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Well-Being in Germany: GDP and Unemployment Still Matter

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Abstract

This paper examines regional differences in subjective well-being (SWB) in Germany. Inferential statistics indicate a diminishing but still significant gap between East and West Germany, but also differing levels of SWB within both parts. The observed regional pattern of life satisfaction reflects macroeconomic fundamentals, where labor market conditions play a dominant role. Differing levels of GDP and economic growth have contributed rather indirectly to regional well-being such that the years since the German reunification can be considered as a period of joyless growth. Approximately half of the "satisfaction gap" between East and West Germany can be attributed to differing macroeconomic conditions. Moreover, we argue that it is advisable for governments to collect more data on aspects that presumably influence the well-being of society. For example, it is highly probable that reliable data on regional income inequality would lead to several important and influential studies. This, in turn, can help to design indicators for those characteristics which are known for affecting SWB. In total, we do not perceive any fundamental caveat for using data on SWB in order to measure welfare directly, at least within culturally and linguistically homogenous regions. To reduce statistical uncertainty, however, it would be helpful to include subjective information of this kind into larger cross-sectional surveys such as common census data.

JEL-Classification: R10, I31

Keywords: social welfare, subjective well-being, unemployment, economic growth

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1 Introduction

Happiness is not just a popular topic for front-page stories. The vast mountain of economic literature on human well-being that has grown during the last two decades (see, e.g., Kahneman and Krueger [2006], Blanchflower and Oswald [2008] or Oswald and Wu [2010]) suggests that individuals' subjective well-being (subsequently referred to as SWB) provides credible information. Hence, happiness economics or – more precisely – evidence based on self-assessed life satisfaction is a promising approach to specify our understanding of utility, to update our welfare reporting standards and to complement the traditional framework of revealed preferences (see Ng [2003]).

Analyses of reported life satisfaction are also highly recognized due to the ongoing skepticism about the hitherto promises of further economic growth. Basically, one can find two lines of critique with respect to GDP as a key welfare indicator and major policy objective. The first line of critique has been established by the influential remarks of Richard A. Easterlin on the relationship between growth and well-being. Easterlins' analyses suggest not just a small but no significant relation at all (see Easterlin [1974] and more recently Easterlin [2005]). However, for developed societies this seeming paradox of a joyless material growth can be widely explained by material repletion, increasing inequality and the human ability to quickly adapt to higher levels of consumption (see, e.g., Lane [2000] or Clark et al. [2008]). A second line questions the compatibility of economic growth and ecological sustainability and goes back to the early 1970s and the Club of Rome.[1] Although this critique rather is concerned about the consequences of economic growth in the long run, it has also stressed the importance of the question whether the GDP is a valid measure for todays quality of life.

As a consequence of these debates, countless private and more and more public initiatives are searching for new ways to measure welfare in a more precise and forward-looking way than it is done by the GDP.[2] But serving both kinds of requirements – measuring current well-being precisely and including aspects of sustainability – seems to be an unsolvable task as it would include substantial trade-offs within one key indicator. One important subordinated question is, however, whether data on SWB is really able to measure the current level of well-being of a nation (or region) validly. In fact, social scientists have gained more and more confidence in using and interpreting data on SWB. Indeed. Many have come to the conclusion that these data could solve the problem of how to measure welfare itself instead of using complicated indicators (see, e.g., Kahneman et al. [2004], Layard [2010] or Diener and Tov [2012]). Among several caveats of the idea of accounting national well-being by using

[1] More recently the main focus of this debate has shifted from the finiteness of natural resources to the aspects of climate change and the global distribution of resources.

[2] Probably the most recognized attempt to complement the GDP has been undergone by the Commission on the Measurement of Economic Performance and Social Progress which was assigned by the French government. Additionally, the European Commission ("beyond gdp") and the OECD ("better life initiative") have become active in this field. And also in Germany an Enquete-Commission titled "Growth, Welfare, Quality of Life" ("Wachstum, Wohlstand, Lebensqualität") has recently been established in order to develop an alternative concept to measure the quality of life that enables politicians and the society as a whole to operate and decide on the basis of valid welfare indicators and without being short-sighted.

subjective information, a striking one has been the lack of international comparability. Whether an indicator is used or not, crucially depends on the question whether it is internationally or regionally comparable or not. If it is not certain that country A is really doing better than country B, it is rather useless to search for root causes of different levels of well-being which in turn could serve as an evidence base for policy measures. This issue becomes even more delicate if countries or political unions such as the EU explicitly try to balance unequal living conditions.

This paper discusses the applicability of self-assessed life satisfaction as an additional welfare indicator by focussing on regional differences within Germany. Thereby three major questions shall be answered: First, do regional mean values of reported life satisfaction reflect real differences in well-being? Second, by how much can the regional variation be explained by established welfare indicators such as GDP or the unemployment rate? Third, what else contributes to the observed regional pattern of SWB within Germany? Finally, we also discuss the question whether SWB might be a proper instrument to complement the existing reporting systems and which determinants of national well-being should receive more attention.

The remainder of the article is as follows. Section 2 provides a short insight into related research. Section 3 discusses the database and provides some descriptive statistics. In Section 4, we show up to which point the regional variation of SWB can be explained by macroeconomic fundamentals such as GDP and unemployment. Section 5 summarizes.

2 Related literature

Especially for developed countries the demand for adequate regional comparisons on welfare has significantly increased during the past years. However, some authors are skeptical with respect to the validity of international comparisons based on subjective information (e.g., Sachverständigenrat [2010]). The arguments are manifold: Simple cross-country comparisons might become misleading due to different regional perceptions of the question (e.g., Wierzbicka [2005]). It can also be argued that regional aspiration levels are differing such that it comes to an unequal interpretation of the given answering scale. Moreover, cultural differences and social norms can lead to special respond behaviors, and therefore, cause additional biases (e.g., Vittersø et al. [2005]).

While most articles do not thoroughly discuss these pitfalls, some authors have started to examine cross-country panel data and included country fixed-effects in order to avoid unobserved regional effects within cross-sectional observations (see, e.g., DiTella et al. [2003], Helliwell [2003] or Alesina et al. [2004]). Cross-national surveys of this kind have helped to estimate the impact of different political constitutions, institutions or macroeconomic conditions on overall life satisfaction without denying differences in mentality and cross-sectional biases. Other authors like Kristensen and Johansson [2008] have stressed these issues even more and use vignettes to control for cultural biases to receive more valid, and therefore, comparable figures. Despite of such examples, a major explanation for the relatively incautious use of international (or interregional)

data might be its plausible pattern. Among several international rankings of well-being the most serious ones are based on the Eurobarometer, the World Value Survey, the World Gallup Poll and the International Social Survey Program. These international sources strongly suggests that reported life satisfaction is rather determined by objective conditions and obvious cultural achievements than by language, adopted aspiration levels or unobserved mentalities (see Diener and Klingelmann [2000], Veenhoven and Ehrhardt [1995], Diener et al. [1995], Frey and Stutzer [2002], and Sacks et al. [2010]). In fact, all data generally show significant correlations with objective life conditions such as health standards or income.

However, while traditional welfare indicators such as the GDP are able to explain large parts of the global variation in SWB, this is not necessarily the case for the developed world. As on the individual level (see Layard et al. [2008]), several authors stress that additional income is becoming also less important or even obsolete on an aggregated level (see, e.g., Lane [2000], Oswald [1997] or Easterlin [2005]). More recent research suggests, however, that higher levels of economic output still raise reported well-being significantly even if many materialistic needs have been satisfied already (Clark et al. [2008], Blanchflower and Oswald [2004], and Shields and Price [2005]). In an ordered probit model using data from the Eurobarometer for 12 European countries, Di Tella et al. [2003] find significant effects for both the level as well as the fluctuation of GDP. Helliwell [2003] explores regional differences among 14 industrial countries by using the World Value Survey and finds decreasing but positive effects of aggregated income as well. Significant and notable effects of GDP per capita are also found by Stewart [2005]. Sacks et al. [2010] confirm the general finding that marginal utility of GDP diminishes, however, they also argue that there are still notable effects even in the highly developed world. Overall, GDP is found to explain the international pattern of SWB (still) quite well, even within the developed world.

