

Welsch, Heinz; Biermann, Philipp

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## Poverty is a public bad: Panel evidence from subjective well-being data

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# Poverty is a Public Bad: Panel Evidence from Subjective Well-being Data

Heinz Welsch and Philipp Biermann

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German Socio-Economic Panel (SOEP)  
DIW Berlin  
Mohrenstrasse 58  
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**Poverty is a Public Bad:**  
**Panel Evidence from Subjective Well-being Data**

Heinz Welsch

Philipp Biermann

Department of Economics

University of Oldenburg

26111 Oldenburg, Germany

**Abstract:** Previous research has found that subjective well-being (SWB) is lower for individuals classified as being in poverty. Using panel data for 39,239 individuals living in Germany from 2005-2013, we show that people's SWB is negatively correlated with the state-level poverty ratio while controlling for individual poverty status and poverty intensity. The negative relationship between aggregate poverty and SWB is more salient in the upper segments of the income distribution and is robust to controlling for the rate of unemployment and per capita GDP. The character of poverty as a public bad suggests that poverty alleviation is a matter not only of equity, but of efficiency.

**Keywords:** poverty; poverty ratio; subjective well-being; public bad; life satisfaction

**JEL classification:** I31; I32; D60

## 1. Introduction

The availability of data on subjective well-being (SWB) has greatly enhanced our ability to study the role for individual welfare of economic variables like income and unemployment. With respect to income, it is well known that richer individuals are more satisfied with their lives (Diener et al. 2010). In addition, it has recently been shown that self reported satisfaction with life is lower for those who are classified as being in poverty (Clark et al. 2015, 2016). With respect to unemployment, it is well established that not only personally being unemployed, but also the aggregate level of unemployment negatively affects SWB (Di Tella et al. 2001) or, in other words, that unemployment is not only a private bad, but a public bad.

The reasons that have been put forward for why unemployment is a public bad (Frey and Stutzer 2002) almost literally apply to poverty: People may be unhappy about poverty even if they are not poor themselves. They may feel bad about the unfortunate fate of the poor and they may worry about the possibility of becoming poor themselves in the future. They may also feel repercussions on the economy and society as a whole. They may dislike the increase in taxes likely to happen in the future. They may fear that crime and social tensions increase, and they may even see the threat of violent protests and uprisings.<sup>1</sup>

Motivated by such reasoning, this paper analyzes whether the degree of poverty prevailing in society affects SWB of people even if they are not themselves classified as being in poverty. Controlling for potentially confounding factors (in particular aggregate unemployment), we show in a fixed-effects framework that people's satisfaction with life is lower if the state-level poverty rate in Germany is higher, which suggests that poverty is a

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<sup>1</sup> Frey and Stutzer (2002) write with respect to unemployment: "People may be unhappy about unemployment even if they are not themselves put out of work. They may feel bad about the unfortunate fate of those unemployed and they may worry about the possibility of becoming unemployed themselves in the future. They may also feel repercussions on the economy and society as a whole. They may dislike the increase in unemployment contributions and taxes likely to happen in the future. They may fear that crime and social tensions increase, and they may even see the threat of violent protests and uprisings."

public bad. The well-being repercussions from aggregate poverty are about half as strong as the repercussions from aggregate unemployment. In addition, we find that the negative relationship between aggregate poverty and well-being is particularly salient for individuals from the upper segments of the income distribution, suggesting that poverty creates negative externalities.<sup>2</sup> The finding that poverty is a public bad and/or creates negative externalities indicates that poverty alleviation is a matter not only of equity, but of efficiency.

The paper is structured as follows. Section 2 discusses methodological issues. Section 3 presents the empirical results. Section 4 provides a discussion and concludes.

## **2. Method**

### *2.1 Poverty Measures*

The measurement of income poverty involves defining as poor all individuals whose income is below a certain threshold, referred to as the poverty line. In this paper we follow the convention applied in documents of the European Union (as do Clark et al. 2015, 2016), in which the poverty line equals 60 percent of the median equivalent income. Given an individual's status as being poor (incidence of poverty), her relative shortfall from the poverty line measures her normalized income deprivation (intensity of poverty).

