed to be normally distributed with a unit variance due to identification in the ordered probit specifications. Even though the econometric specification is presented as an ordered probit model due to the metric structure of the dependent variable, in this paper we estimate various alternative specifications to examine the effect of the immigration on SWB, including linear models. At least in the sample under scrutiny, linear regression provides qualitatively similar results, and hence this method will be used (Ferrer-i Carbonell and Frijters, 2004). The advantages of using a linear specification is that it allows an easier interpretation of the parameter estimates, as well as it enables to control for individual unobservable characteristics in simpler fashion.

As discussed by Boyce (2010), the role of unobserved personal characteristics, such as personality traits, is crucial with a subjective dependent variable. If these factors - as captured by the term α_i in 2 - are correlated with other regressors ($E(\epsilon_{it}, x_{it}) \neq 0$), then a fixed effects specification would be preferred. However, in our specification, a fixed-effects estimator would have some disadvantages as well. For example, estimating equation (1) by including both fixed-region and fixed-individual effects would essentially correspond to estimating the impact of immigration on individuals who actually $change$ region of residence (that is, internal migrants), which is not the primary objective of interest. Furthermore, when comparing the impact of migration on SWB between natives and immigrants, estimates will not be exactly

comparable, as certain time-invariant factors will not be identi ed (for example, years since migration or arrival cohorts in the case of migrants). To address these issues and at the same time to allow individual heterogeneity to be correlated with observable individual covariates, equations (1) and (2) will be estimated using a $correlated\ random\text{-}effects\ model$ (also known as quasi- xed-e ects (QFE), Chamberlain (1984)). This corresponds to a random-e ects model augmented with within means of time-variant individual characteristics (for example, household size, net income and weekly working hours). While the QFE will be the benchmark speci cation, the estimates of OLS, random-e ects and xed-e ects model will be provided for comparison purposes.

4 Results

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

In this section, we test for the e ect of immigration rate on the SWB of natives and immigrants. This is done by estimating equations (1) and (2). In Table 2 we report the results of the estimation using alternative speci cations. Although the table only reports the coe cients of interest (namely the β of (1)), it is important to discuss rst how the estimates of our model compare with respect to the existing literature. The full estimation of the model - which includes all socio-economic characteristics listed in Table 1 - is reported in the Appendix. For the aims of this section, it is important to brie y mention the fact that our results are in line with previous literature about the study of SWB in Germany Ferrer-i Carbonell, 2005; Winkelmann and Winkelmann, 1998. For example, having more children and being married are aspects which are positively correlated with well-being; the same applies for possessing more years of education/training, being healthy and having a higher income. As it has been established in the SWB literature, being unemployed is negatively associated with life satisfaction. The pattern of SWB over the life cycle exhibits the \classic" U-shaped behavior: well-being decreases into an age \dip" until the age of $40 - 45$, and then increases (see Frey and Stutzer 2002; Dolan et al. 2008).

In reference to the parameters of interest, Table 2 reports benchmark results for the group of natives, of immigrants and of the two groups together. The scope of these regression is to estimate the impact of immigration on SWB once observable and unobservable individual characteristics are taken into account. At this stage

we present results by omitting other regional factors such as the ROR's GDP and unemployment rate. We rst start - for comparison purposes - with an ordinary least squares (OLS) speci cation. The results are reported in the rst column of Table 2. The parameter estimate suggests that a higher immigration rate in the

The presence of unobservable individual heterogeneity is addressed by estimating

Table 3: The e ect of immigration on SWB: estimates by observable characteristics

		Natives	Immigrants
Gender			
	Males	0.027	0.032
		(0.021)	(0.055)
	R^2	0.294	0.292
	N	67,824	11,018
	Females	0.064***	0.099*
		(0.021)	(0.057)
	R^2	0.265	0.267
	N	71,216	11,522
Age			
	Below 30	0.084**	0.141
		(0.034)	(0.098)
	R^2	0.197	0.215
	N	27,941	3,846
	30 to 50	0.046**	0.010
		(0.021)	(0.062)
	R^2	0.296	0.267
	N	67,389	11,347
	Over 50	0.052*	0.080
		(0.027)	(0.066)
	R^2	0.314	0.331
	N	43,710	7,347
Marital status			
	Married	0.031*	0.032
		(0.018)	(0.044)
	R^2	0.284	0.259
	N	84,589	17,424
	Not married	0.067***	0.139
		(0.025)	(0.085)
	R^2	0.269	0.337
	N	54,451	51,16
Employment			
	Employed	0.048***	0.025
		(0.016)	(0.047)
	R^2	0.248	0.230
	N	103,217	15,160
	Not employed	0.053	0.149**
		(0.034)	(0.075)
	R^2	0.336	0.342
	N	35,823	7,380
Education			
	Below 12 yrs education/training	0.038*	0.110**
		(0.021)	(0.048)
	R^2	0.276	0.269
	N	81,507	16,942
	Above 12 yrs education/training	0.051**	0.033
		(0.022)	(0.072)
	R^2	0.275	0.304
	N	57,533	5,598
Income			
	Below median income	0.077***	0.084
		(0.027)	(0.061)
	R^2	0.272	0.283
	N	67,668	12,437
	Above median income	0.041**	0.031
		(0.019)	(0.056)
	R^2	0.228	0.238
	N	71,372	10,103

Source: GSOEP 1997-2007 and INKAR 1997-2007. Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. Estimates refers to regression of subjective well-being on immigration rate for each the reported group. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2

groups considered (i.e., below 30 years, between 31 and 50 and over 50 years). However, the estimated coe cient is highest for the younger group, decreases for the \prime-age" group and increases slightly for the group over 50. The same \U-shaped" pattern is observed for the immigrants, albeit the precision of the estimated parameters is rather low. In regards to marital status, the impact of immigration on the SWB of natives who are not married individuals is more than double than in the case of those who are married. The same emerges in the case of immigrants albeit, yet again, results are not statistically robust according to usual signi cance levels. Results by employment status are also interesting. In general, the estimated coe cient is larger for individuals who are not in employment. Nevertheless, the estimate for natives not in employment is somewhat imprecise. For immigrants, the estimate for the group of employed is essentially zero; on the contrary, the e ect of immigration on the group not in employment is large and statistically robust. A di erent pattern across the groups of natives and immigrants emerges in the case of education. The e ect of immigration on SWB is somewhat larger for natives who have more years of education. On the other hand, for the groups of immigrants, the e ect seems to be concentrated on the group with less than 12 years of education/training while it is very small, and statistically insigni cant for more educated immigrants. The last panel in Table 3 considers individuals with household income above and below the median. For individuals with lower income, the impact of immigration on SWB is larger than for individuals who report higher income. This is true for both natives and immigrants, although results are statistically signi cant for natives only.

There are two important aspects about Table 3 that are worth emphasizing. First, the e ect of immigration on SWB di ers substantially in function of diverse socio-economic characteristics. Second, this subgroup analysis con rms the existence of a positive relationship between immigration and SWB for all groups considered - although the precision and the size of the estimates vary somewhat. There could be many explanations of such di erences, a few of which is worth mentioning. For example, some groups might possess traits which are not observed in the data and which are correlated with how immigration a ects well-being. Another possibility is that the e ect of immigration is heterogenous in function of how the di erent impacts that immigration has on the labour market outcomes of these groups. Furthermore, di erent socio-economic groups might react to immigration in a di erent fashion depending on how immigrants are integrated into the labour market and the society.

5 Where is this result coming from? The effect of local labor market

The benchmark results suggest that natives' and immigrants' well-being increases as immigration in the ROR increases. Yet, speci cations in Table 2 do not consider the confounding role that regional characteristics might exert on both immigration and the well-being. Although in all our speci cations we control for time-invariant local characteristics - by introducing 96 ROR dummies, the presence of time/region speci c shocks could further a ect the causal interpretation of our estimates. In this section, we present estimates of models which control for time-varying characteristics in the RORs, namely the regional GDP and the local unemployment rate. For example, if a ROR is characterized by high unemployment, natives and migrants may compete for the same jobs and this may generate welfare loss among either or both groups. If the e ect of these regional variables is particularly strong, the estimated impact found in Table 2 is the likely by-product of the confounding e ect of local characteristics other than immigration. Another important issue is that the structure of local labor market may also in uence the sorting of immigrants into the regions. We will consider this issue separately and give a full account in Section 7.