The probably second most recognized welfare indicator – the unemployment rate – and its impact on the overall life satisfaction of a society have been studied extensively as well. Without controversy are the strong and durable effects of unemployment on the individual level (see, e.g., Clark and Oswald [1994] or Winkelmann and Winkelmann [1995]). Aiming on the effects on the aggregated level, DiTella et al. [2001] estimate the social welfare tradeoff between unemployment and inflation using a cross-country panel. After controlling for several personal characteristics, country fixed effects, and year effects, they conclude that unemployment marginally leads to higher welfare losses compared to inflation. Unemployment is also studied by DiTella et al. [2003] for 12 European countries. Using data from 1975 to 1992, their results suggest that unemployment has been less important than GDP when it comes to the regional variation of SWB.

Harder to grasp but also relevant for overall levels of SWB seems to be the degree of inequality within one country. Oishi et al. [2011], Rousseau [2009] as well as Böhnke and Kohler [2010] argue that rising income inequality is a key factor to understanding the moderate increase in SWB within many developed countries. As a consequence, differing levels of inequality presumably also explain parts of the international variation in SWB. In comparison to other influential variables, however, the perception and impact of inequality probably vary

considerably between nations (Alesina et al. [2004]). Furthermore, research on happiness and inequality is not that voluminous due to the lack of long and comparable cross-country panel data. Several authors also stress the relevance of different kinds of social capital. For example, Helliwell [2003] finds a significant relationship between the level of communal responsibility of a society and the level of life satisfaction. Bjørnskov [2006] emphasizes the different aspects of social capital and argues that indicators of social trust are strongly related to life satisfaction. Overall, it can be stated that an increasing and significant share of the international variation in SWB can be explained in a plausible way based on a manifold set of objective variables. The listed examples provide just a selection of a large number of articles published during the last years.

In contrast to international comparisons, regional analyses of SWB within one country have the advantage that all regions (in most cases) share one language and homogenous cultural traditions which reduces the potential of unobservable or just unobserved heterogeneity. On the other hand, differences in SWB obviously tend to be smaller, and therefore, more difficult to detect and to explain statistically. Recent studies, however, have shown for example significant effects of objective living conditions. Oswald and Wu [2010] provide evidence for the US in which SWB goes along with a bundle of objective indicators for quality of life. Frey and Stutzer [2002] focus on the impact of institutional design with cross-regional data from Switzerland. Luechinger [2011] provides evidence on the relationship of air quality and life satisfaction with data from German Socio-oeconomic Panel (SOEP) and high-resolution SO_2 data.

With respect to Germany, however, most articles have studied regional differences on a descriptive level. Berlemann and Kemmesies [2004] reported regional aspects of well-being for Germany based on the Eurobaromenter. Maddison and Rehdanz [2007] argue that regional levels of SWB within Germany are rapidly converging due to migration and the adjustment of rent prices. Bergheim [2008] analyses SOEP data on a high-resolution level and emphasizes the correlation of fertility rates and life satisfaction. Easterlin and Plagnol [2008] focus on the evolution of SWB in East and West Germany after reunification. Raffelhüschen et al. [2011] compare the regional pattern of SWB with those of several well-explored drivers of well-being and find unexpectedly high satisfaction levels in northern regions. However, to our knowledge there has been no study that explicitly analyzes the drivers of regional variation in SWB within Germany.

3 Database

3.1 Datasource

The following analyses are based on the German Socio-oeconomic Panel (subsequently referred to as SOEP), a longitudinal survey that exists since 1984. The question on overall life satisfaction – "Taken all things together, how satisfied are you with life?" (Wie zufrieden sind sie, alles in allem, mit Ihrem Leben?) – is answered by choosing a level on an eleven-point-scale (ranging from "not satisfied at all" = 0 to "absolutely satisfied" = 10). Besides this information the panel contains a wide range of socio-economic variables on both individual and household characteristics. The SOEP database has started for West Germany with a sample of 12245 observations which has been to small to conduct extensive regional analyses. Subsequently however, the number of observations has increased due to added subsamples as well as data refreshments. With more than 24500, the largest number of observations was achieved in the year 2000. In the following years the number has slightly decreased according to panel mortality. In the wave of the year 2009, which has been the one recently available, 18602 interviews have been conducted. All respondents are of age 16 or older. The long time span of the panel, the considerable variety of socio-economic variables and the large number of observations have made the SOEP to one of the most frequently used datasets for exploring the evolution and causes of subjective well-being (see Wagner et al. [2007]).

3.2 Regionalization

The SOEP is used for cross-regional analyses only rarely. This mainly has to do with the fact that the sample design is done in a way that the observations are – accordingly weighted – representative for whole Germany but not necessarily for smaller regions within Germany. Despite of the subsample for East Germany that has been designed and added in 1990 in order to allow also separated analyses for West and East, the possibility of drawing detailed comparisons between single regions is limited due to the decreasing number of observations per region. Nevertheless, the approximately 20.000 observations that have been made each year since 2000 are spread over all parts of Germany according to the density of the population. The data are collected in a way that the number of observations is proportional to the population of the federal states (Bundesländer) and it reflects rural areas and agglomerations representatively. As the addresses of the respondents have been selected through a random-route-model, it seems reasonable to test to which degree the SOEP provides information on differences and possible explanations for the variance in SWB on a regional level.

In this analyses three levels of regional subdivisions are used. For large-scale comparisons or regressions on representative subsamples Germany is divided into four large regions (north, west, east and south).[3] To avoid any confusion we will refer to the former political division of Germany as East and West Ger-

[3] To get a detailed picture of the regional setting see Figure 8 in the appendix. The map illustrates both the large-scale and the detailed subdivision into 19 regions.

many and to the regional subdivisions as eastern and western parts of Germany. Table 1 shows some basic descriptive figures according to this devision.

Table 1: SOEP regional levels of overall life satisfaction 2009

region	shortcut	mean	std. dev.	obs.
North	N	6.880	1.870	3014
West	W	6.861	1.813	5873
East	E	6.875	1.868	4725
South	S	6.518	1.836	4441
Germany	GER	6.804	1.848	18053

Sources: Own calculations based on the SOEP. Notes: All data have been analytically weighted.

In a second subdivision of 19 regions we follow mainly the borders of the German federal states. The states with the largest population (Bayern, Baden-Württemberg, Nordrhein-Westfalen and Niedersachsen) are split up in more or less equally populated parts according to regional administration borders (Regierungsbezirksebene). Other federal states (Saarland and Bremen) are included in other regions due to critically low numbers of observations. In this framework we obtain an adequate number of observations for cross-regional regressions while representativeness remains high (see Table 2).

Table 2: SOEP regional levels of overall life satisfaction in 2009

region	shortcut	mean	std. dev.	obs.
Baden	BA	6.898	1.710	524
Bayern	BY	6.893	1.972	1543
Berlin	BE	6.703	1.883	683
Brandenburg	BR	6.338	1.736	791
Franken	FR	6.870	1.864	1072
Hamburg	HH	7.355	1.610	269
Hessen	HE	6.859	1.937	1220
Mecklenburg-Vorpommern	MV	6.418	1.811	475
Niedersachsen/Nordsee	NN	6.990	1.842	869
Niedersachsen/Hannover	NH	6.799	1.824	887
Nordrhein/Köln	NK	6.924	1.737	844
Nordrhein/Düsseldorf	ND	6.797	1.747	1005
Rheinland-Pfalz/Saarland	RS	6.977	1.869	1024
Sachsen	SN	6.569	1.898	1371
Sachsen-Anhalt	ST	6.491	1.738	772
Schleswig-Holstein	SH	6.881	2.060	514
Thüringen	TH	6.345	1.808	824
Westfalen	WE	6.810	1.761	1780
Württemberg	WÜ	6.854	1.819	1586
Germany	GER	6.804	1.848	18053

Sources: Own calculations based on the SOEP. Notes: All data have been analytically weighted.

The range within the means amounts to roughly 1.0 with Hamburg (7.36) at

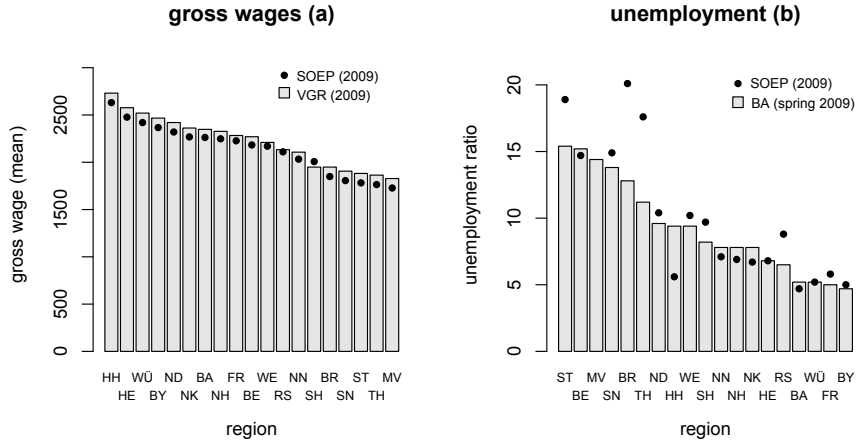
the top and Brandenburg (6.34) at the bottom. The overall mean is 6.80. The standard deviations alternate around 1.8. The number of observations within a single region varies from 1780 (Westfalen) to 269 (Hamburg). The average number of observations per region is 950.[4]

Finally, an even more detailed division of 96 regions is used which follows an often used spatial planning category (Raumordnungsregion). Although this subsample includes a lot of noise due to low numbers of observation, it is still helpful for additional analyses that include more detailed regional information.