Regarding the measurement of poverty at the aggregate (societal) level, a variety of measures were discussed in the literature (Foster et al. 1984, World Bank 2005). In this paper we use the poverty ratio (headcount ratio), i.e. the fraction of the population that is classified as poor, because it arguably is the poverty measure most frequently supplied by statistical offices (such as the German Federal Statistical Office) and most frequently referred to in public debates.

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<sup>2</sup> Negative externalities of poverty on the non-poor are consistent with Acemoglu and Robinson (2000), who explain the emergence of redistributive programs in Western societies by a desire of the elite to prevent social unrest.

## 2.2 Data

We analyze the relationship between the annual poverty ratios prevailing in the 16 states of Germany and citizens' subjective well-being, controlling for individuals' socio-demographic characteristics, the individual-level incidence and intensity of poverty, and state-level economic conditions (unemployment rate and per capita GDP).

The data used in this analysis comes from several sources. People's subjective well-being (measured as reported life satisfaction), their socio-demographic characteristics, and the individual-level incidence and intensity of poverty are taken from (or computed from) the German Socio-Economic Panel (SOEP), one of the most widely used panel data sets in the subjective well-being literature. The SOEP is a panel survey based on a multi-stage random design with yearly re-interviewing (Wagner et al. 2007). Annual waves of the survey involve more than 20,000 individuals aged 16 and over in about 11,000 households. We use SOEP version 30.

The dependent variable in our well-being regressions is the answer to the following question: "How satisfied are you at present with your life, all things considered? Please respond using the following scale, where '0' indicates *not at all satisfied* and '10' indicates *completely satisfied*." The individual income measure we employ to create individual-level poverty measures is equivalent income, i.e. net household income divided by the square root of household size (OECD 2008). Following official EU practice, we classify individuals as poor if their equivalent income is below 60 percent of the country-level median equivalent income.

The state-level poverty ratios and the macroeconomic control variables used in this study are taken from the German Federal Statistical Office.<sup>3</sup> Poverty ratios are based on the

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<sup>3</sup><https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/Soziales/Sozialberichterstattung/Tabellen/ArmutsgefahrungsquoteBundeslaender.html> and [https://www.genesis.destatis.de/genesis/online/data;jsessionid=62C851D497B8C4AB4000449053F8324D.tomcat\\_GO\\_1\\_1?operation=statistikAbruftabellen&levelindex=0&levelid=1477812054692&index=2](https://www.genesis.destatis.de/genesis/online/data;jsessionid=62C851D497B8C4AB4000449053F8324D.tomcat_GO_1_1?operation=statistikAbruftabellen&levelindex=0&levelid=1477812054692&index=2)

Microcensus, an official representative household survey involving about 830,000 individuals in 370,000 private households.<sup>4</sup>

Accounting for availability of comparable poverty ratios at the state level, the data set used in this paper refers to 2005-2013 and includes 172,965 observations for 39,239 individuals. The summary statistics are displayed in Table 1. They reveal that about 12 percent of the observations refer to situations in which individuals lived in poverty (i.e., their equivalent income was below 60 percent of the median equivalent income in the respective year). The (unweighted) mean of state-year poverty ratios is somewhat higher (15 percent) because the poverty ratio tends to be high in some states with small populations.<sup>5</sup>

It should also be noted that the poverty ratio is strongly correlated with the state level unemployment rate ( $r = 0.80$ ) and per capita GDP ( $r = -0.65$ ); it is therefore important to control for these macro-variables.

### *2.3 Empirical Strategy*

We estimated micro-econometric life satisfaction regressions in which life satisfaction ( $LS$ ) of individual  $i$  in state  $s$  and year  $t$  depends on several sets of explanatory variables:

- (i) a standard set of time-variant individual-level controls (age, marital status, whether unemployed, years of education, number of children in the household, and whether the individual has moved between states in the year preceding the interview);
- (ii) state-level controls (unemployment rate, per capita GDP);
- (iii) being in poverty (dummy variable) and intensity of poverty (relative shortfall from the poverty line);

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<sup>4</sup> We use poverty ratios from official statistics to enhance the policy credibility of our analysis. Our qualitative results are the same when we use poverty ratios computed from SOEP.