To mitigate the potential omitted variables bias induced by confounding factors at the ROR level, we test the sensitivity of our results to adding time-variant ROR characteristics in equation (2). These additional variables are the aggregate unemployment rate, the immigrant-speci c unemployment rate and the GDP per capita. Table 4 contains QFE estimates of the same model in the fth column of Table 2, augmented by these regional controls. Controlling for the aggregate unemployment rate does not a ect substantially the e ect of immigration on natives's SWB; for immigrants, estimates are slightly smaller and not statistically signi cant at conventional level. Furthermore, the estimated e ect of the unemployment variable on SWB is in general insigni cant. This does not implies that unemployment does not in uence individuals well-being. Rather, it means that $changes$ over time of unemployment rate are not strongly correlated with changes of SWB. One explanation is that the presence of ROR xed e ects is likely to have absorbed most of the negative in uence of unemployment.

Interesting results emerge when adding GDP per capita to the regression. Estimates for the impact of immigration on SWB are somewhat larger for both natives and immigrants. However, GDP is found to be negatively correlated with individuals' subjective-well being. While this at rst instance appears to be a puzzling result, two remarks are necessary. First, as pointed out in the case of unemployment, the

Table 4: The e ect of immigration on SWB: local labour market characteristics

			Natives			
Immigration rate	0.043***	0.054***	0.042**	0.049***	0.048***	0.048***
	(0.016)	(0.016)	(0.016)	(0.018)	(0.018)	(0.018)
Unemployment rate	0.003			{0.001		{0.003
	(0.006)			(0.006)		(0.008)
Per capita log GDP		{0.573***		{0.466**	{0.484***	{0.503***
		(0.175)		(0.189)	(0.188)	(0.193)
Immigrant unemployment rate			0.002		0.000	0.002
			(0.005)		(0.005)	(0.007)
R^2	0.279	0.276	0.279	0.278	0.277	0.277
N	130,510	126,193	130,013	117,663	117,166	117,166
			Immigrants			
Immigration rate	0.050	0.083**	0.056	0.073	0.077	0.105**
	(0.045)	(0.042)	(0.045)	(0.048)	(0.049)	(0.050)
Unemployment rate	{0.023			{0.036		{0.095**
	(0.021)			(0.022)		(0.040)
Per capita log GDP		{0.235		{0.615	{0.500	{0.801
		(0.510)		(0.570)	(0.574)	(0.575)
Immigrant unemployment rate			0.005		0.003	0.062**
			(0.016)		(0.018)	(0.032)
R^2	0.277	0.269	0.277	0.273	0.273	0.273
N	20,413	20,922	20,412	18,795	18,794	18,794

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2

presence of ROR dummies implies that what is estimated is e ect of changes in GDP on changes in SWB. Hence, the strong positive correlation between SWB and GDP exhibited in Figure 1 is once again likely to be absorbed by the presence of the ROR xed e ects. Second, a plausible explanation of this negative correlation can be attributed to the presence of \positional" or \relative" concerns with respect to income. [6]. Hence, the change in GDP in the ROR represents the change in the level of income that the individuals would like to achieve. Thus, as the GDP in the region increases, it becomes more di cult for individuals to reach the income level of the \reference" group, thereby generating dis-utility Clark and Oswald, 1996; Ferrer-i Carbonell, 2005; Clark et al., 2008.

The results are robust to the introduction of immigrant-speci c unemployment rate. The estimated impact of immigration on SWB is positive and very much in line with the benchmark results for both natives and immigrants. When regional variables are combined in the model, most of the results are similar to the benchmark results. The only exception is when all three regional indicators are added to the model for immigrants. The estimated impact of immigration on the well-being of

[6]Findings from the subjective-well being literature suggest that utility is not only a function of the absolute income but also of how an individual's income \positions" in relation to the income of others individuals Clark and Oswald, 1996; Senik, 2004; Luttmer, 2005; Ferrer-i Carbonell, 2005; Clark et al., 2008

immigrants becomes larger and more signi cant. Furthermore, while the impact of the aggregate unemployment is negative and signi cant - meaning that adverse changes in the labour market negatively impact the well-being - the estimate of the immigrant unemployment rate is positive and signi cant - meaning that adverse changes in the employment status of immigrants have a positive impact on well-being. This counterintuitive results could be potentially explained once again by positional concerns and by emphasizing that the reference category in the regression corresponds to employed individuals. As economic conditions in the ROR become worse, it is relatively easier for employed immigrant to achieve the economic status of the reference group. Another, perhaps more intuitive explanation, is that the somewhat large correlation between the total and immigrant-speci c unemployment rates (0.41) produces estimates with opposite sign. In the following, our preferred speci cations will contain the aggregate unemployment rate and the per capita GDP only.

While the results above suggest that regional characteristics, on average, are supportive of the benchmark results in Table 2, it is possible that the impact of immigration varies in function of di erent regional attributes. To explore this point, we estimate an alternative speci cation of equation 1 which includes an interaction between immigration rate and the regional characteristics. In practice, we estimate three speci cations where each of the regional variables considered before - aggregate unemployment rate, GDP per capita and immigrant-speci c unemployment rate - is divided into quartiles and interacted with the immigration rate in the ROR.[7] The main e ect of each ROR characteristic is also included. This implies that the four interactions in each model absorb the main e ect of the immigration variable. The interaction terms are indicated in Table 5 by the terms $MR \times Q1$, $MR \times Q2$, $MR \times Q3$, and $MR \times Q4$. Here $Q1$ refers to regions with lowest quartile of each indicator; $Q2$ and $Q3$ to the second and third quartile; $Q4$ to the upper 25% of regions in terms of value of a given ROR indicator. The results from the interaction models con rm the robustness of the benchmark regression. The e ect of immigration on natives' well-being is stable in regions with di erent levels of unemployment. On the contrary, the estimated e ect of immigration on well-being decreases somewhat in areas with higher GDP. For immigrants, a similar pattern is observed, although not all of the estimated interactions are statistically signi cant at the conventional levels.

[7] Each quartile is derived by rst constructing the ROR distribution of each regional attribute. This is obtained by averaging over time the values of unemployment and GDP.

Table 5: The e ect of immigration on SWB: interaction models

	Unemployment rate		*Per capita GDP*		*Imm. unemployment rate*	
	Natives	Immigrants	Natives	Immigrants	Natives	Immigrants
MR x Q1	0.049***	0.088*	0.046**	0.095*	0.049***	0.073
	(0.017)	(0.047)	(0.018)	(0.051)	(0.018)	(0.049)
MR x Q2	0.049***	0.089*	0.045**	0.077	0.050***	0.075
	(0.017)	(0.047)	(0.018)	(0.048)	(0.018)	(0.049)
MR x Q3	0.050***	0.095**	0.038**	0.066	0.049***	0.078
	(0.018)	(0.048)	(0.018)	(0.048)	(0.018)	(0.049)
MR x Q4	0.046**	0.078	0.037**	0.072	0.050***	0.076
	(0.018)	(0.049)	(0.018)	(0.048)	(0.019)	(0.049)
R^2	117,663	18,795	117,663	18,795	117,166	18,794

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2.Estimates in each panel refer to interactions between immigration rates (MR) and categorical variables for the regional attributes, de ned by the quartiles of their distributions (Q1, Q2, Q3, Q4).

6 Who is affecting? Immigrants' assimilation and well-being of natives

In this section we investigate another source of regional heterogeneity: the level of assimilation of immigrants. The e ect of immigration on the well-being might depend on the level to which immigrants are economically and culturally integrated in the region. We analyze this issue by rst investigating how the estimated e ect varies across regions with di erent level of economic assimilation. We then consider \pseudo-objective" measures of assimilation, which capture the level of cultural and social attachment of immigrants to the region of residence.

