

SOCIAL DEPRIVATION OF IMMIGRANTS IN GERMANY

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This paper investigates the extent to which immigrants in Germany are socially deprived compared to German natives. We demonstrate that when using a conventional definition of the social deprivation index typically applied in the literature, immigrants do not necessarily appear to be socially deprived. We propose a weighting scheme that weights components of social deprivation by their subjective contribution to an overall measure of life satisfaction. Using this weighting scheme to calculate an index of social deprivation, we find that immigrants experience a significant degree of social deprivation, confirming much of the economic literature examining the economic assimilation of immigrants in Germany. This result is driven by particularly high weights being attributed to employment. Also the size of the groups "in need" is smaller when using the innovative weighting scheme, allowing a more precise targeting of economic policy.

1. INTRODUCTION

As a result of the increasing relevance of international migration, the economic and societal integration of immigrant minorities into the society of their host countries has become a matter of intense debate among economists and policy makers. The economic literature, which follows the seminal papers of Chiswick (1978) and Borjas (1985), mainly concentrates on earnings assimilation patterns to draw inferences about this phenomenon. However, the extent to which immigrants are able to participate in the economic and social life of their host country is a multi-dimensional phenomenon. To consider the various dimensions that are relevant for a comprehensive investigation of the economic and societal integration of immigrants, the economic assimilation discussion may be expanded into the realm of social deprivation such that earnings are simply considered as one component in a multi-dimensional index.

With the Lisbon summit, the European Commission (EC) has adopted measures to start a new Community program to establish comparable ways to measure poverty, to help Member States develop coordinated policy to fight poverty, and to assist networking of social partners and civil society. Further, the initiative

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launches an extensive EC economic and social strategy that aims at modernizing the European social model and promoting social inclusion. The EC focuses on a preventative approach to poverty and social exclusion. Based on Article 137 of the Amsterdam Treaty, the EC intends to promote social inclusion with three main objectives: (a) improve the understanding of social exclusion; (b) organize policy co-operation; and (c) support and develop the capacity of NGOs and other relevant organizations to address social exclusion effectively.

Germany, a major immigration country in the European Union, represents an excellent example for the analysis of social deprivation of immigrants. During the 1960s, “guest workers” from Turkey, Italy, Spain, Greece, and Yugoslavia were recruited by the German government to fill an acute low-skilled labor shortage in Germany during the years of the *Wirtschaftswunder* (“economic miracle”) (Schmidt and Zimmermann, 1992; DeNew and Zimmermann, 1994). The guest workers (by their very name considered to be short-term in nature and thus unlikely to be making longer-term investments in their host country) arriving in Germany in the 1960s were typically very different in cultural and educational background and motivation to their higher-skilled European counterparts that migrated to the United States after the Second World War. One obvious challenge for the overwhelmingly Muslim Turkish immigrants was to adapt to a decidedly Christian nation such as Germany. Relatively restrictive German citizenship laws set the hurdle reasonably high for guest workers to be naturalized (Joppke, 1999). Even second generation immigrants born of parents living legally in Germany were not immediately given citizenship. The assimilation of immigrants was further complicated by limitations regarding dual citizenship. Overall, the German immigration policy differed considerably from the integrative policies of traditional immigration countries such as Australia, Canada, and the United States (Antecol *et al.*, 2003).

This paper aims at providing empirical evidence on the extent to which immigrants in Germany are socially deprived. The components used in our analysis of social deprivation are those from the generally accepted Sen (2000) definition or similarly the European Union definition to identify this phenomenon. Often the terms “deprivation” and “exclusion” are used differentially in the literature, with “deprivation” referring to a temporary negative state, and in contrast, “exclusion” referring to a prolonged negative state. We depart from the social exclusion literature to motivate our approach but focus on short-term deprivation rather than long-term social exclusion in our empirical analysis.

Although the existing literature has focused typically on economically disadvantaged groups such as the poor or the old, the literature is very sparse with respect to the social deprivation of immigrants in Germany. Using data from the German Socio-Economic Panel (SOEP) 1984–2005, we contribute to this literature, in that we outline the current status of integration of immigrants and further propose a more appropriate weighting scheme of the components compared to Tsakloglou and Papadopoulos (2001). Standard definitions of social deprivation essentially weight all component parts equally. Our method, in contrast, weights components by their *subjective* contribution to an overall measure of life satisfaction, i.e. those components in a multivariate context that contribute most to life satisfaction are weighted higher in the calculation of an overall social deprivation measure.

The life satisfaction literature has matured considerably in recent years, dealing with issues such as the impact of income on utility as known as the Easterlin Paradox (Easterlin, 1995, 2001; Diener and Oishi, 2000; Frijters *et al.*, 2004a, 2004b), the psychological effects of unemployment (Winkelmann and Winkelmann, 1998), aversion to monetary inflation (Di Tella *et al.*, 2001), to name a few areas. Clearly the informational content of admittedly subjective information is high, notwithstanding the critique from Bertrand and Mullainthan (2001). In this paper, we exploit additional subjective valuations of the various components of social deprivation and weight these components in calculating an overall measure of social deprivation with these valuations.

We demonstrate that when using a conventional definition of the social deprivation index typically applied in the literature, immigrants do not necessarily appear to be socially deprived. However, augmenting the social deprivation model for what we consider to be more appropriate weights of the component parts, it is clearly the case that we find compelling evidence to support the hypothesis that immigrants experience a significant degree of social deprivation, confirming much of the economic literature examining the economic assimilation of immigrants in Germany. This result is driven particularly by the large life satisfaction weight assigned to employment, thus giving additional deprivation focus to those groups not employed. The proportion of the immigrant population in this group is double that of the native proportion. However the proportion of those particularly at risk, i.e. the prime candidates for policy interventions, is much smaller using the life satisfaction weights.

The paper proceeds as follows. Section 2 provides a brief overview of the concept of social exclusion and explains how this concept can be linked to the life satisfaction literature. In Section 3, the data used for the empirical analysis and the estimation strategy are described. The estimation results are presented in Section 4 and Section 5 concludes.