3.3 Representativeness of regional data

The SOEP is designed in a way that it contains a representative sample for both, East and West Germany. Also the large-scale division can be assumed to be highly representative. However, as noted above, the specific representativeness for smaller regions is not necessarily given. The limited numbers of observations suggest that at least some regional subsamples are not fully representative with respect to key drivers of well-being. Hence, any over- or underrepresentation of particular socio-economic groups can lead to biased results.

Figure 1: Representativeness of regional data in 2009



Sources: Own calculations based on average gross wages from the national accounts of the federal statistical office (VGR) and unemployment data from the German unemployment insurance (BA).
Notes: All data from the SOEP have been analytically weighted. The unemployment ratios represent values from spring 2009 as SOEP data is collected mainly during the first half of the year. All unemployment ratios are expressed as share of the total labor force.

Figure 1 compares both income and unemployment data for all 19 regions with official data from the national accounts of the federal statistical office and the unemployment insurance. While relative positions with respect to gross wages

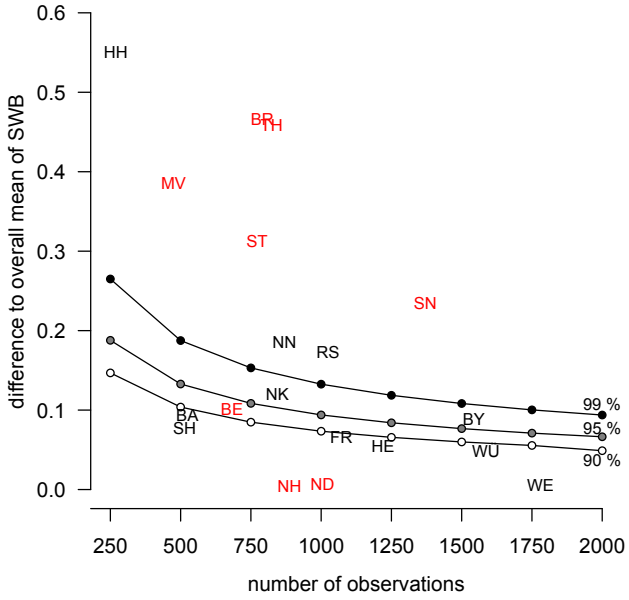
[4]At this point we apologize for having ignored the true origin of the people of the Oberpfalz who are rather committed to the south Bayern instead of Franken.

per employee are fully in line with the official numbers, regional unemployment ratios based on the SOEP only fit roughly to institutional data. Especially in several states of East Germany (BR, TH and ST) the unemployment rates calculated on the basis of the SOEP exceed official numbers significantly. In turn, the group of unemployed seems to be underrepresented in Hamburg. This divergence suggests that smaller regions are biased to some extent to the one or the other direction which has to be taken into account for the interpretation of the subsequent analyses.

3.4 Significance of regional differences in SWB

Simple t-tests show that deviations in SWB from the German average by more than 0.1 can be perceived as significant in most cases. In 2009, SWB is above-average in HH, NN and RS on a 1 percent significance level. NK and BY as well show above average values (on a 5 percent level). BA, SH, FR, HE and WU do not reach significant above-average levels but do exceed the average level as well with high probabilities. The values for WE, NH and ND are close to the German average. BE lies below average on a 10 percent level and all regions that have formerly belonged to the German Democratic Republic (BR, MV, SN, ST and TH) show levels of SWB significantly below the German average (see Figure 2).

Figure 2: Significance of deviations from overall mean in 2009



Sources: Own calculations based on the SOEP. Notes: Red color indicates values below the German average.

Table 3 shows the results of a simple dummy regression to provide an overview about the total size of regional differences in SWB for the year 2009. All coefficient sizes indicate the difference in SWB compared to Brandenburg, the region

with the lowest values. Although absolute levels have converged between East and West Germany since 2005, also 20 years after the reunification of Germany considerable differences in SWB do exist. It can be seen that especially northern regions report relative high satisfaction values. Hamburg is significantly ahead and also the regional sample for NN shows a significant higher level of SWB compared to other regions of West Germany. The economically strong regions in southern Germany (BA, BY, FR and WU) however, do not differ significantly from other regions within West Germany. Within East Germany, Berlin and Sachsen report the highest levels of SWB. Two-sample t-tests for comparing the independent regional samples lead to corresponding results (see Table 14 in the appendix).

Table 3: OLS regression with regional dummies for 2009

region	shortcut	coef.	std. dev.	t
Hamburg (N)	HH	1.02	0.161	6.31
Niedersachsen/Nordsee (N)	NN	0.65	0.130	4.98
Rheinland-Pfalz/Saarland (W)	RS	0.64	0.127	5.02
Nordrhein/Köln (W)	NK	0.59	0.133	4.41
Baden (S)	BA	0.56	0.140	3.98
Bayern (S)	BY	0.55	0.121	4.57
Schleswig-Holstein (N)	SH	0.54	0.167	3.24
Franken (S)	FR	0.53	0.127	4.22
Hessen (W)	HE	0.52	0.121	4.29
Württemberg (S)	WÜ	0.52	0.116	4.46
Westfalen (W)	WE	0.47	0.109	4.31
Niedersachsen/Hannover (N)	NH	0.46	0.129	3.58
Nordrhein/Düsseldorf (W)	ND	0.46	0.120	3.83
Berlin (E)	BE	0.36	0.135	2.71
Sachsen (E)	SN	0.23	0.131	1.77
Sachsen-Anhalt (E)	ST	0.15	0.132	1.15
Mecklenburg-Vorpommern (N)	MV	0.08	0.159	0.5
Thüringen (E)	TH	0.01	0.128	0.05

Sources: Own calculations based on the SOEP. Notes: Dependent variable: subjective well-being. The baseline is allotted to Brandenburg (BR) with a value of zero.

3.5 (In)validity of regional well-being

One could argue that some fraction of the variation of SWB does not reflect real differences in life satisfaction. Overall, it can be found three major sources for invalidity: First, due to the limited number of observations per region it is obvious that some parts of the variation can be ascribed to random errors. A series of randomly drawn subsamples with 900 observations shows that approximately 40 percent of the total standard deviation in the sample with 19 regions is caused simply by statistical uncertainty. Second, as representativeness is not totally given this also causes distortions that reduce validity which is probably the case for Hamburg and partly for East Germany (see Section 3.3). Third, there might exist regionally differing social norms that lead to peculiari-

ties within respond behavior which do not reflect real levels of life satisfaction. Imagine, for example, that it is more common to complain about something openly for people in region A than for those in region B. On the other hand, it might be culturally anchored to show modesty in region B, while communication is more direct in region A. Such differences in mentality can potentially influence survey data and are difficult to detect.[5]

4 Macroeconomic fundamentals

4.1 Correlations

Employment and income have been detected and described as positive drivers of well-being in many cases both on the individual (see, e.g., Winkelmann and Winkelmann [1995], Gerlach and Stephan [1996]) as well as on the aggregate level (see, e.g., DiTella et al. [2001], DiTella et al. [2003], and Stewart [2005]). The evidence endorses the fact that indicators such as GDP or unemployment rates are the most frequently and prominently reported ones in many countries. This leads to two relevant questions: First, by how much can regional differences within Germany be explained by different levels of GDP and unemployment? Second, how important are both welfare indicators in relation to each other? These questions are discussed in the following paragraphs.

Table 4: Correlation coefficients for 19 German regions from 2000 to 2009

	GDP per capita	economic growth	unemployment
SWB	.51***	-.14	-.81***
GDP per capita	1	-.18*	-.57***
economic growth		1	.09

Sources: Own calculations based on the SOEP, Statistisches Bundesamt and Bundesagentur für Arbeit. Notes: *** significant at 0.1 percent level; ** at 1 percent level; * at 5 percent level.