6.1 Objective measures of assimilation

Immigrants - as much as natives - are clearly not an homogenous group in their skills. Some immigrants possess skills which are comparable and substitutable with those of natives; other immigrants on the other hand possess skills which actually complement those possessed by natives. Since the labour market impact depends on this level of substitutability of skills, it might well be that also the impact of immigration on the well-being of natives (and of other immigrants) varies in function of the level of competition in the labour market. Upon their arrival in the country of destination, immigrants lack skills which are speci c to the host labour market. However, over time they acquire the necessary knowledge and skills - such as language - and they assimilate in the labour market Chiswick, 1978; Borjas, 1985. As a consequence, their earnings and employment opportunities will tend to catch-up with those of natives. To what extent immigrants' economic success plays a role on

the well-being of natives is very much an empirical question. On the one hand, the economic integration of immigrants might produce more competitive pressures on natives; on the other hand, the fact that they are more assimilated in the labour market, might also produce positive spillover for German-born individuals. Likewise, assimilation might have ambiguous e ects on the group of immigrants as well. As labour market outcomes of immigrants converge to those of natives, immigrants indeed will gain in terms of well-being; on the other hand, this might also imply stronger competition pressures, given the fact that substitution among immigrants is in general stronger Card, 2001; Manacorda et al., 2012.

To examine how immigrant economic integration in uences our results, we construct two assimilation indicators - one for wage assimilation and one for employment assimilation - and interact them with the immigration rate in the region. Before we present the results, however, we brie y outline how the assimilation indicators were derived. The rst step is to estimate earning and employment assimilation models in line with Borjas 1985, 1999. We assume that the outcome y (alternately earnings and employment probability) of each individual i belonging to the group of natives (n) or immigrants (m) follows the data generating function below:

$$\log(y_{it}^{n}) = \mathbf{X}_{it}'\boldsymbol{\gamma}^{n} + \sum\nolimits_{h} \eta_{h}^{n} P_{h}^{n} + \alpha_{i}^{n} + \delta_{r}^{n} + \mathbf{Z}_{rt}' + \upsilon_{it}^{n}, \tag{3}$$

$$\log(y_{it}^{m}) = \mathbf{X}_{it}'\boldsymbol{\gamma}^{m} + \pi^{m} ysm_{it}^{m} + \sum$$

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approaches experimented in the literature. One method is to estimate the equations for natives and immigrants jointly and achieve identi cation by imposing the restriction that the period-e ects are the same for the two groups (i.e, $P_h^n = P_h^m$, $\forall h$ Borjas (1985)). In this paper, we follow a \wage-curve" approach which imposes that period-e ects have the same impact for natives and immigrants $conditional$ on labour market characteristics (Barth et al., 2004). This is achieved by estimating an assimilation model which controls for regional characteristics (as represented by $\mathbf{Z}$ in the equation above). In addition, instead of using the year of entry in Germany, we group arrival cohorts into periods of ve years. This further reduces the issues of collinearity described above.[10]

After the estimation of the parameters in equations (3) and (4), the second step is to predict the outcome variable y_{it} (earnings and employment probabilities) for each individual i and year t, for both groups of immigrants and natives. The third step consists of constructing a regional indicator on the estimated output.[11] This is constructed by calculating, in each region, the ratio between the average predicted wage (or employment probability) of immigrants and the average predicted wage (or employment probability) of natives, that is:

$$A_r = \frac{\sum_{it} \hat{y}_{irt}^m / M}{\sum_{it} \hat{y}_{irt}^n / N}, \tag{5}$$

where $\hat{y}$ represents the tted values from equation (3) and (4) and N and M are the total numbers of natives and immigrants in the region, respectively. Values of A_r close (or above) 1 indicate that in a given ROR immigrants' outcomes converge to those of natives. Values below unity indicate that immigrants are less assimilated. We then determine quartiles from the distribution of A_r (that is: $Q1$ correspond to RORs which are less assimilated, while $Q4$ are RORs where outcome of immigrants converge to those of natives.

We estimate a model similar to that in Table 5, whereby the immigration rate is interacted with the quartiles of the index A_r. The interaction terms reveal whether the impact of immigration on the well-being of individuals depend on the extent to which immigrants are assimilated in the region. Results are presented in Table 6 and 7 where the models have been estimated using the wage assimilation index and the employment assimilation index, respectively. The rst column of each table contains the results for all individuals, with natives in the rst panel and immigrants in the second panel. The other columns contains the results for each of the groups

[10] To test the robustness of the results, we experimented various models to identify the assimilation parameters. We found no substantial di erence across di erent speci cations employed.

[11] Both models, for wages and employment are estimated using QFE speci cations.

considered in Table 3.

Starting from the results of wage assimilation in Table 6, a clear pattern emerges. For the group of natives, the e ect of immigration on well-being is not distinctively di erent from zero in RORs where immigrants are less assimilated. It then increases and \peaks" in RORs where immigrants are intermediately assimilated ($Q2$ and $Q3$), and decreases again to values which are essentially zero. The pattern di ers only slightly for the groups of individuals with di erent socio-demographic characteristics. For instance, the people aged 30-50, the impact is positive and signi cant in correspondence of RORs which are less assimilated, and then decreases to zero in RORs where wages of immigrants converge to those of natives. We conduct the same analysis for the employment assimilation in Table 7. The pattern of the results is remarkably similar to what found in Table 6. For natives, in the majority of the cases, the e ect of immigration on well-being follows a sort of \inverted-U" pattern, peaking in regions with intermediate level of assimilation. For immigrants, the results are essentially similar to those in Table 6.

The ndings from the assimilation analysis provide further insight about which regions are more likely to be a ected: the impact of immigration on well-being is stronger in RORs which are only partially assimilated. At the same time, this result might appear also somewhat puzzling. Why do natives become satis ed with immigrants as assimilation increases and why does the welfare gain experienced by natives disappear when immigrants' assimilation is achieved? One potential explanation is that while the convergence of economic outcomes between immigrants and natives generates utility for the latter group (through spillover and complementarities), it could also generate more competition on the labour market - and hence disutility. Another potential interpretation is that when immigrants are completely assimilated, they may enter in the reference group of natives (since their economic outcomes are essentially the same) and this generates an \envy" e ect. Although speculative, both explanations are compatible with the observed \decline" of the e ect observed in more integrated regions. In the following, we will explore whether similar results hold when considering measures of assimilation which are not strictly economic.

6.2 Pseudo-objective and subjective measures of assimilation

Although regions exhibit di erent level of economic assimilation, they might also di er depending to the degree of social and cultural integration of immigrants. As a consequence, the impact of immigration on well-being might vary depending on

Table 6: The e ect of immigration on SWB: accounting for immigrant wage assimilation

	All	*Gender*		*Age*			*Married*		*Employed*		*Education*		*Income*	
		Males	Females	< 30	30-50	> 50	Yes	No	Yes	No	$<$12y	$\geq$12y	Low	High
Natives														
MR x Q1	0.019	0.007	0.034	{0.006	0.092*	{0.079	0.057	{0.016	0.030	0.027	{0.014	0.076	0.066	0.029
	(0.034)	(0.047)	(0.048)	(0.073)	(0.048)	(0.065)	(0.042)	(0.056)	(0.037)	(0.075)	(0.047)	(0.048)	(0.060)	(0.045)
MR x Q2	0.107***	0.098*	0.108**	0.163*	0.088	0.141**	0.058	0.129**	0.120***	0.012	0.110**	0.091*	0.122**	0.097**
	(0.037)	(0.053)	(0.053)	(0.085)	(0.054)	(0.069)	(0.046)	(0.060)	(0.040)	(0.085)	(0.054)	(0.051)	(0.062)	(0.048)
MR x Q3	0.057	0.045	0.065	0.164**	0.013	0.078	0.030	0.112*	0.014	0.187**	0.049	0.047	0.123*	0.051
	(0.036)	(0.050)	(0.052)	(0.076)	(0.054)	(0.068)	(0.043)	(0.065)	(0.041)	(0.081)	(0.048)	(0.054)	(0.068)	(0.043)
MR x Q4	0.027	{0.011	0.065	{0.002	0.026	0.049	0.049	{0.012	0.021	0.078	0.035	0.011	0.004	0.026
	(0.032)	(0.045)	(0.046)	(0.073)	(0.044)	(0.061)	(0.041)	(0.052)	(0.037)	(0.069)	(0.043)	(0.051)	(0.060)	(0.042)
Immigrants														
MR x Q1	0.105	0.001	0.200	0.322*	{0.080	0.107	0.069	0.122	0.036	0.195	0.192*	{0.096	0.176	{0.065
	(0.101)	(0.124)	(0.155)	(0.193)	(0.155)	(0.164)	(0.112)	(0.209)	(0.115)	(0.147)	(0.113)	(0.211)	(0.123)	(0.135)
MR x Q2	0.060	{0.026	0.142	0.276	{0.038	0.184	{0.005	0.185	{0.066	0.325*	0.112	0.075	0.231*	0.023
	(0.096)	(0.127)	(0.143)	(0.251)	(0.144)	(0.157)	(0.107)	(0.200)	(0.108)	(0.172)	(0.117)	(0.179)	(0.138)	(0.132)
MR x Q3	0.153**	0.222**	0.085	0.215	0.048	0.278*	0.168**	0.064	0.118	0.116	0.183**	0.012	0.052	0.259*
	(0.077)	(0.108)	(0.111)	(0.176)	(0.114)	(0.145)	(0.084)	(0.174)	(0.092)	(0.144)	(0.092)	(0.135)	(0.122)	(0.133)
MR x Q4	{0.027	0.011	{0.025	{0.017	{0.091	0.041	{0.060	0.114	0.003	{0.141	0.051	{0.097	0.035	{0.170
	(0.077)	(0.121)	(0.100)	(0.248)	(0.115)	(0.133)	(0.087)	(0.166)	(0.085)	(0.209)	(0.093)	(0.151)	(0.134)	(0.114)