2. JOINING SOCIAL EXCLUSION AND LIFE SATISFACTION

The potentially nebulous term “social exclusion” is used often in a blanket manner and can mean many things to researchers from various disciplines. As Bossert *et al.* (2007) write, most importantly the concept of social exclusion deals with the “inability of an individual to participate in the basic political, economic and social functionings of the society in which she lives.” Of interest here is exactly how this concept can be operationalized into observable indicators available to researchers. An individual is considered to be “excluded” if, based on many indicators, she cannot participate fully in society. Thus simply to be lacking in one particular area does not constitute “exclusion” and therefore we are interested in a multi-dimensional index which summarizes information from many domains. In the strictest sense of the term, exclusion deals with not having access to something not because one chose not to have it but rather because it was simply beyond the reach of a person, whether due to budget restrictions or institutional restrictions, etc.

Micklewright (2002) provides an overview of the European Union’s definition of social exclusion. Eurostat (1998) states, “Social exclusion is considered a

dynamic process, best described as descending levels: some disadvantages lead to some exclusion, which in turn leads to more disadvantages and more social exclusion and ends up with persistent multiple (deprivation) disadvantages. Individuals, households and spatial units can be excluded from access to resources like employment, health, education, social or political life.” Clearly this definition is open to interpretation.

Correspondingly, the same report a paragraph later states, “At the moment, generally accepted definitions of social exclusion for policy purposes are not available. The Task Force decided not to define social exclusion. However, in the long run a statistical definition has to be found. In the process to this statistical definition the Task Force chose a pragmatic approach in using the following policy description of social exclusion as a hypothesis for the further work.” This is not the only definition found in the literature. Dekkers (2002) cites many competing definitions, such as those found in Townsend (1979, 1993), Whelan and Whelan (1995), Zajczyk (1995), Percy-Smith (2000), etc. For more information, the reader is directed to Bossert *et al.* (2007) and Dekkers (2002), who provide a thorough overview of the existing literature on social exclusion.

Nevertheless, Eurostat (2000) pragmatically outlines various indicators as main components of a multi-dimensional social deprivation index: (a) financial difficulties, (b) basic necessities, (c) housing conditions, (d) consumer durables, (e) health, (f) social contact, and (g) dissatisfaction. Tsakoglou and Papadopoulos (2001) and Papadopoulos and Tsakoglou (2002) suggest a method of combining these indicators into a single index. Tsakoglou and Papadopoulos (2001) analyze social exclusion using the European Community Household Panel (ECHP) for 14 countries. They calculate and report head-count ratios (with a threshold of 60 percent of national median) for four domains of social deprivation: income, living conditions, necessities of life, and social relation, and find that Germany is toward the mid to lower end of the social exclusion distribution compared to other European countries, i.e. that residents of Germany are indeed better integrated than many of their European neighbors.

Because the social deprivation index is multi-dimensional, one is obviously confronted with conflicting conclusions from the individual component parts creating a particular drawback of the method of Tsakoglou and Papadopoulos (2001). In an attempt to address this problem, Tsakoglou and Papadopoulos (2001) examine the domains in which a country is below a certain threshold in the distribution, and whether this is persistent over time (see Tsakoglou and Papadopoulos, 2001, tables 1–4). This has the disadvantage that one is drawn away from a single index to examine now a vector of indices.

To address this issue, we make a straightforward and intuitive contribution to the literature. Using standard procedures, one may have many indicators from various domains and one explicitly weights the importance of each particular indicator by definition equally. Perhaps in reality, not having a dishwasher is objectively not all that important, whereas having inadequate access to health care is much more important. One cannot account for this heterogeneity with this simple measure and augmenting the simple model with a weighting scheme to reflect better the “true” importance of each component part would shed light on this. The question then remains, which weights to use? This paper uses individual

valuations of life satisfaction to evaluate the empirical importance of all component parts of the social deprivation index. Using estimated coefficients from a first stage life satisfaction regression, one weights the various components of social deprivation accordingly in calculating the index.

The empirical literature on life satisfaction has developed rapidly in the last several years. Frey and Stutzer (2000, 2002) provide an overview of the informational value embedded in life satisfaction indicators and demonstrate the robust results that life satisfaction analysis delivers. Specifically for the social inclusion domains identified by Eurostat (2000) we provide an overview of the empirical findings. Frijters *et al.* (2004a, 2004b) identify a positive income gradient with respect to life satisfaction, albeit small for Germany. In contrast, Easterlin (1995, 2001) finds that even in the face of a large macro-economic shock such as German reunification, that dynamic valuation of the future expected life satisfaction is accurately predicted after a very short adjustment and learning period. Winkelmann and Winkelmann (1998), Clark *et al.* (2001), and Clark (2003) find evidence for the negative impact of unemployment on life satisfaction. Clark *et al.* (2001) and Clark (2003) find that these effects are mitigated by high local unemployment rates.

As residents of Germany should certainly not be considered homogeneous, we examine two groups who are typically thought of as being very different in many respects, namely natives and immigrants living in Germany.

3. EMPIRICAL STRATEGY AND DATA

In the following, we calculate a multi-dimensional index of social deprivation for German natives and immigrants that consists of various components measured by different indicators. In particular, we define a dichotomous variable X_{ik} , indicating whether an individual i has a particular characteristic k and if she does, then X_{ik} is equal to one (1) and zero (0) if not. Since some components of our index do a better job in explaining social deprivation than others, we have to assign a certain weight ω_k to each item k , reflecting the relative importance of item k for the overall index of social deprivation. Assuming there were K items, the general form of an index measure for individual i can be calculated as follows:

$$(1) \quad I_i(\omega) = [X_{i1}\omega_1] + [X_{i2}\omega_2] + \dots + [X_{iK}\omega_K],$$

where X_{i1} , X_{i2} , X_{iK} are either zero or one and each component of the vector of weights $\omega = (\omega_1, \omega_2, \dots, \omega_K)$ ranges between zero and one, with $\sum_{k=1}^K \omega_k = 1$. Clearly, the index is bounded by zero and one, with zero being complete deprivation, and one being complete non-deprivation (or inclusion). Typically though, the empirical distribution will lie between some number larger than zero and some other number smaller than one.

A particular challenge when calculating the index of social deprivation is the choice of weights. Following Tsakloglou and Papadopoulos (2001) and Papadopoulos and Tsakloglou (2002), we derive our first weight from an overall average of individuals having a particular item, good, or characteristic: $\omega_k^1 = \bar{X}_k / \sum_{k=1}^K \bar{X}_k$, with $\bar{X}_k = (1/N) \sum_{i=1}^N X_{ik}$ and $\sum_{k=1}^K \omega_k^1 = 1$. Multiplying X_{ik} by

the average is an attempt to weight the particular importance of a particular item k . If all others have an item and a small number do not, then this small number is considered to be relatively deprived. If however, in general very few people do have a particular item, say an expensive car, then even though many would not have such an item, they would still be considered relatively included. Thus each person either has zero when she does not have a particular item, or she has X_{ik} . The list of items is averaged for every individual and then an overall index of deprivation based on all items is available for each individual.