<sup>5</sup> For instance, in 2015 the poverty ratio was 24.8 percent in Bremen (population share: 0.7 percent), 22.4 percent in Berlin (population share: 3.7 percent), and 21.7 percent in Mecklenburg-Western Pomerania (population share: 2.4 percent). We use state dummies to control for state size.

(iv) the state-level poverty ratio.

To account for possible endogeneity of the poverty ratio with respect to migration, we include among the time-varying individual controls a dummy variable indicating whether the individual has moved between states in the year preceding the interview. Time-invariant factors (observed and unobserved) are captured through person-fixed effects. In addition, we use state dummies and year dummies. The estimating equation can be stated as follows:

$$LS_{ist} = \alpha' \mathbf{micro}_{ist} + \beta' \mathbf{macro}_{st} + \gamma' \mathbf{poor}_{ist} + \delta' \mathbf{deprivation}_{ist} + \phi' \mathbf{PR}_{st} + \mathbf{person}_i + \mathbf{state}_s + \mathbf{year}_t + \varepsilon_{ist} \quad (1)$$

where *micro* and *macro* denote the individual-level and state-level controls, respectively, *poor* is a dummy variable taking the value 1 if an individual is poor, *deprivation* is a poor individual's relative shortfall from the poverty line (set to zero for the non-poor), and *PR* is the poverty ratio; *person*, *state* and *year* denote person-fixed effects and state and year dummies respectively, and  $\varepsilon$  is the error term.<sup>6</sup>

As is common in the SWB literature (Ferrer-i-Carbonnel and Frijters 2004), we estimate equ. (1) using a linear fixed-effects estimator and report standard errors adjusted for clustering at the state-year level.

### 3. Results

Table 2 shows the results from versions of fixed-effect regressions corresponding to equ. (1). The first regression includes individual-level controls only (*micro*), whereas the following regressions also include state-level controls (*macro*).

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<sup>6</sup> Person fixed effects control for time-invariant characteristics, both observed (sex, birth cohort, immigration status) and unobserved. State dummies capture factors such as size, population density and the degree of urbanization.

In the overall sample (Regressions 1 and 2), the individual-level controls attract the expected coefficients (Clark et al. 2015): life satisfaction is u-shaped in age up until the age of 70, and it is negatively correlated with being unemployed, separated and widowed, while being positively related to being married and being divorced.<sup>7</sup> Having moved in the year preceding the interview is significantly associated with greater life satisfaction.<sup>8</sup> With respect to poverty, we find that both its incidence and intensity are significantly negatively correlated with life satisfaction (as was found by Clark et al. 2015, 2016).

Turning to aggregate poverty, we find that, even controlling for the incidence and intensity of poverty at the individual level, the poverty ratio is significantly negatively correlated with life satisfaction. In spite of the large correlation between the poverty ratio and the unemployment rate and per capita GDP, significance of the poverty ratio is obtained even when the latter are controlled for, but the coefficient size varies depending on whether the macro controls are included or not. It amounts to 0.0477 points when the macro controls are omitted (Regression 1) and drops to 0.0218 when the unemployment rate and per capita GDP are controlled for (Regression 2). In the latter specification, the effect of a 1-percentage point change in the poverty ratio amounts to one-half of the effect of a 1-percentage point change in the unemployment rate. The unemployment rate and per capita GDP both have significantly negative coefficients. The latter suggests that per capita GDP incorporates negative income externalities as it may act as reference income in income comparisons (Clark et al. 2008).

The following regressions split the overall sample into subsamples of poor and non-poor individuals and subsamples of individuals whose equivalent income is below and above the annual median income.<sup>9</sup> Considering Regressions 3 and 4, a salient result is that a significantly negative relationship between life satisfaction and the poverty ratio exists only

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<sup>7</sup> As suggested by Clark et al. (2015), the latter is consistent with higher well-being as compared to a failing marriage.

<sup>8</sup> This is consistent with Faßhauer and Rehdanz (2015).