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2. Estimates in each panel refer to interactions between immigration rates (MR) and categorical variables for the regional assimilation index (obtained by estimating eq 3 and 4) de ned by the quartiles of its distribution (Q1, Q2, Q3, Q4).

Table 7: Impact of immigration on happiness: accounting for immigrant employment assimilation

	All	*Gender*		*Age*			*Married*		*Employed*		*Education*		*Income*	
		Males	Females	< 30	30-50	> 50	Yes	No	Yes	No	<12y	≥12y	Low	High
Natives														
MR x Q1	0.026	0.023	0.033	0.016	0.107**	{0.098	0.065	{0.007	0.047	{0.003	{0.020	0.101**	0.066	0.048
	(0.034)	(0.048)	(0.048)	(0.074)	(0.047)	(0.065)	(0.042)	(0.056)	(0.037)	(0.076)	(0.047)	(0.049)	(0.061)	(0.044)
MR x Q2	0.129***	0.127**	0.128**	0.191**	0.108*	0.167**	0.081	0.160**	0.121***	0.124	0.212***	0.014	0.247***	0.052
	(0.039)	(0.055)	(0.055)	(0.088)	(0.056)	(0.073)	(0.050)	(0.062)	(0.042)	(0.092)	(0.056)	(0.055)	(0.065)	(0.053)
MR x Q3	0.034	0.002	0.059	0.124*	{0.021	0.089	0.004	0.073	0.004	0.113	{0.021	0.107**	{0.009	0.069*
	(0.034)	(0.047)	(0.050)	(0.073)	(0.053)	(0.064)	(0.040)	(0.061)	(0.039)	(0.076)	(0.047)	(0.049)	(0.062)	(0.041)
MR x Q4	0.025	{0.009	0.057	{0.013	0.032	0.036	0.048	{0.017	0.022	0.066	0.031	0.013	{0.016	0.027
	(0.032)	(0.046)	(0.046)	(0.074)	(0.044)	(0.061)	(0.041)	(0.052)	(0.037)	(0.070)	(0.043)	(0.051)	(0.060)	(0.043)
Immigrants														
MR x Q1	0.061	{0.014	0.121	0.323*	{0.157	0.020	0.015	0.121	{0.000	0.135	0.158	{0.170	0.104	{0.068
	(0.104)	(0.128)	(0.160)	(0.193)	(0.161)	(0.168)	(0.115)	(0.221)	(0.121)	(0.150)	(0.117)	(0.221)	(0.128)	(0.140)
MR x Q2	0.083	{0.045	0.212	0.349	{0.105	0.239	0.022	0.204	{0.066	0.303*	0.107	0.212	0.273*	0.074
	(0.101)	(0.136)	(0.147)	(0.237)	(0.156)	(0.166)	(0.111)	(0.215)	(0.124)	(0.176)	(0.124)	(0.180)	(0.149)	(0.144)
MR x Q3	0.161**	0.218**	0.100	0.182	0.120	0.254*	0.175**	0.085	0.115	0.196	0.193**	0.017	0.100	0.182
	(0.073)	(0.099)	(0.107)	(0.182)	(0.106)	(0.131)	(0.081)	(0.157)	(0.083)	(0.140)	(0.087)	(0.136)	(0.115)	(0.115)
MR x Q4	{0.042	{0.015	{0.028	{0.011	{0.106	0.048	{0.079	0.099	{0.010	{0.147	0.049	{0.144	0.013	{0.172
	(0.078)	(0.126)	(0.100)	(0.254)	(0.116)	(0.138)	(0.089)	(0.167)	(0.087)	(0.211)	(0.095)	(0.152)	(0.133)	(0.119)

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2. Estimates in each panel refer to interactions between immigration rates (MR) and categorical variables for the regional assimilation index (obtained by estimating eq 3 and 4) de ned by the quartiles of its distribution (Q1, Q2, Q3, Q4).

how immigrants integrate into the host society. To explore this point, we perform a similar analysis to that in Tables 6 and 7, using subjective indicators of integration. In particular, we construct three measures based on information from the GSOEP: one about \German identity" and two about language ability.[12] The measure on identity is constructed using the variable: *"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 which is equal to 1 for those individuals reporting values above the median (which is the category \In some respects") and is equal to 0 for those who feel \Barely" or \Not at all" German. We then calculate the regional mean of this indicator (that is we aggregate the values over time and across individuals in the same ROR). We hence obtain a regional indicator of \identity" . Similarly to what done in the analysis of economic assimilation, we derive the quartiles of this variable and interact them with the immigration rate. A similar procedure is carried out for the language ability indicators. In particular, we consider the variable *"Own Opinion of spoken German"* and *"Own Opinion of written German."*. Each of these allow five possible answers: 1) Very good; 2) Good; 3) Not bad; 4) Fairly bad and 5) Not at all. As before, we derive a dichotomous variable which is equal to 1 if the individual reports a value above the median and 0 if below. We then aggregate the values to obtain ROR indicators of subjective language performance. For each of the two variables, quartile of the distribution are obtained and each quartile is interacted with the immigration variable.

In what follows, we assume that regions with a higher incidence of immigrants \feeling German" or with the ability of speaking the German language are those which are more \assimilated" . These assimilation measures go beyond the economic aspects of wages and employment analyzed in Table 6 and 7, but also involve non economic factors which signal to what extent immigrants integrate to the host society. The results of regressions using these additional measures of assimilation are reported in Table 8. For natives the effect of immigration on well-being follows a pattern very similar to that is in the case of economic assimilation, especially with reference to the \identity" variable and the one about writing ability. In these two cases, it appears that the effect of immigration increases with the degree of socio-cultural assimilation in the region; however, in very high assimilated RORs the effect of immigration decreases to reach essentially zero as in the case of more objective measures of assimilation.

[12] 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, which are excluded from the calculations.

Table 8: The e ect of immigration on SWB: pseudo-objective and subjective measures of immigrant assimilation

	Feel German		*Write good German*		*Speak good German*	
	Natives	Immigrants	Natives	Immigrants	Natives	Immigrants
MR x Q1	0.090**	0.169*	0.055	0.163	0.039	0.161
	(0.035)	(0.089)	(0.042)	(0.104)	(0.047)	(0.098)
MR x Q2	0.101**	0.063	0.090**	0.155*	0.034	0.076
	(0.045)	(0.096)	(0.038)	(0.080)	(0.034)	(0.075)
MR x Q3	0.056**	{0.007	0.078**	{0.017	0.037	0.023
	(0.027)	(0.076)	(0.032)	(0.079)	(0.026)	(0.067)
MR x Q4	{0.047	0.134	{0.005	0.030	0.143***	0.251
	(0.043)	(0.089)	(0.034)	(0.103)	(0.049)	(0.220)

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2. Estimates in each panel refer to interactions between immigration rates (MR) and categorical variables for the regional assimilation index (obtained by estimating eq 3 and 4) de ned by the quartiles of its distribution (Q1, Q2, Q3, Q4).