In addition to the weighting scheme of Tsakloglou and Papadopoulos (2001) and Papadopoulos and Tsakloglou (2002), we propose a set of alternative weights that appear more appropriate in reflecting the relative importance of different components of the social deprivation index. To derive these weights, we investigate the extent to which each of the characteristics of the social deprivation index contributes to the individual general life satisfaction. In particular, we apply a linear fixed effects model to estimate the effects of the different components of the social deprivation index on the general life satisfaction:

$$(2) \quad LS_{it} = \mu_i + \mathbf{X}_{it}\beta + \varepsilon_{it}, \quad i = 1, \dots, N, \quad t = 1, \dots, T,$$

where LS_{it} denotes the general life satisfaction of individual i at time t , \mathbf{X}_{it} is a vector of regressors, β is a vector of coefficients, μ_i is the individual-specific effect, and ε_{it} is the error term. Although LS_{it} is measured on an ordinal scale from zero to ten (where zero means “completely dissatisfied” and ten means “completely satisfied”), we apply a linear fixed effects model instead of a non-linear model for two reasons. Firstly, using information about the general life satisfaction drawn from the SOEP, Frijters and Ferrer-i-Carbonell (2004) demonstrate that the issues of ordinality as opposed to cardinality are not as great as one might think, allowing us to avoid the use of non-linear models such as ordered Probit in favor of straight forward models such as fixed effects OLS.¹ Secondly, since the interpretation of the coefficients derived from a linear model with fixed effects is immediately intuitive as the coefficients are identical to the marginal effects, we are able to use the OLS estimates to generate weights for the calculation of the social deprivation index.²

Fleurbaey *et al.* (2009) argue that welfare economics should include concepts from happiness and satisfaction studies and this point is well taken. While it is true that individual preferences will deviate from those of specific groups, there is additional information to be gained by examining group-specific preferences, especially when the groups are relatively homogeneous, such as natives and immigrants. This is also the case for the highly selective group of foreign guest workers

¹We have rerun our regressions using conditional logit (fixed effects) with individual thresholds and find similar results based on the magnitudes and signs of the coefficients. The estimates are available from the authors upon request.

²By estimating a linear regression model, we calculate the average contribution of an item to the overall life satisfaction. Thus, our model assumes that the gains from owning a particular item are average gains for the entire (native or immigrant) population. Some persons have below-average gains from owning an item—including those who choose not to have this item, although they could afford it—while others have (or would have had) above-average gains from owning the item. Since we may not observe individual preferences, we consider the average contribution of an item to the overall life satisfaction as a suitable measure.

that were specifically recruited to Germany, having a high correlation of preferences within the group. We may obtain weights from separate life satisfaction regressions to account for group-specific preferences. Moreover, analogous to Schokkaert (2007), we remove the idiosyncratic individual factors influencing life satisfaction by controlling for individual fixed effects.

Given the fixed effects estimates, we can derive two alternative social deprivation indices using the following weighting schemes:

$$(3a) \quad \omega_k^2 = \hat{\beta}_k / \sum_{k=1}^K \hat{\beta}_k,$$

$$(3b) \quad \omega_k^3 = \hat{\beta}_k (1 - p_k) / \left[\sum_{k=1}^K \hat{\beta}_k (1 - p_k) \right],$$

with $\sum_{k=1}^K \omega_k^2 = \sum_{k=1}^K \omega_k^3 = 1$, where $\hat{\beta}_k$ is an estimate of the k -th component of the parameter vector β of equation (2) and p_k is the corresponding p-value ($k = 1, \dots, K$).

While the conventional weights previously used in the literature only reflect the share of the population having a particular characteristic, the weights given by equation (3a) use the contributions of the particular characteristics to overall life satisfaction, i.e. how people themselves value a particular aspect as indicated by the coefficients from the first stage life satisfaction multivariate regression.³ However, the coefficients from the first stage life satisfaction regression are estimated and hence have standard errors. We augment equation (3a) with equation (3b), such that we calculate “1 minus the p-value” to increase the weight when a particular component’s contribution is significant and conversely reduces the weight when a component is less significant. Since nearly all coefficients of the following analysis are highly significant (see Table 2), differences between ω_k^2 and ω_k^3 will be neglected. As such, we will concentrate our analysis on Index 1 and 2. Specifically, we use the (normalized) sample means of Table 1 and the weights presented in Table 2 to calculate Index 1 and 2, respectively. However, in general, should the estimation error in the first step regression play a substantial role, the role of Index 3 becomes relevant.

Finally, after having calculated an individual-specific index of social deprivation, we would like to investigate the degree to which social deprivation is prevalent within a certain group. For that reason, we use the poverty measure proposed by Foster *et al.* (1984),

$$(4) \quad FGT(\alpha) = \frac{1}{N} \sum_{i=1}^N ((z - I_i(\omega)) / z)^\alpha,$$

which depends on the parameter α . FGT(0) corresponds to the “head-count ratio,” i.e. the share below a certain threshold z . FGT(1) refers to the intensity below a threshold, i.e. not whether one is below a threshold, but rather the average distance below. FGT(2) squares the distance and punishes large distances more

³We use the weights presented in Table 2 to calculate Index 2.

than shorter distances. The choice of the threshold is arbitrary. In the following, different threshold values and poverty measures will be compared.

In the following empirical analysis, data from the German Socio-Economic Panel (SOEP) is utilized.⁴ The SOEP is a representative longitudinal study including native and immigrant households residing in the old and new German states which started in 1984. In 2005, about 22,000 persons in nearly 12,000 households were sampled. The panel contains information on socioeconomic and demographic characteristics, household composition, occupational biographies, etc. Immigrants are defined as foreign-born persons who immigrated to Germany since 1948 (including foreign-born individuals who received German citizenship after immigration). This definition does not comprise ethnic migrants (e.g. persons who possess German nationality since birth and immigrated to Germany) or the second generation of immigrants (persons with foreign nationality who were born in Germany). Since less than 2 percent of the migrant population in the sample lives in East Germany, the analysis concentrates on immigrants residing in West Germany.