<sup>9</sup> More precisely, the subsamples refer to situations (by year) in which the respective conditions prevailed.

for those who are not themselves poor, whereas the respective coefficient is non-significant and of very small magnitude for the poor. In addition, per capita GDP is significant only for the non-poor (with a negative coefficient), not for the poor. The latter suggests that for the poor it is own income, not income comparison, that matters for well-being.<sup>10</sup> In contrast to aggregate poverty, the labor market perspectives (the unemployment rate) affect the well-being of the poor much stronger than that of the non-poor.

Regressions 5 and 6 strengthen the results from Regressions 3 and 4: The well-being not only of poor individuals (with income lower than 60 percent of median income), but the well-being of individuals with income lower than the median income is not significantly affected by the poverty ratio. A significantly negative relationship between life satisfaction and the poverty ratio exists only for those whose income is higher than the median income. In addition, only for the wealthier individuals does per capita GDP affect life satisfaction (weakly) significantly.

#### **4. Discussion and Conclusion**

This study used fixed effect regressions to investigate the relationship between state-level poverty ratios in Germany and citizens' subjective well-being. Controlling for socio-demographic characteristics, the individual-level incidence and intensity of poverty, and potentially confounding macro-level factors, life satisfaction was found to be significantly negatively correlated with the poverty ratio, suggesting that poverty is a public bad. The well-being repercussions from aggregate poverty were found to be about half as strong as the repercussions from aggregate unemployment. Differentiating the overall sample by subgroups revealed that the relationship between well-being and aggregate poverty is more

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<sup>10</sup> The non-significance of the poverty ratio and per capita GDP for the poor is not an artifact of the smaller size of this subsample; it survives when subsamples are of almost equal size (Regressions 5 and 6).

salient for individuals whose income falls into the upper segment of the income distribution, which suggests that poverty creates negative externalities on those not poor themselves.

Possible reasons why people may be unhappy about poverty even if not poor themselves include altruism (pity), the fear of becoming poor themselves in the future, and worry about social tensions and social unrest. With respect to the latter channel, our finding that the well-being repercussions of aggregate poverty refer in particular to individuals with higher incomes is consistent with the theory of institutional reform of Acemoglu and Robinson (2000), which explains the emergence of redistributive programs in Western societies by a desire of the elite to prevent social unrest. Empirical evidence consistent with this view was presented by Yamamura (2016), who found that high-income earners' stated preference for income redistribution is related to their perceived degree of conflict between the rich and the poor.

From a policy point of view, the finding that poverty is a public bad and/or creates negative externalities suggests that poverty implies market failure. This, in turn, suggests that poverty alleviation is a matter not only of equity, but of efficiency.

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**Table 1: Descriptive Statistics**

Variable	Mean	Std. Dev.
Life Satisfaction	7.017293	1.775678
Poor	0.11818	0.322822
Poverty Intensity	0.0256126	0.0907926
Poverty Ratio (%)	14.99433	3.448916
Unemployed	0.0644523	0.2455577
Unemployment Rate (%)	8.814743	3.75851
GDP p. c. (1000 Euro/year)	30.406	6.466
Moved	0.1024196	0.3032001
Age: 16-20	0.0233747	0.1510908
Age: 21-30	0.1213193	0.326499
Age: 31-40	0.1556789	0.3625517
Age: 41-50	0.2071055	0.405233
Age: 51-60	0.1841876	0.3876382
Age: 61-70	0.1634146	0.3697446
Age: 71-80	0.1087735	0.3113557
Age: >80	0.036146	0.186654
No. Years of Education	12.23184	2.700571
Single	0.2125285	0.4090979
Married	0.6177088	0.4859486
Separated	0.0208366	0.1428375
Divorced	0.0794669	0.270467
Widowed	0.0694591	0.254234
No. Children in HH	0.4590524	0.8501726
Schleswig - Holstein	0.029451	0.1690676
Hamburg	0.0155754	0.1238261
Lower Saxony	0.0902784	0.286581
Bremen	0.0069783	0.0832444
North Rhine-Westphalia	0.2029717	0.4022128
Hesse	0.0693666	0.2540773
Rhineland Palatinate	0.0470095	0.2116598
Baden-Wuerttemberg	0.119105	0.323913
Bavaria	0.1484925	0.3555885
Saarland	0.0111583	0.1050423
Berlin	0.0372619	0.1894034
Brandenburg	0.0423959	0.2014912
Mecklenburg Western Pomerania	0.0241378	0.1534775
Saxony	0.0712514	0.2572451
Saxony-Anhalt	0.0412858	0.198951
Thuringia	0.0432804	0.2034883