7 Endogeneity issues and robustness checks

Studies which rely on regional variation to identify the impact of immigration on the labour market are usually subjected to issues of endogeneity. The main source of endogeneity is that immigrants typically do not randomly distribute in labor markets. This may be due either to the fact that natives respond to immigration by moving to regions with lower immigration, hence creating a spurious outcome between immigration and natives' outcome (Filer, 1992), or because immigrants self-select in function of market characteristics Borjas, 1994, 2003. 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 biases will arise. In absence of exogenous variation (for example see Card 1990), analysis on the impact of immigration on outcomes such as wages and employment are hence subject to problem of causal interpretation. The typical approach to address endogeneity in t he literature has been to seek for an instrumental variable which is correlated with immigration rate but not with the outcome of interest. For example, Hatton and Tani (2005) use lagged immigration rates as instrument for current immigration rates. Pischke and Velling (1997) use the past level of unemployment rate. Card (2001) constructs an instrument based on the ows by country of birth. Ortega and Peri (2009) use a similar \country of origin" approach, whereby immigration in the destination function is instrumented by the pushing migration factors exerted at the source region.

In general, the \quest" for an instrument is justi ed by the endogeneity issues between objective measures of natives' welfare and immigration rate. Is the degree of endogeneity which could occur in the case of subjective outcomes the same as

with objective outcomes such as wages? The panel structure of our data already allows us to control for ROR xed-e ects. This means that any unobservable time-invariant factor correlated with immigration rate and SWB is already absorbed by the ROR dummies. The presence of time-varying regional characteristics controls for other unobservable factors which can in uence the immigration rate as well. Hence, the presence of these variables already substantially mitigates the presence of endogeneity. Yet, in this section we explore in depth the extent to which potential causality issues a ect our results. Our ndings suggest that endogeneity issues when using \subjective" outcomes to study the impact of immigration are much more negligible than when using \objective" outcomes. We explore endogeneity issues by rst investigating whether natives \respond" to immigration by moving to regions where there are less immigrants and then by examining whether immigrants sort into regions where natives are happier. We also carry out a second set of tests to ensure that our results are not a ected by the selection of the sample or the de nition of the immigration variable.

7.1 Selection 1: Do unhappy natives move out?

One of the important source of selection bias is that natives living in a certain region decide to move out to a di erent region as the number of immigrants changes in the region of origin. If natives who move are actually those who experience a decrease in their utility as a consequence of immigration, then the remaining sample of natives will mechanically possess a high level of well-being and this may arti cially generate the positive e ect that we found above. If immigrants produce such \displacement" e ect, then the decision of natives to move out of the ROR will be $positively\ correlated$ with the immigration in the region of residence, that is, the probability of being displaced increases with the immigration rate. In order to directly test for this hypothesis, we extract from the GSOEP a sub-sample of natives who have changed ROR during the period of analysis (1997-2007) and use them to model the decision of internal migration as a function of immigration rate. In practice we estimate the following linear regression model:

$$move_{it} = 1\left[\ \mathbf{X}'_{it}\boldsymbol{\gamma} + \beta^O MR^O_{rt} + \beta^D MR^D_{rt} + \mathbf{Z}'^O_{rt}\boldsymbol{\lambda}^O + \mathbf{Z}'^D_{rt}\boldsymbol{\lambda}^D + \epsilon_{it} > 0\ \right] \quad (6)$$

$$\epsilon_{it} = \alpha_i + \delta_r + \theta_t + \varepsilon_{it} \quad (7)$$

where $move$ is an indicator for whether a native individual moves from the ROR of origin O to the ROR of destination D. In the (linear probit) regression, besides all socio-economic covariates considered in the analysis so far ($\mathbf{X}$), we add the labor

market characteristics of the ROR of origin ($\mathbf{Z}^O$) and of the ROR of destination ($\mathbf{Z}^D$). These include the unemployment rate (total and immigrant-speci c), the per capita GDP. In equation (6), we control for the immigration rate in the origin ROR, MR^O_{rt}, and the immigration rate in the destination ROR, MR^D_{rt}. The error structure is identical to that in equation (2), and hence the model includes dummies for the ROR of residence (δ_r) and for the time periods. Furthermore, the probability to migrate is estimated through a QFE estimator, very much in line with the econometric strategy adopted so far. We report the results of these regressions in Table 9, where we estimate various alternatives of equation (6). We are particularly interested in the e ect of the immigration rate in the origin, that is MR^O_{rt}. The estimate of the parameter β^O informs about how the immigration rate in the ROR correlates with the probability that a native moves to a di erent region.

Table 9: The e ect of immigration on SWB: robustness checks

	Selection I: Native out-migration			Selection II: Immigrants sorting		
Immigration rate (O)	0.0069	0.0021	{0.0006		{0.0080	0.0003
	(0.0098)	(0.0108)	(0.0130)		(0.0345)	(0.0403)
Immigration rate (D)	0.0076***	0.0053***	0.0034**		{0.0045	{0.0058
	(0.0008)	(0.0010)	(0.0016)		(0.0039)	(0.0068)
Unemployment rate (O)		0.0093**	0.0143***		0.0312**	0.0379**
		(0.0037)	(0.0046)		(0.0150)	(0.0171)
Unemployment rate (D)		{0.0058***	{0.0059***		0.0020	0.0019
		(0.0010)	(0.0012)		(0.0046)	(0.0057)
Per capita log GDP (O)			0.1699			0.5620
			(0.1339)			(0.5023)
Per capita log GDP (D)			0.0496			{0.0032
			(0.0318)			(0.1263)
SWB (O)				0.0208	{0.1101**	{0.0727
				(0.0464)	(0.0553)	(0.0682)
SWB (D)				{0.0055	0.0552	0.0421
				(0.0376)	(0.0442)	(0.0531)
R^2	0.079	0.083	0.039	0.134	0.144	0.121
N	31,398	29,148	26,448	3,942	3,588	3,300

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2

The rst column only includes immigration rates in the ROR of origin and destination. The estimates reveal that while immigration in the area of origin is positively correlated with the probability of moving, the size of the estimate is statistically insigni cant. On the other hand, immigration in the destination appears to be a \pull factors" for natives. Yet, this e ect could be obfuscated by other regional factors in the regions of origin and destination. For this reason, in the second column we add local unemployment rates and per capita GDP. While the e ect of income appears to be irrelevant, unemployment rate is a strong predictor for the probability of migration. In particular - and as economic theory predicts - a higher

local unemployment in the region of origin induces natives to out-migrate, while a higher unemployment in the destination decreases the probability of changing ROR. Remarkably, after controlling for these additional origin and destination local market characteristics, immigration rate in the origin has essentially no impact on the probability of out-migration. Given these findings, it is possible to conclude that natives are not crowded out by immigration rate and hence our benchmark results are unlikely to be affected by this sort of self-selection.

7.2 Selection 2: Do migrants move in happier regions?

Another potential source of endogeneity is that the immigrants sort themselves in regions where well-being is higher. If this is the case reverse causality could potentially arise - that is, the observed immigration rate could itself be a function of SWB. Before investigating this issue, it is informative to provide a brief account about the historical patterns of immigration in Germany. Most of the earlier cohorts of immigrants moved to Germany through \`guest workers programmes", that is through bilateral recruitment contracts stipulated between Germany and partner countries (for example, Turkey, Italy and Greece). After 1973, the program was formally closed: albeit immigration to guest workers regions continued through other channels, such as family reunification. However, recent patterns of immigration have changed dramatically, especially after the fall of the Berlin wall (a good discussion about immigration in Germany is given in Pischke and Velling (1997) and D'Amuri et al. (2010)). As a consequence, the \immigration rate" observed in a given region is the likely outcome of many complex factors such as economic characteristics and the presence of ethnic networks in the region of destination. The characteristics that determine the sorting of immigrants into a particular region - many of which are unobservable to the researcher - are often correlated with the outcome of interest (in our case SWB). The estimation strategy used in this paper allows - by introducing fixed-ROR effects - to control for all regional time-invariant characteristics. To further control for the sorting of immigrants driven by time-variant \shocks" in the region, our models includes regional characteristics, such as unemployment rate and per capita GDP. Yet, if immigrants decide to migrate $internally$ after arrival into Germany, and if the SWB in the region of destination is a major determinant of this decision, the estimated impact of immigration on well-being will be affected by reverse causality.