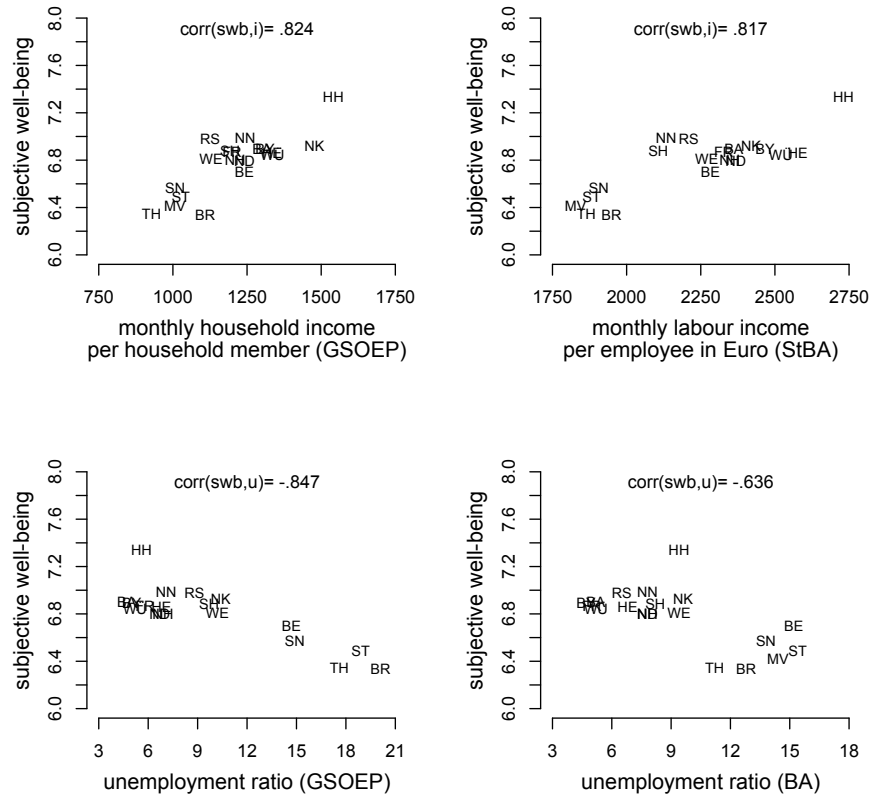
The descriptive statistics shown in Section 3 generally support the theory that aggregated levels of SWB can be explained largely by objective macroeconomic variables such as unemployment rates or mean income.[6] Unsurprisingly, SWB is negatively correlated with the degree of unemployment and positively correlated with the economic performance of each region. During the period from 2000 to 2009, for the sample of 19 German regions, the correlation coefficient of GDP and SWB has been on average .51. In contrast, the correlation between regional SWB and unemployment (measured as ratio of unemployed persons

[5]Theoretically, one could also argue that language is understood not in the same way even within one country due to regionally differing idioms. This would imply that the meaning of "life satisfaction" varies somewhat across regions. Although we do not provide any evidence, we think that this is not of great importance as the notion "life satisfaction" (Lebenszufriedenheit) has presumably the same meaning throughout Germany.

[6]We do not focus on inflation as inflation rates have been moderate in Germany since the mid-1990s. Furthermore, regional differences have been quite small due to common monetary policy and highly integrated markets for consumer goods.

to the total civil workforce) has been -.81 (see Table 4).[7] Real growth rates however, turn out to be insignificantly negatively correlated with both SWB and GDP levels which indicates a slow economic convergence within Germany.

Figure 3: Life satisfaction and macroeconomic key indicators 2009



Sources: SOEP, Statistisches Bundesamt and Bundesagentur für Arbeit, own calculations. Notes: All data from the SOEP have been analytically weighted. The unemployment ratios represent values from spring 2009 as SOEP data is collected mainly during the first half of the year. All unemployment ratios are expressed as share of the total labor force.

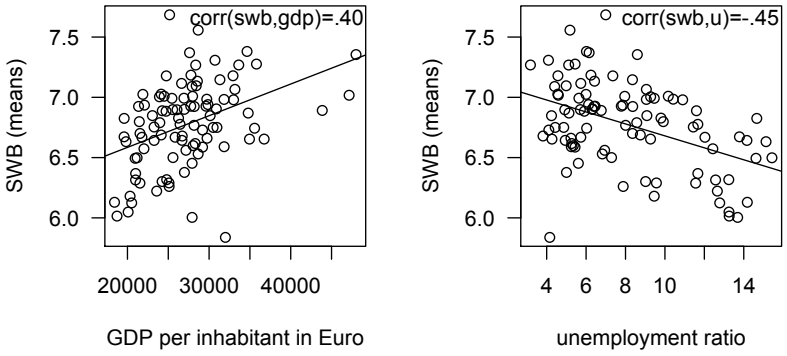
The correlations become even more significant if one focuses on the average income instead of GDP. Figure 3 shows exemplarily correlations between reported well-being and aggregated data taken directly from the SOEP as well as from the federal statistical office and the German unemployment insurance for 2009. Average monthly income appears to be highly correlated with SWB, where both correlation coefficients are larger than 0.8. For unemployment can be found a

[7] The fact that GDP and unemployment are correlated themselves significantly (-.57) obviously complicates the interpretation of these numbers. However, the problem of multicolinearity is considered and found to be no obstacle for identifying the major driver of regional well-being.

similar (but negative) level of correlation (-.85). Using official unemployment rates, the coefficient is a bit weaker with -0.64 which can be explained partly by the described lack of representativeness. With respect to cross-sectional data, it can be said that the correlations are mainly driven by the differences between East and West Germany. As one takes a closer look at West Germany, however, data show that correlations do not remain significant (see Figure 3).

A similar picture arises from the analyses on the level of 96 regions (see Figure 4). The correlations are equally apparent even though correlation coefficients are lower which can be explained to a large extent by the lower number of observations per region.[8] In fact, it is difficult to say whether the correlation is really weaker or not. In general, the level of the coefficients suggests that also at this regional level GDP and unemployment have the ability to indicate regional welfare.

Figure 4: SWB and macroeconomic key indicators for 96 regions 2009



Sources: Own calculations based on the SOEP, Statistisches Bundesamt and Bundesagentur für Arbeit. Notes: All data have been analytically weighted.

4.2 Some arguments on causality

As macroeconomic indicators are collinear themselves and often also go along with other characteristics of the regional subsamples (e.g. wealth), such correlations can only provide a first impression. However, it seems highly implausible for the data that the results are driven by reverse causality or confounding factors. Thus, the possibility that subjective well-being drives GDP or unemployment is excluded in the following analyses even though this might play an important role on the individual level. We also exclude the possibility that other factors simultaneously change the macroeconomic variables and subjective well-being, as factors that would potentially qualify as confounding factors such as for example culture and institutions remain quite constant over the different regions and/or the given time period.

Commonly, the presented correlations are explained by a combination of individual and social effects. The individual effect is caused directly: a person

[8] Notice that the regional values of SWB can not be reasonably compared due to the low number of observations.

looses her job, another receives a higher salary, etc. Social effects, however, are multilayer. They appear first of all at the social environment of the respective person, as unemployment or changes in household income also affect family members. Second, macroeconomic conditions cannot just be described as the sum of microeconomic happenings. They also might influence the mood of an entire society. If unemployment rises, this also might induce the fear of many employees to become unemployed (see, e.g., Clark et al. [2009] and Luechinger et al. [2010]) and higher contribution payments. Correspondingly, an increase in production not just leads to higher household incomes but probably also swells tax revenues and contributes to brighter expectations. Finally, there is no need for mentioning the well known impact of economic growth on the unemployment rate itself.[9] When it comes to GDP, the relationship is even more complex. Although higher levels of GDP per head commonly go along with higher incomes and more consumption, aggregated numbers on income tend to be like a black box. The examples have already been described by many researchers: Just think about expenditures for national defense or intelligence – it is hard to grasp the direct link that should cause any increase in subjective well-being. Furthermore, GDP obviously compromises consumption expenditures and investments alike. Fluctuations of investment or export activities (which mostly drive business cycles) are not supposed to raise life satisfaction immediately. The effects of economic growth on average SWB can also be reduced if for example growth boosts particularly earnings at the top of the income distribution where people realize comparably low levels of marginal utility (Layard et al. [2008]). Focussing on positional concerns or crowding out of social interactions can lead to arguments where SWB can be lowered by economic growth (see, e.g., Pugno [2009] or Kolmos and Salamon [2008]). Finally, any regional redistribution of public recourses – which is done intensively within Germany – additionally reduces the potential impact of changes in GDP. Hence, there are several arguments that lead to the assumption that the effects of output per head are less significant than those of the labor market situation.