Using the SOEP data set we will be able to describe the dimensions outlined by Eurostat (2000) using the following set of indicator variables X_{it} of equation (2): (a) financial difficulties: income, employment status, education; (b) basic necessities: car, telephone; (c) housing conditions: subjective opinion as to domicile size, balcony/terrace, garden/yard; (d) consumer durables: PC (without modem/ISDN), stereo, dishwasher; (e) health: hospital stays, doctor visits, work disability, physically challenged; (f) social contact: marital status, attending cultural, sporting or religious events, active participation in sports. Our regression model further includes a squared function of age and a set of children indicators, which may be considered as important control variables. The category (g) dissatisfaction is captured by the use of general life satisfaction as dependent variable of equation (2). A description of all variables used in the empirical analysis is given in the Appendix; Table A1. The Appendix can be downloaded from the website of the journal ([http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1475-4991](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1475-4991)).

Table 1 describes the relevant socioeconomic and demographic characteristics of natives and immigrants. The descriptive statistics reveal that the financial situation of natives is, on average, substantially better than that of immigrants. In particular, immigrants are on average less likely to have an income above the median and face a higher risk of being unemployed. Moreover, immigrants are, on average, less educated than natives. Due to these differences, we observe that immigrants are less likely to own basic necessities (such as a car or a telephone) than natives. Immigrants also report poorer housing conditions and lower ownership rates of consumer durables than natives. However, immigrants are, on average, younger and appear to be healthier than natives. Immigrants are also more likely to be married and have more children than natives. Finally, natives are, on average, more likely to attend cultural and sporting events and less likely to attend religious events than immigrants.

⁴The data used in this paper was extracted from the SOEP Database provided by the DIW Berlin (<http://www.diw.de/soep>) using the Add-On package PanelWhiz v1.0 (Oct 2006) for Stata(R). PanelWhiz was written by Dr. John P. Haisken-DeNew (john@panelwhiz.eu). The PanelWhiz generated DO file to retrieve the SOEP data used here and any Panelwhiz Plugins are available upon request. Haisken-DeNew and Hahn (2006) describe PanelWhiz in detail.

TABLE 1
MEANS OF ALL VARIABLES IN 2004

Variable	Natives		Immigrants		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
General satisfaction with life	6.797	1.858	6.620	1.875	6.773	1.862
(a) Financial situation						
Income equivalent larger than median	0.621	0.485	0.352	0.478	0.585	0.493
Currently registered unemployed	0.065	0.246	0.120	0.326	0.072	0.259
Years of education > 10	0.835	0.371	0.620	0.485	0.807	0.395
(b) Basic necessities						
Car in household	0.849	0.358	0.770	0.421	0.838	0.368
Telephone	0.946	0.227	0.929	0.258	0.943	0.231
(c) Housing conditions						
Subjective opinion as to domicile size	0.848	0.359	0.766	0.423	0.837	0.370
Balcony/terrace	0.827	0.378	0.737	0.440	0.815	0.388
Garden/yard	0.664	0.473	0.422	0.494	0.631	0.482
(d) Consumer durables						
PC without modern/ISDN	0.647	0.478	0.584	0.493	0.639	0.480
Stereo in household	0.835	0.371	0.736	0.441	0.822	0.383
Dishwasher in household	0.694	0.461	0.615	0.487	0.683	0.465
(e) Health						
No hospital stay last year	0.870	0.336	0.885	0.319	0.872	0.334
No doctor visits last year	0.316	0.465	0.372	0.483	0.324	0.468
No work disability longer than six weeks	0.974	0.160	0.960	0.195	0.972	0.165
No handicap/not physically challenged	0.850	0.357	0.893	0.309	0.856	0.351
(f) Social contact						
Married	0.577	0.494	0.760	0.427	0.601	0.490
Attending cultural events	0.120	0.325	0.046	0.210	0.110	0.313
Attending cinema, dancing, sporting events	0.211	0.408	0.141	0.348	0.202	0.401
Attending church, religious events	0.189	0.392	0.293	0.455	0.203	0.402
Participating actively in sports	0.450	0.498	0.253	0.435	0.424	0.494
Control variables						
Age (in years)	48.8	16.2	46.7	14.7	48.5	16.0
Children aged 0–2 years in household	0.051	0.220	0.074	0.262	0.054	0.226
Children aged 3–6 years in household	0.081	0.273	0.128	0.334	0.087	0.282
Children aged 7–16 years in household	0.151	0.358	0.307	0.461	0.172	0.377
N	10,116		1,890		12,006	

Note: Weighted numbers based on weights provided by the SOEP.

Overall, the descriptive statistics indicate substantial differences in socioeconomic and demographic characteristics between natives and immigrants. While the overall economic situation of average immigrants appears to be noticeably worse than that of average natives, immigrants have other positive compensating characteristics valuable to them. As described above, an appropriate weighting scheme has to be applied that accounts for the relative importance of these factors to investigate the extent to which immigrants are socially deprived.

4. EMPIRICAL ANALYSIS

4.1. Weights: First-Stage Life Satisfaction

Using panel data for the period 1984–2005, we adopt a parsimonious linear fixed effects model to estimate the determinants of life satisfaction for Germans

and immigrants as displayed as Model A in the top half of Table 2 using 161,172 and 43,438 person-year observations for Germans and immigrants, respectively. We expand the spartan Model A to incorporate many other possible components of social exclusion, but which are only available in the data for a limited time period, namely for the years 2000, 2002, and 2004.⁵ We define this to be Model B. Correspondingly this reduces the sample size greatly to 27,573 and 5,613 person-year observations for natives and immigrants, respectively.

The models presented in Table 2 were also estimated separately for natives and immigrants to investigate differences in the parameter estimates. However, Chow tests reveal that group differences in relevant coefficients (i.e. excluding control variables) are insignificant. For that reason, we use the same weights for natives and immigrants to calculate Index 2.

4.2. *Social Deprivation Indices: Natives vs. Immigrants*

In Figure 1, we examine the social deprivation index using the weights from ω_k^1 for both the parsimonious Model A and the extended Model B. While differences in the average values between natives and immigrants are not significant for Model A, the average values of Model B are significantly higher for natives than for immigrants, indicating that natives are more included over the period 2000–04. Overall, these findings suggest that Index 1 produces rather mixed results with regard to social deprivation.