To investigate this issue, we mimic the procedure above and select from the data a sub-sample of immigrants who have changed ROR during 1997-2007. We estimate the same model as in equation (6), and add as control variables the average level

of well-being in the ROR of origin and in the ROR of destination. If the average SWB in a region is a signi cant determinant of the internal sorting of immigrants, then one should expect to nd strong positive correlation between the decision of migrating and average level of well-being in the ROR of destination. Instead, the results in the fourth to sixth column of Table 9 reveal a di erent picture. In none of the three speci cations the well-being in the destination is found to be a strong magnet for internal migration. Instead, the major factor \pushing" out immigrants from a ROR is the unemployment rate - as found in previous studies. Based on this result we conclude that the e ect of immigrants' sorting due to higher SWB in regions is weak. However, we further investigate this issue below with various alternative robustness checks.

7.3 Sensitivity tests

The previous section showed that our results are not likely to be substantially affected by natives' crowding-out or by immigrants' sorting. In this section, we conduct further tests to assess the sensitivity of our analysis to the selection of our sample and to the de nition of the immigration variable. The results from these additional tests are reported in Table 10. First, and to further corroborate the ndings of Table 9, we explore whether there are substantial di erences between the sample of movers (that is, individuals who have changed ROR) and stayers. Table 9 has already shown the natives are not crowded out because of immigration. Thus, we expect that the e ect of the immigration rate for those who move out of the ROR and those who never changed ROR would generate similar results. This is essentially what we nd in the second column of Table 10, where estimates are slightly larger albeit borderline signi cant at conventional levels. The same conclusion is reached in the case of immigrants although, very much in line with the ndings so far, the estimates are not statistically signi cant.

We then explore whether our results are con rmed if we consider West and East Germany separately. Since immigration patterns as well as macroeconomic fundamentals, and level of well-being di er substantially between the two areas, one wonders whether our benchmark results will be di erent as well. The results in the third and fourth column of Table 10 seem to somewhat con rm our predictions. In particular, in the West the e ect of immigration on SWB is somewhat smaller than the benchmark result, while in the East the estimate is far larger. For the sample of immigrants, on the contrary, the point estimate for the West area is very close to the benchmark results, while the estimate for the East is somewhat negative, but also considerably imprecise, due to the very small sample size.

Table 10: The e ect of immigration on SWB: further tests

	Movers	*Stayers*	*West*	*East*	*Excl. top MR ROR*	*Excl. top SWB ROR*	*Net inflow rate*
Selection I: Native out-migration							
Immigration rate	0.067	0.044***	0.034*	0.161***	0.068***	0.066***	0.015**
	(0.041)	(0.016)	(0.018)	(0.049)	(0.021)	(0.016)	(0.007)
R^2	0.282	0.280	0.254	0.264	0.280	0.275	0.053
N	17,167	121,873	100,095	38,945	106,139	129,231	90,161
Selection II: Immigrants sorting							
Immigration rate	0.089	0.053	0.065	{0.179	0.168***	0.066	0.022
	(0.120)	(0.042)	(0.041)	(0.399)	(0.058)	(0.043)	(0.032)
R^2	0.321	0.275	0.266	0.368	0.280	0.265	0.063
N	2,509	20,031	22,134	406	14,631	21,013	14,517

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. Movers are de ned as individuals who live in a di erent ROR than the previous year. The excluded top migrant RORs correspond to the regions that make up the upper quartile of the immigration rate distribution (10 RORs). The excluded top SWB RORs correspond to the regions that make up the upper quartile of the SWB distribution (28 RORs). The immigration net ow rate corresponds to the di erence between the number of foreign born individuals moving into a ROR and those moving out of the ROR, divided by current population in the ROR. All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2. ROR and year dummies are included in all models except the one in the last column.

In the fth and sixth column, we investigate how the results change when we exclude top immigration RORs or those with highest levels of well-being. The rationale of these restrictions is to test whether our results are driven entirely by regions who absorb large in ows of immigrants (that is RORs which contain largest cities) or by particularly \happy" regions which might a ect the sorting of immigrants (or of natives). Our results seem to corroborate the benchmark results, and the parameter estimates for natives are remarkably similar to those in Table 2 even after excluding these \outlier" regions. The only remark for the group of immigrants is that by excluding top immigration destination, the impact of immigration on well-being become substantially large and highly statistically signi cant. One possible explanation is that in top immigration RORs, labour competition among immigrants is rather strong and this generates some dis-utility, at least with respect to the observed level of well-being in RORs with lower immigrant populations.

Finally, in the last column we explore the sensitivity of our results to the choice of the immigration variable used. To this aim, instead of immigrant $stocks$ in the region, we use information on immigrant $net\ inflow$ rate, constructed as the di erence between the $inflows$ and $outflows$ of immigrants in a ROR. This allows us to assess how our results are sensitive to the use of an alternative immigration variable. In practice, we estimate a model similar to the one in equation (1), except that all variables are expressed in $first\ differences$. This is because the net in ow rate of immigrants is itself a measure of change over time. The only di erence with the speci cations used so far is that we omit the ROR xed e ects, because un-

observable, local-speci c characteristics are mechanically di erenced out. A similar approach using measures of ows without \destination dummies" is adopted in Ortega and Peri (2009). The results reveal a pattern that is remarkably similar to the one found when we use immigration stocks, albeit the estimates for both natives and immigrants are somewhat smaller when compared to the benchmark results.

7.4 Domain specific well-being: is the impact similar?

As further robustness checks, we explore more in depth our measure of well-being used. So far, we have not being concerned to understand what dimensions of well-being are particularly a ected by immigration. Although a comprehensive investigation of this issue is out of the scope of this paper, we are interested in exploring whether our results di er substantially across speci c \domains" of well-being . These could be interpreted as components of the measure of well-being used so far. In practice, we look at ve \satisfaction" dimensions: job, health, income, dwelling and leisure. While these do not constitute a complete taxonomy, they allow investigating aspects of life which are more sensitive to be a ected by immigration.

Table 11: The e ect of immigration on domain-speci c SWB

	Job	*Health*	*Income*	*Dwelling*	*Leisure*
			Natives		
Immigration rate	{0.005	0.021	0.027	0.138***	0.066***
	(0.023)	(0.014)	(0.019)	(0.020)	(0.022)
R^2	0.166	0.587	0.321	0.109	0.123
N	100,401	139,007	137,215	138,503	138,776
			Immigrants		
Immigration rate	0.075	0.073**	0.016	{0.008	0.129**
	(0.064)	(0.036)	(0.051)	(0.053)	(0.054)
R^2	0.228	0.592	0.302	0.152	0.181
N	14,674	22,529	22,398	22,495	22,490

Source: GSOEP 1997-2007 and INKAR 1997-2007 (GDP available only 1997-2006). Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. Movers are de ned as individuals who live in a di erent ROR than the previous year. *Job* correspond to the question "Satisfaction With Work"; *Health* correspond to the question "Satisfaction With Health"; *Income* correspond to the question "Satisfaction With Household Income"; *Dwelling* correspond to the question "Satisfaction With Dwelling"; *Leisure* correspond to the question "Satisfaction With Amount of Leisure Time". All speci cations are estimated using quasi xed-e ects and include the covariates of Table 2

The results in Table 11 reveal that the impact of immigration on natives' job satisfaction is essentially zero, both economically and statistically. Neither the health, nor the income satisfaction of natives seems to be a ected by immigration. On the other hand our results indicate that satisfaction with dwelling and leisure appear to be the most a ected domains. One possibility, albeit speculative, is that higher immigration contributes to decrease the house rents (also) for German-born individ-

uals. This is compatible with the fact that natives do not move out as immigration increases, as seen in Table 9. As for leisure satisfaction, one potential interpretation is that immigrants bring amenities - such as \ethnic" or \multicultural" goods - and that these increase the well-being of natives in terms of their living habits. For immigrants, the impact of immigration on well-being appears to be economically and statistically relevant in two domains, namely health and leisure satisfaction. These results are compatible with the ndings of section 5, where it was shown that the assimilation of immigrants is found to be \neutral" in terms of labour market e ects, while socio-cultural integration has a positive impact - at least for certain levels of assimilation - on individuals' well-being.