4.3 Macroeconomic estimations

The empirical strategy follows mainly the approach of Di Tella et al. (2001). In order to tackle both dimensions of causality, macro- and microeconomic regression models are used and finally combined by including macroeconomic variables to microeconomic fixed effects estimations. While all microeconomic data have its source in the SOEP, all macroeconomic data have been drawn from the federal statistical offices and the German unemployment insurance.

To receive elementary information about the overall effects of macroeconomic indicators on regional SWB, we started by conducting pure macroeconomic regressions where the dependent variable equals the weighted mean values of reported life satisfaction SBW_{it} of each region i in the year t:

$$SWB_{it} = \beta X_{it} + \epsilon_i + \lambda_t + \mu_{it} \tag{1}$$

[9] Note that Okun's law has changed significantly in Germany during the last decade. Due to labor market reforms and the demographic changes ahead, Germany has been able to sustain employment even with average growth rates of less than one percent.

Besides the explanatory marcoeconomic regressors X_{it}, the model includes regional fixed effects ϵ_i as well as year dummies λ_t. The error term is represented by μ_{it}. Table 5 shows the results from such a cross-regional OLS regressions for the time period from 1995 to 2009.[10] Regressions in columns (1) and (2) use the log of real GDP per capita as independent variables whereas regressions in columns (3) to (5) focus on economic growth (ΔGDP).

By including year dummies and regional fixed effects, the results in column (1) are most meaningful. While the effect of unemployment turns out to be highly significant, significance of GDP is only at a 10 percent level. The relative size of standardized beta-coefficients suggests that differences in unemployment do explain a significantly higher share of the regional variation in SWB. At the margin, one percentage point of unemployment reduces SWB by 0.033 while an increase in GDP per capita by one percent raises SWB by approximately 0.004.[11] As a consequence, this means that a steady reduction of the unemployment rate by only one percentage point would trade off an increase in GDP per capita of approximately 7.8 percent. In comparison to the effects measured by Di Tella et al. [2003], who estimate a trade-off relation of approximately 1 to 2.8 percent examining data from the Eurobarometer from 1975 to 1992, the German marginal rate of substitution seems very high.[12]

Table 5: Explaining life satisfaction through macroeconomic fundamentals for 19 German regions from 1995 to 2009

	(1)	(2)	(3)	(4)	(5)
unemployment	-.0333***	- .0531***	- .0369***	- .0210***	-.0186**
in percent	(.0070)	(.0032)	(.0071)	(.0061)	(.0059)
lnGDP	.4444*	.1133			
per capita	(.2527)	(.0598)			
Δ GDP			-.0043	.0026	.0043
per capita			(.0040)	(.0048)	(.0046)
$-\beta_u/\beta_{gdp}$	1.4	8.6	19.1	17.4	9.7
year dummies	yes	yes	yes	yes	no
reg. fixed eff.	yes	no	yes	no	yes
Obs.	285	285	285	285	285
R^2	.924	.714	.924	.775	.795
$adj.R^2$	.914	.697	.913	.758	.777

Notes: OLS-Regression with standard errors in parentheses. Dependent variable: regional mean of SWB. *** significant at 0.1 percent level; ** at 1 percent level; * at 5 percent level. Regressions in columns (1), (3) and (5) include country specific time trends for Berlin (BE) and Hamburg (HH).

[10]The time span for the panel analysis is restricted as reliable data on regional unemployment and output is available only since 1995.

[11]Since $(ln(1.01) - ln(1))0.4444 \simeq 0.0044$. In a similar regression for a sample of 66 non-transition countries based on the World Value Survey Sacks et al. [2010] find a significant effect of 0.004 for any increase of real GDP by one percent, which resembles the results of this paper. However, as they do not control for unemployment, estimates cannot be compared easily.

[12]Note that the analysis of Di Tella et al. [2003] is based on a life satisfaction question that offers only four different satisfaction levels for reply. Thus, coefficients cannot be compared easily.

However, several arguments can be brought up to explain the moderate relevance of GDP. First, the panel analyses is based on data from a time period in which Germany has been significantly richer and more saturated than the countries of the European sample during the 1970s and 1980s. Second, as one focuses on the effects within one country, one has to take the regional redistribution scheme into account which e.g. transferred considerable shares of GDP from West to East Germany during the last two decades. Third, economic growth has not proportionally contributed to wage increases (especially for blue-collar jobs) during the considered time span (see, e.g., Fuchs-Schündeln et al. [2010]). Thus, the estimated trade-off relation is not implausible on first sight. The finding that unemployment probably plays a dominant role compared to growth can be underlined by the recent increase in SWB within East Germany. Since 2005, the unemployment rate in East Germany has dropped rapidly from 18.7 to 13.0 percent in 2009 while reported life satisfaction has increased significantly from 6.3 to 6.5. In contrast, the evolution of SWB after the renunification has not reflected the rapid growth rates of real incomes.

The regression shown in column (2) of Table 5 excludes regional fixed effects and provides a picture that is even more explicit. While the negative effect of unemployment is becoming stronger, the impact of GDP is still significant on the 10 percent level but has only one forth in size compared to column (1). Although multicollinearity weakens the significance, this strongly suggests that the existing regional differences in SWB can be explained much better by unemployment than by data on aggregated income respectively GDP. The regression results in columns (3) to (5) basically point into the same direction. In each of the regressions unemployment is highly significant whereas no significant effect of real economic growth can be found.[13]

Table 6: Fixed effects OLS regression for regional life satisfaction for 96 German regions from 2001 and 2009

	(1)	(2)	(3)	(4)
unemployment	-.0437**	-.0447***	-.0412***	- .0412***
in percent	(.0136)	(0058)	(.0072)	(.0063)
GDP	.0082	.0100*		
per capita	(0263)	(.0041)		
lnGDP			- .1027	.3332**
per capita			(.5411)	(.1231)
year dummies	yes	yes	yes	yes
reg. fixed eff.	yes	no	yes	no
Obs.	192	192	192	192
R^2	.828	.447	.828	.447

Notes: OLS-Regression with robust standard errors (in parentheses). Dependent variable: regional mean of SWB. *** significant at 0.1 percent level; ** at 1 percent level; * at 5 percent level.

[13] As high growth rates do not instantly change the level of wages and salaries, we also run several regressions with lagged growth variables which, however, do not change the results substantially.

Before one gives a broader interpretation of these results, it is advisable to recheck the findings by conducting regression analyses for the sample of 96 regions as well. Table 6 shows the regression results for a panel with only two waves, one in 2001 and the other one in 2009. This limited number of points in time is sufficient due to the high number of observations in each wave and allows us to avoid the problem of detecting effects of growth on SWB that are time-lagged. The year 2001 has been chosen as a starting point because of a drastic increase in the number of observations in the SOEP data since 2000 and the availability of regional unemployment data. All aggregated data have been taken again from the federal statistical office and from the unemployment insurance. Regressions in columns (1) and (2) use nominal GDP per capita levels (where GDP has been multiplied by a factor of 1000) as explanatory variable whereas regressions in columns (3) and (4) use log values.[14]

The results are similar to the ones above even though the data contains additional noise due to the low numbers of observation per region. The negative effect of the unemployment rate is highly significant. Also the size of the effect of unemployment is robust at a level slightly above 0.04 which is close to the previous results. The GDP on the other hand does not enter the estimation in a significant way, at least if regional fixed effects are included. If regional effects are excluded, significance of both welfare indicators is increasing as one would expect. However, as the point estimates of GDP and lnGDP are far from robust, there is no sense in deriving any trade-off relation from these estimations.

To sum up, the macroeconomic estimates provide evidence for the assumption that the total effect of one percentage point change of unemployment lies between -0.3 and -0.5 depending on the regional division and whether regional fixed effects are included or not. If one follows the estimation of regression (1) in Table 5, this would mean that a regional difference in unemployment of 6 percentage points (the difference between West and East Germany in 2009) leads to a gap in SWB of approximately 0.2 on the 0-10 scale. This implies that approximately one half of the difference in SWB between East and West Germany can be attributed to different levels of unemployment. Assuming a convergence just in terms of GDP would result in a reduction of the "satisfaction gap" by approximately 25 percent. However, these estimates should just be classified as a first rough approximation as other explanatory collinear variables (e.g. wealth) are not included to the model. The fact that SWB – if one looks at smaller regions – does not reflect differences in economic growth from a period of eight years is stunning.