Using the weights gained from the coefficients of the life satisfaction analysis (ω_k^2), we can examine the average values of the social deprivation index again for natives and immigrants and find significant differences between natives and immigrants in both Models A and B (Figure 2). The results suggest that immigrants experience a significant degree of social deprivation and highlight substantial differences in the social and economic situation between natives and immigrants, confirming much of the economic literature examining the assimilation of immigrants in Germany.

For the parsimonious model (based on ω_k^1), we plot the distribution of the social deprivation index separately for natives and immigrants in Figure 3. The solid curve represents the social deprivation index for natives, which does not differ substantially from the immigrants' distribution (dotted line). For clarity, two vertical lines are also drawn for the overall median and the deprivation "threshold" of 50 percent of the median, corresponding to that used to calculate the FGT measures. Those persons having a social deprivation index score less than this threshold are considered to be "socially deprived." This is analogous to the poverty literature in calculating poverty head count ratios for instance. In this graphic, we see that the mass of persons (area under the curve) to the left of the thresholds is about equal for natives and immigrants, indicating that both groups are equally included. In contrast, using the alternative model (Figure 4), i.e.

⁵Since some of the social contact measures (attending cultural events, cinema dancing, sporting events, church/religious events, and actively participating in sports) may only be observed in 1999, 2001, and 2003, we use lag variables for these measures in the empirical analysis.

TABLE 2
DETERMINANTS OF GENERAL LIFE SATISFACTION; OLS WITH FIXED EFFECTS

	Natives and Immigrants		Weight
	Coefficient	S.E.	
Model A: 1984–2005			
Income equivalent larger than median	0.137**	0.009	0.121
Currently not registered unemployed	0.701**	0.017	0.621
Education ≤ 10 years [†]	0.033	0.017	0.029
Subjective opinion as to domicile size	0.125**	0.010	0.110
Married	0.130**	0.015	0.115
Age	−0.027**	0.003	
Age ² /100	−0.014**	0.003	
Children aged 0–2 years in household	0.170**	0.014	
Children aged 3–6 years in household	−0.043**	0.013	
Children aged 7–16 years in household	0.019	0.012	
Constant	7.683**	0.059	
N	204,610		
Model B: 2000, 2002, and 2004			
(a) Financial situation			
Income equivalent larger than median	0.207**	0.020	0.046
Currently not registered unemployed	0.800**	0.039	0.179
Education > 10 years	0.209**	0.029	0.047
(b) Basic necessities			
Car in household	0.231**	0.034	0.051
Telephone	0.192**	0.045	0.043
(c) Housing conditions			
Subjective opinion as to domicile size	0.196**	0.024	0.044
Balcony/terrace	0.105**	0.028	0.023
Garden/yard	0.083**	0.024	0.018
(d) Consumer durables			
No PC (without modem/ISDN)	0.113**	0.023	0.025
Stereo in household	0.211**	0.027	0.047
Dishwasher in household	0.035	0.024	0.007
(e) Health			
No hospital stay last year	0.204**	0.026	0.045
No doctor visits last year	0.163**	0.018	0.036
No work disability longer than six weeks	0.291**	0.046	0.065
No handicap/not physically challenged	0.654**	0.033	0.146
(f) Social contact			
Married	0.198**	0.028	0.044
Attending cultural events	0.231**	0.027	0.051
Attending cinema, dancing, sporting events	0.038	0.024	0.008
Attending church, religious events	0.174**	0.024	0.039
Participating actively in sports	0.113**	0.020	0.025
Control variables			
Age	−0.058**	0.005	
Age ² /100	0.057**	0.005	
Children aged 0–2 years in household	0.232**	0.036	
Children aged 3–6 years in household	0.071*	0.032	
Children aged 7–16 years in household	−0.023	0.027	
Constant	5.005**	0.137	
N	33,186		

Notes: Some of the reported dummy variables had to be redefined, because the calculation of social exclusion indices is exclusively based on positive parameter estimates.

[†]Since the coefficient on “Education > 10 years” was negative (and insignificant) in Model A, we replaced the indicator by “Education ≤ 10 years.”

Control variables (age and children in the household) are not included in the calculation of the indices.

*p < 0.05, **p < 0.01.