8 Conclusion

This paper provides an innovative approach to directly testing the impact of immigration on the utility of individuals. We exploit advanced techniques developed in the well-being literature to answer a question at the hearth of the economics of immigration: \What is the impact of immigration on the native population?" Yet in our paper, we go beyond the traditional approach of analyzing only labour market outcomes, and we consider the impact of immigration on a more comprehensive measure of utility, namely subjective well-being.

Merging panel data with detailed information on German local labour markets for the period 1997-2007, we explore how immigration in the region a ects the well-being of natives and immigrants. Our major nding is that an increase of immigration in the region positively a ects the well-being of natives. In other words, German-born individuals obtain welfare gains as the immigration in their region of residence increases. For immigrants, we nd similar results, albeit they are less robust throughout the many tests conducted. In the analysis, we control for a series of confounding factors at both the individual and regional level. In particular, we nd that controlling for local labour market conditions does not in uence our ndings, a results which can be seen as a corollary of recent evidence that immigration does not have a detrimental e ect on the German labour market (D'Amuri et al., 2010). We also investigate the e ect of sorting by natives and immigrants. Our analysis suggest that the impact of sorting is not strong on the results given our subjective outcome.

To the best of our knowledge, this paper is the of its kind in examining the impact of immigration directly on the \utility" of natives. One of the novel and important ndings in this paper indicate that the impact of immigration is also a function of

the degree of economic and cultural assimilation in the region. According to our results, immigration increases well-being up to a certain level of an \assimilation threshold", beyond which its e ect becomes essentially zero. We recognize that this is perhaps the most important nding of the paper; the investigation of the channels behind this nding, as well its potentially policy implications will be the scope of future research.

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Appendix

Table A1: Benchmark results - natives

	OLS	OP	RE	FE	QFE
Immigration rate	0.043***	0.031***	0.042***	0.040**	0.046***
	(0.014)	(0.010)	(0.015)	(0.016)	(0.015)
Age	{0.086***	{0.058***	{0.076***	{0.033***	{0.190***
	(0.003)	(0.002)	(0.004)	(0.007)	(0.006)
Age squared	0.001***	0.001***	0.001***	0.000***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.119***	0.084***	0.139***		0.119***
	(0.009)	(0.006)	(0.015)		(0.015)
East Germany	{0.332***	{0.234***	{0.406***	{0.201***	{0.335***
	(0.026)	(0.017)	(0.032)	(0.064)	(0.032)
Years of education	0.010***	0.007***	0.026***	0.003	0.013*
	(0.002)	(0.001)	(0.003)	(0.007)	(0.007)
Log household size	{0.376***	{0.256***	{0.244***	{0.171***	{0.176***
	(0.016)	(0.011)	(0.021)	(0.026)	(0.024)
One child	0.097***	0.062***	0.095***	0.113***	0.101***
	(0.013)	(0.009)	(0.015)	(0.018)	(0.015)
Two children	0.199***	0.127***	0.163***	0.166***	0.178***
	(0.016)	(0.011)	(0.021)	(0.026)	(0.021)
Three or more children	0.234***	0.169***	0.173***	0.190***	0.194***
	(0.025)	(0.017)	(0.034)	(0.044)	(0.034)
Separated	{0.580***	{0.364***	{0.431***	{0.296***	{0.429***
	(0.034)	(0.022)	(0.040)	(0.047)	(0.040)
Single	{0.281***	{0.194***	{0.221***	{0.159***	{0.212***
	(0.015)	(0.010)	(0.022)	(0.032)	(0.022)
Divorced	{0.311***	{0.203***	{0.208***	0.016	{0.188***
	(0.017)	(0.012)	(0.026)	(0.041)	(0.026)
Widowed	{0.290***	{0.188***	{0.334***	{0.531***	{0.317***
	(0.032)	(0.021)	(0.053)	(0.098)	(0.053)
Spouse in native country	{0.063	{0.148	{0.079	0.285***	0.055
	(0.145)	(0.100)	(0.057)	(0.050)	(0.066)
Very good	1.082***	0.836***	0.777***	0.577***	0.763***
	(0.135)	(0.090)	(0.124)	(0.128)	(0.124)
Good	0.504***	0.328***	0.360***	0.267**	0.356***
	(0.134)	(0.090)	(0.124)	(0.127)	(0.124)
Satisfactory	{0.259*	{0.217**	{0.174	{0.142	{0.171
	(0.135)	(0.090)	(0.124)	(0.127)	(0.124)
Poor	{1.048***	{0.692***	{0.808***	{0.668***	{0.799***
	(0.135)	(0.090)	(0.125)	(0.128)	(0.124)
Bad	{2.339***	{1.356***	{1.880***	{1.581***	{1.866***
	(0.140)	(0.092)	(0.132)	(0.137)	(0.132)
Not in labour force	0.003	{0.001	{0.007	{0.016	{0.015
	(0.027)	(0.019)	(0.026)	(0.027)	(0.026)
Retired	{0.040	{0.037	{0.030	{0.053	{0.030
	(0.069)	(0.049)	(0.062)	(0.070)	(0.062)
In school/training	0.107***	0.052**	0.158***	0.100**	0.126***
	(0.037)	(0.026)	(0.037)	(0.041)	(0.037)
Unemployed	{0.716***	{0.433***	{0.538***	{0.468***	{0.541***
	(0.032)	(0.021)	(0.032)	(0.034)	(0.032)
Self-employed	{0.127***	{0.070***	{0.049**	0.028	{0.058**
	(0.016)	(0.011)	(0.024)	(0.034)	(0.024)
Log wage	0.006***	0.004***	0.007***	0.003	0.006***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Log working hours	0.001	{0.006	0.021***	0.028***	0.026***
	(0.007)	(0.005)	(0.007)	(0.007)	(0.007)
Log household income	0.601***	0.412***	0.462***	0.324***	0.311***
	(0.012)	(0.009)	(0.016)	(0.019)	(0.018)
R^2	0.277	0.083	0.271	0.232	0.277
N	139,040	139,040	139,040	139,040	139,040

Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. OLS=Ordinary least square; OP=Ordered probit; RE=Random-e ects; FE=Fixed-e ects; QFE=Quasi xed-e ects. All speci cations include ROR indicators and year dummies. QFE includes also individual averages over time of age, log household size, years of education, log household income and log working hours. The R^2 for the OP speci cation refers to pseudo-R^2.