4.4 Microeconomic estimations

In order to separate the effects on the individual from those on the aggregated level and to control for multicolinearity we continue with several fixed effect regressions, aiming at individual life satisfaction. The OLS regression equation on a pure microeconomic level is given by

[14]Note that regional price levels in general change uniformly do to highly integrated markets. Hence, relative changes in nominal values of GDP also reflect relative changes in real values. However, when it comes to real estate markets and rents, regional price dynamics exist to some extent.

$$SWB_{jit} = \beta X_{jit} + \alpha_i + \epsilon_j + \lambda_t + \mu_{it}, \quad (2)$$

where SWB_{jit} is the well-being level reported by individual i in country j in year t, α_i is the individual fixed effect of individual i, ϵ_j is a regional fixed effect and λ_t is a year effect. As there is no need for the availability of macroeconomic data, the time span of the analyzed panel is extended by three more waves (1992 to 1994). The set of personal characteristics X_{jit} has been chosen according to general literature findings. The regression results are shown in Table 7 and confirm standard findings where unemployment causes a significant drop in SWB and personal labor income enhances SWB with decreasing marginal returns. If one controls for income variables, unemployment reduces SWB of a person by approximately 0.4 on the 0-10 scale (see column (3)). Without controlling for income, the size of the effect is rather -0.6 (see column (2)). As those estimates are fairly robust, this already suggests that the individual losses in life satisfaction do not account for the major part of the aggregated effects estimated in Section 4.3. This can be shown by a simple calculation: If the unemployment rate increases by one percent and the labor force represents 70 percent of the adult population, this implies that the effects on the individual level lower the overall mean of life satisfaction by only 0.0042 ($= 0.01 * 0.7 * 0.6$) which is less than 15 percent of the macroeconomic effect (see in comparison Table 5). Income on the other hand raises SWB by approximately 0.003 if real net income increases by one percent. Hence, if GDP growth is reflected in income, an increase of real GDP per capita by 10 percent should cause a durable aggregated effect of approximately 0.03 which accounts for two thirds of the macroeconomic effect measured above. This is plausible as GDP growth also contributes to public sector growth. However, as our macroeconomic estimation is not very precise, it is not reasonable to note this relation as a robust finding. In addition, several authors argue that on an aggregated level positional concerns potentially disperse large parts of the individual effects (see Section 2). Although one can not draw any conclusion on this question, we are highly confident in concluding that the indirect effects of unemployment are of higher importance than the ones that lies within GDP growth. Moreover, the finding of Winkelmann and Winkelmann [1995], who argue that the individual costs of becoming unemployed sum up to high financial amounts, can be recorded.

Further interesting results are: (i) Divorced persons are happier than single persons who have never been married. (ii) Disposable income of household members is at least as important for subjective well-being as personal income. (iii) The subjective health status plays a dominant role among explanatory variables. (iv) Life satisfaction is found to be U-shaped with respect to age. (v) On average, marriage causes higher effects than cohabitation. (vi) Owning real estate is connected to higher levels of SWB.

Table 7: Fixed effects OLS regression for individual life satisfaction from 1992 to 2009

Independent Variable	(1)	(2)	(3)	(4)
age	-.0730***	-.0278***	-.0728***	-.0406***
	(.0038)	(.0022)	(.0037)	(.0022)
age^2	.0475***	.0047*	.0539***	.0097***
	(.0042)	(.0020)	(.0041)	(.0020)
SHS^a "very good"	.7286***	.7421***	.7355***	.7356***
	(.0135)	(.0111)	(.0132)	(.0113)
SHS "good"	.4095***	.3990***	.4094***	.3961***
	(.0082)	(.0067)	(.0081)	(.0068)
SHS "not that good"	-.5125***	-.5622***	-.5200***	-.5552***
	(.0126)	(.0087)	(.0124)	(.0089)
SHS "bad"	-1.4316***	-1.642***	-1.4528***	-1.6235***
	(.0305)	(.0163)	(.0299)	(.0166)
married	.4796***	.4012***	.4423***	.4572***
	(.0181)	(0139)	(.0176)	(.0142)
with partner	.3329***	.3045***	.3306***	.3072***
	(.0135)	(0.108)	(.0133)	(.0110)
divorced	.2171***	.1673***	.2058***	.1922***
	(.0240)	(.0207)	(.0236)	(.0209)
unemployed	-.3879***	-.6038***	-.3771***	-.5597***
	(.0344)	(.0110)	(.0339)	(.0112)
lnY_p	.1116***		.1601***	
personal net income	(.0094)		(.0087)	
lnY_h	.2193***			.2973***
hh net income per member	(.0123)			(.0089)
house/flat owner	.0938***	.0808***	.0949***	.0768***
	(.0121)	(.0100)	(.0119)	(.0102)
R-sq (within)	.0794	.0985	.0782	.1015
R-sq (between)	.1404	.1579	.1403	.1549
R-sq (overall)	.1336	.1433	.1344	.1383
rho	.5626	.5536	.5613	.5627
Number of individuals	30320	44222	31227	42938
Avg obs per ind.	5.9	7.3	6.0	7.3

Notes: OLS-Regression with individual fixed effects, individual characteristics as well as aggregate information. Number of observations: 188069. Standard errors in parentheses. Dependent variable: regional mean of SWB. *** significant at 0.1 percent level; ** at 1 percent level; * at 5 percent level. Regional fixed effects and year dummies have been included. ^{a}SHS: subjective health status.

4.5 Combining both datasets

After having shortly introduced the results of basic microeconomic regressions, we return to the aggregated level. The combined regression equation is given by

$$SWB_{jit} = \alpha_i + \beta_1 ln(GDP)_j + \beta_2 U_j + \sum_{k=3}^{N} \beta_k X_{kit} + \epsilon_j + + \lambda_t + \mu_{it} \qquad (3)$$

where as before α_i denotes the individual fixed effect of individual i, ϵ_j the regional fixed effect of region j and λ_t the year dummy in year t. In addition, aggregated data on GDP and unemployment (U) are included to the model. The baseline results are shown in column (1) of Table 8. If one controls for all individual characteristics from regression (4) in Table 7, this yields in harsh drop of the effect of the unemployment rate by approximately one half. The effect, however, remains statistically significant on a 0.1 percent level which suggests that within the pure macroeconomic model unemployment rates serve also as proxies for other important variables such as mean household income, financial wealth or even average health status. Nevertheless, there remains a considerable macroeconomic effect of approximately -0.15 (per percentage point of unemployment).

Table 8: Fixed effects OLS regression for individual life satisfaction with macroeconomic variables from 1995 to 2009

	(1)	(2)	(3)	(4)	(5)
unemployment	-.0154***	-.0150***	-.0307***	-.0287***	.0099
(in percent)	(.0035)	(0029)	(.0020)	(.0019)	(.0092)
unemployment^2					-.0008**
					(.0003)
lnGDP	-.2217	-.0524	-.1071	-.1286*	-.2420*
	(.1149)	(.0638)	(.1067)	(.0595)	(.1151)
year dummies	yes	yes	no	no	yes
reg. fixed eff.	yes	no	yes	no	yes
R-sq (overall)	.1375	.1279	.1132	.1172	.1421
rho	.5724	.5804	.5953	.5917	.5688

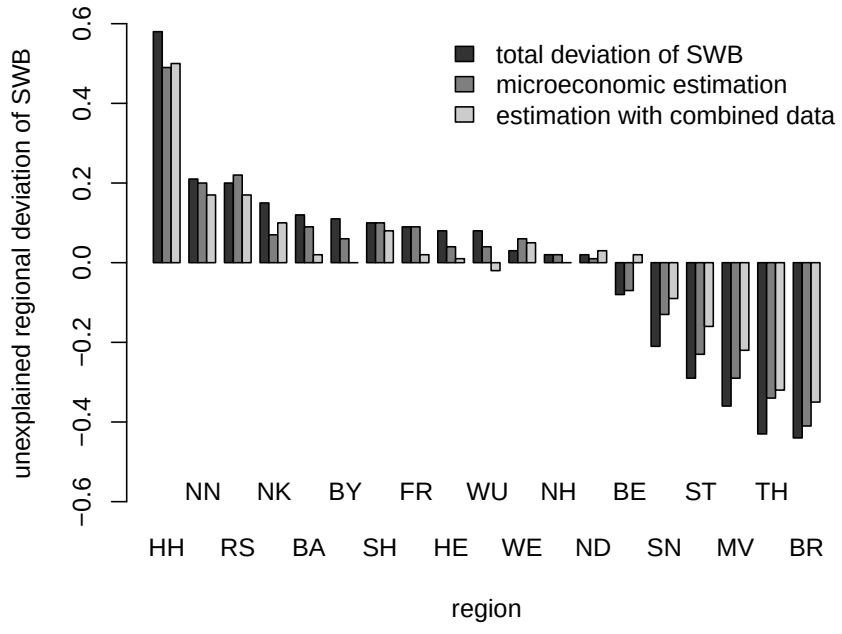
Notes: OLS-Regression with individual fixed effects and individual characteristics (see column (4) of Table 7). Standard errors in parentheses. Dependent variable: individual SWB.Number of observations: 276191. Number of individuals: 40906. Average number of observations per individual: 6.8. *** significant at 0.1 percent level; ** at 1 percent level; * at 5 percent level.