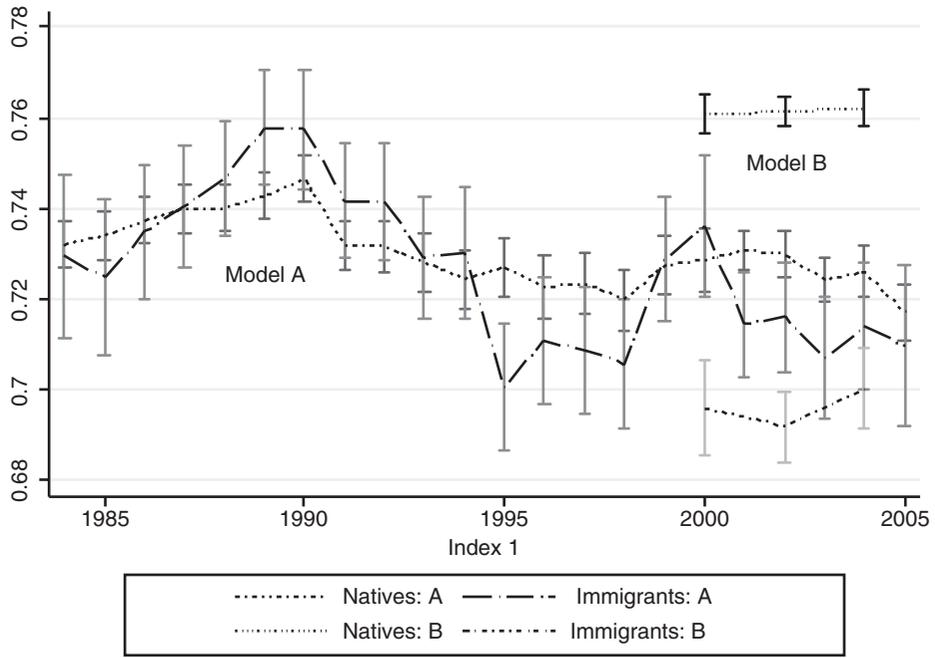


Figure 1. Index 1. Model A: 1984–2005; Model B: 2000, 2002, 2004

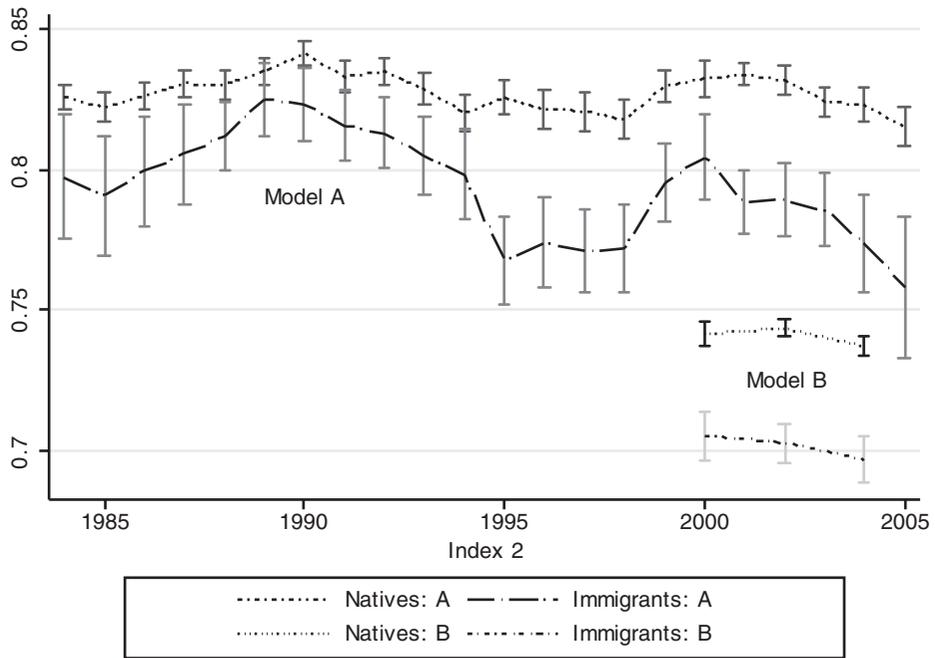


Figure 2. Index 2. Model A: 1984–2005; Model B: 2000, 2002, 2004

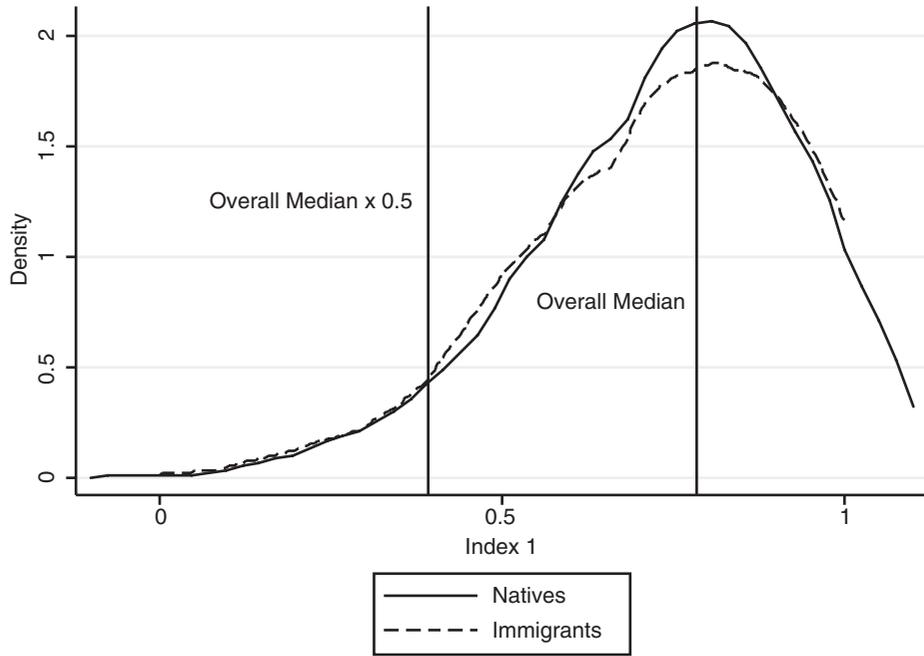


Figure 3. Distribution of Index 1. Model A: 1984–2005

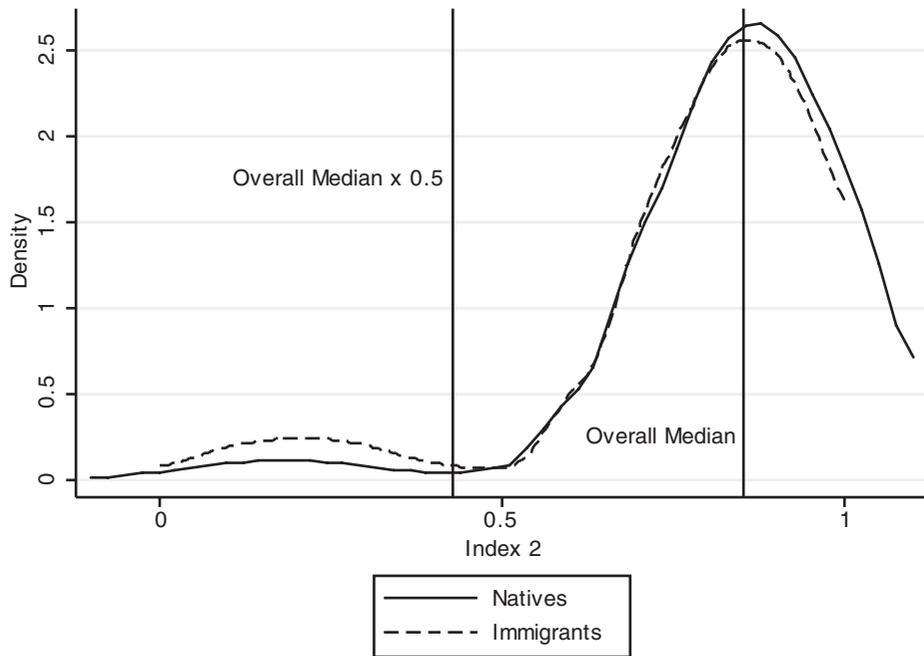


Figure 4. Distribution of Index 2. Model A: 1984–2005

weighting the components of social deprivation by their contributions to life satisfaction, we find that natives appear to be more included than immigrants. In particular, the probability mass to the left of the deprivation threshold is considerably larger for immigrants than for natives, pointing to social deprivation of immigrants.⁶