Table A2: Benchmark results - immigrants

	OLS	OP	RE	FE	QFE
Immigration rate	0.078**	0.063**	0.064	0.053	0.066*
	(0.038)	(0.025)	(0.040)	(0.043)	(0.040)
Age	{0.075***	{0.050***	{0.084***	{0.058***	{0.176***
	(0.007)	(0.005)	(0.011)	(0.018)	(0.016)
Age squared	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.192***	0.125***	0.207***		0.174***
	(0.023)	(0.016)	(0.039)		(0.041)
East Germany	{1.058***	{0.674***	{0.846***	{0.294	{0.839***
	(0.161)	(0.099)	(0.250)	(0.628)	(0.248)
Years of education	0.018***	0.013***	0.023***	0.011	0.012
	(0.005)	(0.003)	(0.008)	(0.016)	(0.016)
Log household size	{0.355***	{0.250***	{0.306***	{0.238***	{0.262***
	(0.043)	(0.029)	(0.058)	(0.074)	(0.069)
One child	0.166***	0.119***	0.163***	0.155***	0.163***
	(0.034)	(0.023)	(0.041)	(0.047)	(0.040)
Two children	0.223***	0.149***	0.210***	0.192***	0.215***
	(0.040)	(0.027)	(0.053)	(0.066)	(0.053)
Three or more children	0.282***	0.178***	0.246***	0.201**	0.257***
	(0.053)	(0.036)	(0.069)	(0.087)	(0.069)
Separated	{0.539***	{0.350***	{0.462***	{0.400***	{0.460***
	(0.076)	(0.048)	(0.104)	(0.140)	(0.104)
Single	{0.115***	{0.088***	{0.137**	{0.174*	{0.120*
	(0.042)	(0.028)	(0.062)	(0.103)	(0.063)
Divorced	{0.433***	{0.286***	{0.398***	{0.342***	{0.388***
	(0.053)	(0.033)	(0.078)	(0.123)	(0.077)
Widowed	{0.426***	{0.276***	{0.438***	{0.329	{0.411***
	(0.082)	(0.052)	(0.128)	(0.210)	(0.129)
Spouse in native country	{0.812***	{0.540***	{0.584**	0.957	{0.488*
	(0.161)	(0.100)	(0.272)	(0.588)	(0.267)
Very good	1.050***	0.787***	0.705***	0.528**	0.686***
	(0.346)	(0.227)	(0.254)	(0.257)	(0.258)
Good	0.512	0.348	0.306	0.214	0.289
	(0.345)	(0.226)	(0.253)	(0.255)	(0.256)
Satisfactory	{0.174	{0.136	{0.162	{0.149	{0.173
	(0.345)	(0.226)	(0.253)	(0.255)	(0.256)
Poor	{0.843**	{0.544**	{0.708***	{0.627**	{0.716***
	(0.346)	(0.226)	(0.255)	(0.258)	(0.258)
Bad	{2.096***	{1.209***	{1.721***	{1.491***	{1.726***
	(0.352)	(0.230)	(0.262)	(0.267)	(0.266)
Not in labour force	0.046	0.022	0.059	0.064	0.047
	(0.074)	(0.049)	(0.073)	(0.077)	(0.073)
Retired	{0.132	{0.105	{0.114	{0.104	{0.117
	(0.212)	(0.132)	(0.188)	(0.210)	(0.189)
In school/training	0.136	0.063	0.125	0.088	0.103
	(0.107)	(0.074)	(0.114)	(0.128)	(0.114)
Unemployed	{0.437***	{0.297***	{0.299***	{0.250***	{0.309***
	(0.080)	(0.052)	(0.082)	(0.087)	(0.082)
Self-employed	{0.194***	{0.129***	{0.062	0.036	{0.092
	(0.053)	(0.035)	(0.076)	(0.106)	(0.076)
Log wage	0.009*	0.006**	0.008*	0.007	0.008*
	(0.005)	(0.003)	(0.005)	(0.005)	(0.005)
Log working hours	0.035*	0.015	0.062***	0.075***	0.065***
	(0.019)	(0.013)	(0.019)	(0.021)	(0.020)
Log household income	0.597***	0.387***	0.492***	0.375***	0.371***
	(0.033)	(0.022)	(0.044)	(0.052)	(0.051)
R^2	0.277	0.080	0.269	0.143	0.272
N	22,540	22,540	22,540	22,540	22,540

Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. OLS=Ordinary least square; OP=Ordered probit; RE=Random-e ects; FE=Fixed-e ects; QFE=Quasi xed-e ects. All speci cations include ROR indicators and year dummies. QFE includes also individual averages over time of age, log household size, years of education, log household income and log working hours. The R^2 for the OP speci cation refers to pseudo-R^2.

Table A3: Benchmark results - natives and immigrants

	OLS	OP	RE	FE	QFE
Immigration rate	0.052***	0.039***	0.043***	0.040***	0.049***
	(0.013)	(0.009)	(0.014)	(0.015)	(0.014)
Age	{0.085***	{0.057***	{0.077***	{0.038***	{0.185***
	(0.003)	(0.002)	(0.004)	(0.007)	(0.006)
Age squared	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.127***	0.089***	0.147***		0.124***
	(0.008)	(0.006)	(0.014)		(0.014)
East Germany	{0.349***	{0.241***	{0.409***	{0.205***	{0.354***
	(0.026)	(0.017)	(0.032)	(0.064)	(0.031)
Years of education	0.011***	0.008***	0.026***	0.004	0.013**
	(0.002)	(0.001)	(0.003)	(0.006)	(0.006)
Log household size	{0.364***	{0.250***	{0.251***	{0.180***	{0.185***
	(0.015)	(0.010)	(0.019)	(0.024)	(0.023)
One child	0.102***	0.068***	0.104***	0.119***	0.108***
	(0.012)	(0.008)	(0.014)	(0.017)	(0.014)
Two children	0.197***	0.127***	0.168***	0.168***	0.179***
	(0.015)	(0.010)	(0.019)	(0.024)	(0.019)
Three or more children	0.248***	0.170***	0.185***	0.187***	0.204***
	(0.022)	(0.015)	(0.030)	(0.038)	(0.030)
Single	{0.574***	{0.361***	{0.434***	{0.308***	{0.432***
	(0.031)	(0.020)	(0.037)	(0.044)	(0.037)
Separated	{0.261***	{0.181***	{0.213***	{0.164***	{0.206***
	(0.014)	(0.009)	(0.020)	(0.030)	(0.021)
Divorced	{0.320***	{0.208***	{0.226***	{0.022	{0.209***
	(0.017)	(0.011)	(0.025)	(0.039)	(0.025)
Widowed	{0.303***	{0.196***	{0.344***	{0.508***	{0.325***
	(0.029)	(0.020)	(0.049)	(0.089)	(0.049)
Spouse in native country	{0.655***	{0.462***	{0.491**	0.664	{0.319
	(0.140)	(0.087)	(0.223)	(0.446)	(0.215)
Very good	1.074***	0.824***	0.766***	0.569***	0.753***
	(0.126)	(0.084)	(0.114)	(0.118)	(0.115)
Good	0.502***	0.328***	0.352***	0.258**	0.347***
	(0.126)	(0.083)	(0.114)	(0.117)	(0.114)
Satisfactory	{0.252**	{0.208**	{0.173	{0.144	{0.170
	(0.126)	(0.083)	(0.114)	(0.118)	(0.114)
Poor	{1.021***	{0.671***	{0.792***	{0.663***	{0.784***
	(0.126)	(0.084)	(0.115)	(0.118)	(0.115)
Bad	{2.305***	{1.332***	{1.853***	{1.567***	{1.839***
	(0.131)	(0.086)	(0.121)	(0.125)	(0.121)
Not in labour force	0.006	{0.000	{0.001	{0.010	{0.010
	(0.026)	(0.017)	(0.024)	(0.026)	(0.024)
Retired	{0.053	{0.046	{0.045	{0.067	{0.046
	(0.066)	(0.045)	(0.059)	(0.067)	(0.059)
In school/training	0.116***	0.058**	0.158***	0.101***	0.127***
	(0.035)	(0.025)	(0.035)	(0.039)	(0.035)
Unemployed	{0.667***	{0.411***	{0.502***	{0.439***	{0.504***
	(0.030)	(0.019)	(0.030)	(0.032)	(0.030)
Self-employed	{0.134***	{0.077***	{0.051**	0.027	{0.063***
	(0.016)	(0.011)	(0.023)	(0.032)	(0.023)
Log wage	0.007***	0.004***	0.007***	0.004*	0.007***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Log working hours	0.006	{0.004	0.026***	0.034***	0.031***
	(0.006)	(0.004)	(0.006)	(0.007)	(0.006)
Log household income	0.599***	0.407***	0.468***	0.333***	0.320***
	(0.011)	(0.008)	(0.015)	(0.018)	(0.017)
R^2	0.273	0.081	0.268	0.231	0.273
N	161,580	161,580	161,580	161,580	161,580

Robust standard errors in parentheses. *** signi cant at 1%; ** signi cant at 5%; * signi cant at 10%. OLS=Ordinary least square; OP=Ordered probit; RE=Random-e ects; FE=Fixed-e ects; QFE=Quasi xed-e ects. All speci cations include ROR indicators and year dummies. QFE includes also individual averages over time of age, log household size, years of education, log household income and log working hours. The R^2 for the OP speci cation refers to pseudo-R^2.