In contrast, GDP does not contribute to the estimation in a significant way. In the baseline regression (column (1)) the point estimate even turns out to be negative. This result does not even change qualitatively if regional fixed effects are excluded (see column (2)) which leads to the conclusion that the sum of all indirect effects of GDP growth have not contributed to regional well-being during the last 15 years. This, however, does not imply that GDP growth is

obsolete for the country as a whole, although the negative coefficient for log GDP even turns out to be significant as soon as time and regional dummies are excluded (see column (4)). That this is a false conclusion can be easily seen if one considers the regional distribution of public net investments within Germany since the reunification. In fact, the stock of public infrastructure has increased in per capita terms especially in those regions where it has been on the lowest levels. This hypothesis is one out of many and cannot be discussed here in detail.

What can be discussed instead is how much of the regional variance can be explained by unemployment and differences in income. Figure 5 shows the unexplained regional effects of both the microeconomic as well as the combined regression model. In comparison to the total variation of SWB in 2009, which is illustrated by the dark bars, it can be seen that significant parts but not the majority of regional differences can be attributed to macroeconomic fundamentals. For most regions within East Germany, however, considerable negative effects still remain. In contrast, Hamburg and the very northwest of Germany still show surprisingly high values of SWB. Nevertheless, approximately 40 percent of the gap in life satisfaction between East and West Germany can be attributed to fundamental macroeconomic conditions.

Figure 5: Unexplained regional deviation 2009



Source: Own calculations based on the regression results in Tables 7 and 8.

4.6 The marginal disutility of unemployment

To complete the analyses of Sections 4.1 to 4.5, it can be argued that the impact of macroeconomic fundamentals is not equal in size within each region partly due to nonlinearity of effects. With respect to GDP and household income this has been considered by using log values as marginal utility diminishes both on the individual and on the aggregate level (Sacks et al. [2010]). However, when it comes to unemployment, things are less obvious. In fact, there are several arguments that counter the simple idea of constant marginal effects of unemployment as well. However, as one has to take into account always both groups, the employed and the unemployed, this is more tricky. In theory, the employed are harmed by unemployment at least in two ways: First, high unemployment is connected to lower job security. In other words, the higher the unemployment is the more afraid of layoffs employees become. Second, employees who witness layoffs might suffer as well due to feelings of guilt and a worsening of social climate at work. Some more linkages are discussed by Clark et al. (2009). What we want to emphasize is that these arguments only apply if unemployment exceeds some basic level. If, in contrast, unemployment is only a problem of persons with deficits in basic qualifications, it is not plausible that this causes any fear among the employed. The same is true if unemployment mainly occurs due to persons who enter the labor market after education or change jobs voluntarily. As a consequence, the negative effects of unemployment on the employed would only be considerable if unemployment is caused by structural labor market distortions such as high labor costs or business cycles which lead to unemployment rates that exceed a basic level. This can be a potential explanation for an increase in marginal disutility of unemployment on the aggregate level which is indicated by regression (5) in Table 8.

With respect to the unemployed Clark [2003] provides evidence from the British Household Survey and argues that higher unemployment numbers help the unemployed to cope with their "violation" of the social norm not to live from public funds. Hence, some authors have concluded that a rise in unemployment eases the disutility of the unemployed which as a consequence would contribute to a decrease in marginal disutility of unemployment. For Germany, however, empirical evidence is not in line with any conclusion that ascribes a dominant role to this effect. Regionally separated fixed effects regressions show significantly stronger effects of unemployment for eastern parts of Germany where unemployment rates have been nearly twice as high during the last two decades (see Table 9). On the other hand, the effect has been significant but rather low for southern Germany where unemployment has remained on a comparably low level during the same time period. Similar findings have been also made by Chadi [2011] who emphasizes the effect of lower job prospects in presence of high unemployment rates. Overall, we do not want to conclude on possible causes at this point, but there is evidence suggesting increasing marginal disutility for both groups, the employed as well as the unemployed. Hence, it can be assumed that differing levels of unemployment contribute even more to the regional variation of SWB, in particular with respect to the difference between East and West Germany.

Table 9: Fixed effects OLS regression for individual life satisfaction by region from1992 to 2009

Independent Variable	(north)	(west)	(south)	(east)
age	-.1136***	-.1156***	-.1287***	-.0451***
	(.0030)	(.0189)	(.0205)	(.0106)
age^2	.0535***	.0479***	.0469***	.0463***
	(.0136)	(.0097)	(.01060)	(.0120)
SHS^a "very good"	.7585***	.7071***	.7662***	.6908***
	(.0369)	(.0259)	(.0272)	(.0321)
SHS "good"	.4078***	.4024***	.4258***	.3984***
	(.0231)	(.0155)	(.0178)	(.0187)
SHS "not that good"	-.4910***	-.5106***	-.5911***	-.4739***
	(.0396)	(.0267)	(.0309)	(.0327)
SHS "bad"	-1.4902***	-1.482***	-1.496***	-1.3141***
	(.0396)	(.0869)	(.0909)	(.0977)
married	.5253***	.4552***	.4825***	.3709***
	(.0626)	(0446)	(.0469)	(.0556)
with partner	.4034***	.3331***	.3227***	.3006***
	(.0433)	(.0313)	(.0326)	(.0370)
divorced	.1446***	.2567***	.2142**	.2177**
	(.0806)	(.0577)	(.0653)	(.0682)
unemployed	-.3973***	-.4803***	-.2093	-.5248***
	(.1150)	(.0866)	(.1094)	(.0700)
net labor income	.0092***	.0128***	.0113***	.0274***
in 100 Euro	(.0024)	(.0013)	(.0014)	(.0024)
net labor income^2	-.0012***	-.0015***	-.0014***	-.0058***
	(.0003)	(.0002)	(.0002)	(.0010)
house/flat owner	.0504***	.1008***	.07847*	.0317*
	(.0149)	(.0262)	(.0282)	(.0317)
R-sq (within)	.0794	.0865	.0898	.0669
R-sq (between)	.0346	.0302	.0329	.0019
R-sq (overall)	.0447	.0388	.0487	.0090
rho	.6668	.6631	.6950	.6842
number of obs.	29447	62240	51570	44812

Notes: OLS-Regression with individual fixed effects, year dummies and regional fixed effects. Standard errors in parentheses. Dependent variable: regional mean of SWB. *** significant at 0.1 percent level; ** at 1 percent level; * at 5 percent level. Regional fixed effects and year dummies have been included. ^{a}SHS: subjective health status.

5 Summary and discussion

This paper examines regional differences in SWB within Germany. Although the analyses do only cover some out of many possible drivers of SWB, we conclude that large parts of the variation do reflect objective living conditions. Moreover, highly recognized welfare indicators such as the GDP or unemployment rates are not just correlated with regional SWB but also have the ability to explain the evolution and differences of regional levels of SWB.

The macroeconomic regression model applied for a sample of 19 regions with mean values of SWB as dependent variable suggests for the period from 1995 until 2009 that up to three-quarters of all real differences are related to macroeconomic conditions. If common statistical standard errors are taken into account, still one half of the total variation can be attributed to macroeconomic conditions. These estimates, however, include presumably various indirect effects which go along with fluctuations of unemployment or growth. To obtain more precise estimates several microeconomic regressions have been conducted as well. Applying common FE-regressions, it can be found that that regional differences in household income and individual effects of unemployment do explain approximately 25 percent of all real variation. If the macroeconomic effects from unemployment are taken into account, this fraction increases to approximately 40 percent. In addition, we conclude that there is strong evidence that marginal disutility is increasing with unemployment. As a consequence, it can be assumed that the differences in quality of life between East and West Germany would be reduced by approximately half if macroeconomic conditions were equal.