4.3. *Decomposition: Identifying the Driving Factors*

In Tables 3 and 4 we illustrate the effects that differential weighting of the social deprivation components can have, corresponding to the results for Index 1 and Index 2, respectively. We compare the two indices of social deprivation, by decomposing the indices by population subgroup. We create four broad (positive) characteristics categories: (I) those having at least median equivalent income; (E) those employed; (C) those with children in the household; and (A) those under 30 years of age. The four groups provide up to 16 (4×4) combinations of these characteristics.⁷

For each and every combination, we calculate each group's contribution (percentage share) to the overall measure of poverty as defined by the Foster *et al.* (1984) class of measures FGT(0), FGT(1), and FGT(2). We use these measures as they are standard indicators in the poverty literature and allow analytical decompositions. Furthermore, these measures rely on an arbitrary "poverty" threshold (social deprivation is implemented as a relative and not absolute concept). We have chosen the thresholds to be 50 percent of the median of the social deprivation index. One can think of FGT(0) as the bluntest measure of poverty, simply indicating a "head-count ratio," i.e. share of persons with an index value under an arbitrary threshold. FGT(1) takes into consideration the simple distance below the threshold and FGT(2) squares the distance below the threshold. As the FGT argument increases in size, the more poverty is "punished" in the outcome measure.

In Table 3 we decompose the distribution of Index 1 by FGT measures, setting a threshold at 50 percent of the median. We display each possibility of the 16 possible combinations set. We examine Group 1, those having lower than median equivalent income (not I), not in employment (not E), having no children (not C), and being older than 30 years (not A) and find that 18 percent of Index 1 is explained by Group 1 (first column), although its population share is only 1.3 percent (natives) and 3 percent (immigrants). Groups 2–4 have the attributes only A, only C, and both A and C, respectively. Some 50 percent of Index 1 is attributed to Groups 1–4, affecting approximately 3 percent of the native population and 7 percent of the immigrant population. It is not particularly surprising to be able to

⁶Due to the definition of our index measures, the variation in index distributions is very low. For that reason, we limit our discussion to overall index distributions. A more detailed analysis of changes in social deprivation patterns over time is beyond the scope of the paper.

⁷It is perfectly reasonable to accept the idea that there are decreasing returns to a particular characteristic, e.g. the benefit of having one additional child given that one has only one child already or in contrast, already having two children or more. However, we model all characteristics as dummy variables, indicating changes from one state to another, e.g. moving from the lower half of the income distribution to the upper half, or being under 30 years of age, etc. So the effect that we are identifying is at this particular pivot point and would induce no change whatsoever, moving from the 95-percentile to the 96-percentile of the income distribution, or from 26 to 27 years of age. While this does simplify the interpretation of the coefficient, it also allows each characteristic component to be weighted in an identical manner.

TABLE 3
DECOMPOSITION OF INDEX DISTRIBUTIONS (50% OF THE MEDIAN); INDEX 1, 1984–2005

	Groups				FGT(0)	FGT(1)	FGT(2)	Natives	Immigrants
	I	E	C	A					
1.	–	–	–	–	18.671** (0.644)	23.703** (0.580)	28.874** (1.121)	2,160 [1.34%]	1,322 [3.04%]
2.	–	–	–	A	14.429** (0.343)	19.111** (0.560)	25.541** (0.911)	1,162 [0.72%]	385 [0.88%]
3.	–	–	C	–	11.510** (0.470)	15.200** (0.879)	17.196** (1.534)	1,046 [0.64%]	1,173 [2.70%]
4.	–	–	C	A	5.300** (0.524)	7.189** (0.658)	8.923** (0.739)	558 [0.34%]	285 [0.65%]
5.	–	E	–	–	11.520** (0.570)	8.382** (0.445)	3.794** (0.215)	30,478 [18.91%]	8,569 [19.72%]
6.	–	E	–	A	20.226** (0.814)	14.716** (0.573)	6.662** (0.277)	12,541 [7.78%]	2,887 [6.64%]
7.	–	E	C	–	5.649** (0.324)	4.110** (0.231)	1.860** (0.105)	18,431 [11.43%]	10,469 [24.10%]
8.	–	E	C	A	2.497** (0.167)	1.816** (0.124)	0.822** (0.054)	5,267 [3.26%]	3,282 [7.55%]
9.	I	–	–	–	4.052** (0.164)	1.705** (0.163)	1.734** (0.256)	1,105 [0.68%]	395 [0.90%]
10.	I	–	–	A	4.549** (0.283)	3.129** (0.291)	3.888** (0.397)	542 [0.33%]	105 [0.24%]
11.	I	–	C	–	1.090** (0.139)	0.622** (0.052)	0.443** (0.052)	338 [0.20%]	151 [0.34%]
12.	I	–	C	A	0.508** (0.059)	0.317** (0.092)	0.264* (0.103)	87 [0.05%]	31 [0.07%]
13.	I	E	–	–	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	49,802 [30.89%]	7,573 [17.43%]
14.	I	E	–	A	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	17,423 [10.81%]	2,095 [4.82%]
15.	I	E	C	–	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	17,989 [11.16%]	3,895 [8.96%]
16.	I	E	C	A	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	2,243 [1.39%]	821 [1.89%]

Notes: Calculation of indices based on OLS fixed effects estimates. The following categories were considered: income equivalent larger than median (I), employment (E), children below 16 years in household (C), age \leq 30 years (A).

Standard errors in parentheses.

Number of person-year observations: 204,610.

Share of subgroup in full sample given in brackets.

* $p < 0.05$, ** $p < 0.01$.

explain a large share of the index by having little or none of the positive characteristics in Table 1 (Groups 1–4).

Examining the next set of Groups 5–8, we find that 40 percent of the total FGT(0) is attributed to these groups. However, the share of natives and immigrants is substantially larger at around 42 and 58 percent, respectively. Worthy of note here is that Groups 5–8 are all in employment (E) but are in the lower half of the income distribution (not I).

Groups 9–12 (higher than median income but not in employment) are attributed about 10 percent of Index 1 but only affect about 1 percent of natives and 1.5 percent of immigrants. Groups 13–16 are attributed zero percent of the index.

TABLE 4
 DECOMPOSITION OF INDEX DISTRIBUTION (50% OF THE MEDIAN); INDEX 2, 1984–2005

	Groups				FGT(0)	FGT(1)	FGT(2)	Natives	Immigrants
	I	E	C	A					
1.	–	–	–	–	32.107** (0.623)	35.381** (0.699)	36.272** (0.794)	2,160 [1.34%]	1,322 [3.04%]
2.	–	–	–	A	14.265** (0.403)	19.261** (0.501)	23.232** (0.561)	1,162 [0.72%]	385 [0.88%]
3.	–	–	C	–	20.461** (0.547)	22.012** (0.672)	21.880** (0.830)	1,046 [0.64%]	1,173 [2.70%]
4.	–	–	C	A	7.773** (0.500)	8.945** (0.620)	9.520** (0.685)	558 [0.34%]	285 [0.65%]
5.	–	E	–	–	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	30,478 [18.91%]	8,569 [19.72%]
6.	–	E	–	A	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	12,541 [7.78%]	2,887 [6.64%]
7.	–	E	C	–	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	18,431 [11.43%]	10,469 [24.10%]
8.	–	E	C	A	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	5,267 [3.26%]	3,282 [7.55%]
9.	I	–	–	–	13.831** (0.373)	6.602** (0.162)	3.590** (0.113)	1,105 [0.68%]	395 [0.90%]
10.	I	–	–	A	5.966** (0.428)	5.079** (0.374)	4.020** (0.307)	542 [0.33%]	105 [0.24%]
11.	I	–	C	–	4.509** (0.252)	2.067** (0.125)	1.060** (0.069)	338 [0.20%]	151 [0.34%]
12.	I	–	C	A	1.088** (0.081)	0.654** (0.050)	0.425** (0.051)	87 [0.05%]	31 [0.07%]
13.	I	E	–	–	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	49,802 [30.89%]	7,573 [17.43%]
14.	I	E	–	A	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	17,423 [10.81%]	2,095 [4.82%]
15.	I	E	C	–	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	17,989 [11.16%]	3,895 [8.96%]
16.	I	E	C	A	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	2,243 [1.39%]	821 [1.89%]

Notes: See Notes to Table 3.

From Table 2 we have seen the relatively large impact of employment on life-satisfaction (Models A and B both show “Currently not registered unemployed” to have the largest single impacts on life satisfaction as measured by coefficient sizes). Thus we now focus on the role of the relative common valuations that immigrants and natives have given to the impact of the particular component parts in the new Index 2 as summarized in Table 4.

Groups 1–4 in Table 4 explain approximately 75 percent of Index 2, affecting (exactly as in Table 3) only 3 percent of the German native population and 7 percent of the immigrant population. This is to be expected given that these groups are not in employment and are in the lower half of the income distribution. The particularly strong effect of not being in employment drives the much larger contribution of these groups (compare 50 percent in Table 3 to 75 percent in Table 4).

Groups 5–8 are attributed statistically zero percent of Index 2. Thus the 42 and 58 percent of the native and immigrant population previously thought to be attributed some 40 percent of the index are now being attributed zero percent. This

result is being driven clearly by the strong weight attached to employment (E) which Groups 5–8 enjoy.

Groups 9–12 using Index 2, although above the median income threshold, all exhibit no employment. Thus the part of Index 2 attributed to these groups increases accordingly (from 10 percent in Table 3 to around 25 percent in Table 4). However, one must keep in mind that the absolute size of these groups is tiny (as in Table 3, about 1 percent of natives and 1.5 percent of immigrants). Groups 13–16 are attributed unsurprisingly (as in Table 3) zero percent of Index 2.

To summarize, moving from Index 1 (Table 3) to Index 2 (Table 4) we allow the relative sizes of the component parts of the deprivation index to vary according to their coefficients in a life satisfaction regression (Table 2). Of particular interest is the impact of the weight on employment, allowing a dramatic shift in the explained part to the groups without employment. Thus in Table 3, Groups 5–8 had 40 percent of the index attributed to them. In Table 4 this is reduced to zero, with approximately 25 percentage points being redirected to Groups 1–4 and 15 percentage points being redirected to Groups 9–12. Economically this is of interest as the share of the population in Groups 5–8 is 42 and 58 percent for natives and immigrants, respectively. Intuitively this seems unusually large. In Table 4, the contribution disappears for these groups and is redirected to Groups 1–4 (3 percent of the native and 7 percent of the immigrant population) and Groups 9–12 (1 percent of the native and 1.5 percent of the immigrant population). This has immediate policy implications as the sizes of the groups at deprivation risk are particularly small, thus allowing better targeted interventions. Also this result is quite stable regardless of the FGT measure being used: the results from FGT(1) and FGT(2) follow in a similar pattern to that of FGT(0).

5. CONCLUSIONS

This paper contributes to the existing literature on the social deprivation of immigrants in Germany. An innovative weighting scheme was implemented that weights components of social deprivation by their subjective contribution to an overall measure of life satisfaction. Our findings suggest that when using a conventional definition of the social deprivation index typically used in the literature, immigrants appear to experience similar levels of social deprivation. However, augmenting the social deprivation model with more intuitive weights for their respective component parts as defined by their subjective valuation in a life satisfaction regression, we find that immigrants experience a significant degree of social deprivation, confirming the literature on the economic assimilation of immigrants in Germany.

Using the life satisfaction based weights, we find that the highest contributions to social deprivation are found in the following groups: (a) low income, not employed, having no children, and being older than 30; and (b) the same as the previous, but with children in the household. Specifically, because of the very large impact on life satisfaction that the lack of unemployment has, social deprivation and unemployment are highly correlated. For policy makers, these are the groups (Groups 1 and 3) of the population that need to be targeted for potential interventions, amounting to approximately only 2 percent of the native and around 6

percent of the immigrant population, but contributing 20–36 percent to one of the overall index measures.

In contrast, those low-income, employed persons aged 30 and under without children in the household (Groups 5 and 6) are thought to be attributed up to 31 percent of the conventional index, whereas using the life satisfaction weights, this amount is reduced to zero. As this group comprises approximately 25 percent of the native and immigrant population, this is an important finding, allowing a better targeting of policy within the 16 groups to those truly “in need.” Having employment (and all the positive associated characteristics) is associated with a dramatically reduced extent of social deprivation as the weight of employment in the life satisfaction regression is so dominant. This corroborates the empirical and theoretical findings on social exclusion of several studies, such as Atkinson and Hills (1998). The existing life satisfaction literature has clearly demonstrated the high informational content found in subjective life satisfaction indicators. This paper builds on the existing social deprivation literature and combines this subjective information to arrive at substantially different policy conclusions. As such, we find compelling evidence for the hypothesis that immigrants in Germany, based on commonly accepted valuations of their situation, reflecting the tastes of immigrants and natives alike, find themselves more deprived than native Germans.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article.

Table A1. Definition of Variables.