The question on the relative importance of unemployment and growth can be answered unambiguously. Even though both welfare indicators are highly correlated with SWB, the results strongly suggest that differing levels of unemployment affect regional SWB significantly stronger than differences in GDP. Correspondingly, also changes in unemployment have influenced average SWB in a stronger way and more directly than economic fluctuations. Correspondingly, we have not found any significant relation between economic growth and well-being for the analyzed period of time. Controlling for income effects on the household level, the model even yields negative though insignificant coefficients for GDP.

This, however, does not mean that economic growth can be neglected neither on a national nor on a regional level. Beyond dispute are the indirect effects of growth as it maintains and creates employment. Moreover, our analyses is shortsighted with respect to regional transfers within the public budget. Finally, the moderate impact of growth can be explained by the sharp decline of the labor share and the corresponding increase in inequality in Germany since the early 1990s. Hence, the interdependency probably will change again if Germany experiences comparably higher wage increases in the future. Nevertheless, the moderate impact of the GDP supports the perception that economic growth is not an end in itself.

When it comes to the discussion on new sets of welfare indicators, SWB definitely provides an important basis to detect relevant drivers of welfare as it contains valid information. Hence, it seems to be advisable for governments

to collect more data on aspects that presumably influence the well-being of society. For example, it is highly probable that reliable data on regional income inequality would lead to several important and influential studies. This, in turn, can help to design indicators for those characteristics which are known for affecting SWB. Moreover, we do not perceive any fundamental caveat for using data on SWB in order to measure welfare directly, at least within culturally and linguistically homogenous regions. To reduce statistical uncertainty, however, it would be helpful to include subjective information of this kind into larger cross-sectional surveys such as common census data.

A Appendix

Figure 6: Regional subdivisions

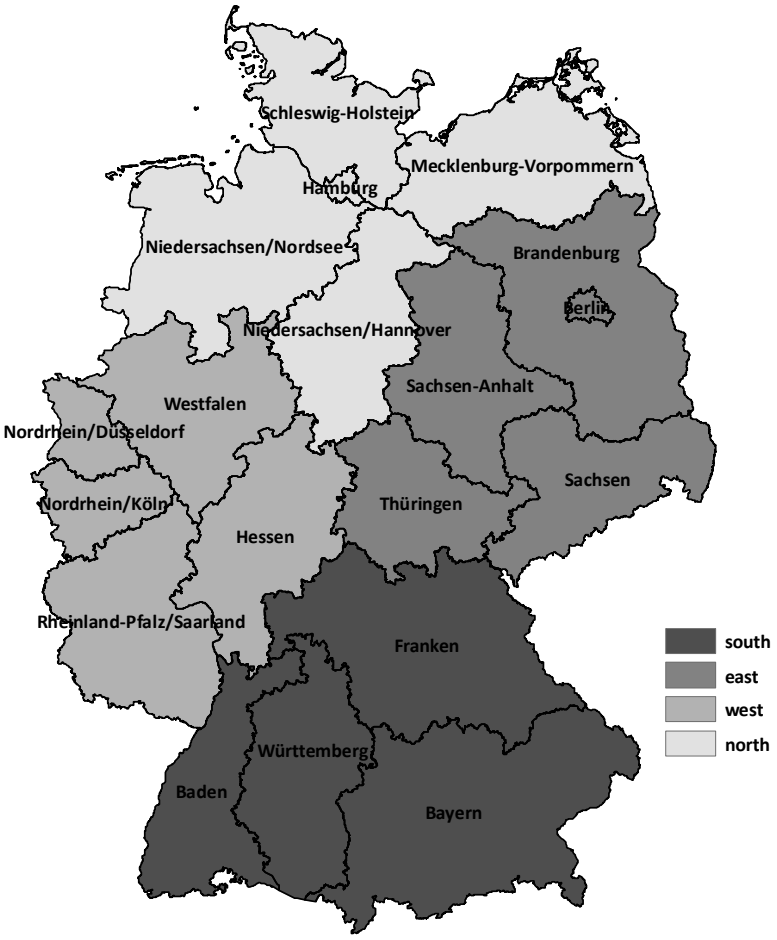


Table 10: Probabilities of higher regional SWB in percent, 2009

	BA	BY	BE	BR	FR	HH	HE	MV	NN	NH
BA		52.1	96.8	100.0	61.3	0.0	65.2	100.0	17.6	84.1
BY	47.9		98.3	100.0	61.6	0.0	67.0	100.0	11.6	87.5
BE	3.2	1.7		100.0	3.4	0.0	4.4	99.5	0.1	15.3
BR	0.0	0.0	0.0		0.0	0.0	0.0	21.7	0.0	0.0
FR	38.7	38.4	96.6	100.0		0.0	55.0	100.0	7.8	80.0
HH	100.0	100.0	100.0	100.0	100.0		100.0	100.0	99.8	100.0
HE	34.8	33.0	95.6	100.0	45.0	0.0		100.0	6.1	76.4
MV	0.0	0.0	0.5	78.3	0.0	0.0	0.0		0.0	0.0
NN	82.4	88.4	99,9	100.0	92.2	0.2	93.9	100.0		98.5
NH	15.9	12.5	84.7	100.0	20.0	0.0	23.6	100.0	1.5	
NK	60.7	65.0	99.1	100.0	74.1	0.0	78.0	100.0	22.2	92.7
ND	14.1	10.6	85.4	100.0	18.0	0.0	21.5	100.0	1.0	48.9
RS	79.3	86.2	99.8	100.0	90.6	0.1	92.8	100.0	44.2	98.2
SN	0.0	0.0	6.6	99.7	0.0	0.0	0.0	93.5	0.0	0.2
ST	0.0	0.0	1.3	95.9	0.0	0.0	0.0	76.0	0.0	0.0
SH	44.3	45.4	94.0	100.0	58.1	0.0	58.1	100.0	15.4	77.9
TH	0.0	0.0	0.0	53.1	0.0	0.0	0.0	24.2	0.0	0.0
WE	15.6	10.1	90.7	100.0	23.3	0.0	23.3	100.0	0.7	55.6
WÜ	31.4	28.5	96.4	100.0	41.4	0.0	46.9	100.0	3.9	76.3
GER	12.5	3.6	91.9	100.0	12.8	0.0	15.4	100.0	0.2	52.7

	NK	ND	RS	SN	ST	SH	TH	WE	WÜ	GER
BA	39.3	85.9	20.7	100.0	100.0	55.7	100.0	84.4	68.6	87.5
BY	35.0	89.4	13.8	100.0	100.0	54.6	100.0	89.9	71.5	96.4
BE	0.9	14.6	0.2	93.4	98.7	6.0	100.0	9.3	3.6	8.1
BR	0.0	0.0	0.0	0.3	4.1	0.0	46.9	0.0	0.0	0.0
FR	25.9	82.0	9.4	100.0	100.0	45.8	100.0	80.6	58.6	87.2
HH	100.0	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HE	22.0	78.5	7.2	100.0	100.0	41.9	100.0	76.7	53.1	84.6
MV	0.0	0.0	0.0	6.5	24.0	0.0	75.8	0.0	0.0	0.0
NN	77.8	99.0	55.8	100.0	100.0	84.6	100.0	99.3	96.1	99.8
NH	7.3	51.1	1.8	99.8	100.0	22.1	100.0	44.4	23.7	47.3
NK		94.0	26.2	100.0	100.0	66.0	100.0	94.0	82.0	96.8
ND	6.0		1.3	99.9	100.0	20.4	100.0	42.8	21.6	45.7
RS	73.8	98.7		100.0	100.0	82.2	100.0	99.1	95.3	99.8
SN	0.0	0.1	0.0		82.8	0.1	99.7	0.0	0.0	0.0
ST	0.0	0.0	0.0	17.2		0.0	94.9	0.0	0.0	0.0
SH	34.0	79.6	17.8	99.9	100.0		100.0	78.0	61.0	82.4
TH	0.0	0.0	0.0	0.3	5.1	0.0		0.0	0.0	0.0
WE	6.0	57.2	0.9	100.0	100.0	22.0	100.0		23.7	55.3
WÜ	18.0	78.4	4.7	100.0	100.0	49.0	100.0	76.3		85.1
GER	3.2	54.3	0.2	100.0	100.0	17.6	100.0	44.7	14.9	

Source: Own calculations based on the GSOEP. Notes: Two-sample t-tests. Values denote probabilities by which the SWB of a region in a certain row is higher than the one in the region of the respective column.

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