Variable	Mean	Std. Dev.
2005	0.113179	0.3168124
2006	0.1207874	0.325881
2007	0.1136184	0.3173481
2008	0.1066748	0.3087002
2009	0.1128783	0.3164449
2010	0.1027491	0.3036318
2011	0.1005117	0.3006819
2012	0.1017778	0.3023568
2013	0.1278235	0.3338942
Observations	172965	
Individuals	39239	

Note: Based on SOEP v30.

**Table 2:** Regression Results. Dependent Variable: 11-Point Life Satisfaction

	(1)	(2)	(3)	(4)	(5)	(6)
	Overall	Overall	Poor	Not poor	Inc<median	Inc>median
Poor (yes = 1)	-0.120*** (0.0219)	-0.117*** (0.0219)			-0.114*** (0.0238)	
Poverty Intensity	-0.327*** (0.0817)	-0.325*** (0.0818)	-0.490*** (0.113)		-0.401*** (0.0852)	
Poverty Ratio	-0.0477*** (0.00695)	-0.0218*** (0.00689)	-0.00378 (0.0233)	-0.0247*** (0.00746)	-0.00971 (0.0117)	-0.0224** (0.0100)
Unempl. Rate		-0.0436*** (0.00617)	-0.0862*** (0.0224)	-0.0319*** (0.00664)	-0.0532*** (0.00981)	-0.0315*** (0.00866)
GDP p.c.		-0.0195** (0.00790)	-0.0105 (0.0250)	-0.0213** (0.00853)	-0.00965 (0.0125)	-0.0177* (0.0101)
Moved	0.110*** (0.0167)	0.108*** (0.0168)	0.143*** (0.0537)	0.0988*** (0.0167)	0.125*** (0.0326)	0.0973*** (0.0178)
Unemployed	-0.527*** (0.0235)	-0.522*** (0.0236)	-0.294*** (0.0444)	-0.532*** (0.0285)	-0.483*** (0.0257)	-0.436*** (0.0421)
Age 16-20	0.0954* (0.0502)	0.0941* (0.0504)	0.128 (0.172)	0.110** (0.0506)	0.168** (0.0834)	0.0494 (0.0646)
Age 21-30	0.0295 (0.0352)	0.0259 (0.0352)	0.101 (0.126)	0.00645 (0.0367)	0.114* (0.0593)	-0.0143 (0.0448)
Age 31-40	-0.0150 (0.0196)	-0.0198 (0.0195)	-0.112 (0.0842)	-0.00976 (0.0188)	-0.0360 (0.0337)	-0.0140 (0.0220)
Age 51-60	0.0450** (0.0183)	0.0433** (0.0183)	0.103 (0.0798)	0.0313* (0.0183)	0.0998*** (0.0376)	0.0261 (0.0213)
Age 61-70	0.153*** (0.0285)	0.151*** (0.0286)	0.0715 (0.124)	0.145*** (0.0289)	0.244*** (0.0597)	0.132*** (0.0345)
Age 71-80	0.0599 (0.0371)	0.0547 (0.0371)	-0.130 (0.172)	0.0676* (0.0363)	0.111 (0.0716)	0.0851* (0.0478)
Age >80	-0.123** (0.0542)	-0.128** (0.0543)	-0.498** (0.212)	-0.0711 (0.0578)	-0.126 (0.0967)	-0.0600 (0.0678)
Education	-0.0177** (0.00763)	-0.0179** (0.00767)	-0.0609* (0.0365)	-0.00568 (0.00809)	-0.0159 (0.0160)	-0.0211** (0.00962)
Married	0.139*** (0.0295)	0.142*** (0.0295)	-0.0798 (0.129)	0.164*** (0.0300)	0.238*** (0.0568)	0.112*** (0.0364)
Separated	-0.174*** (0.0585)	-0.169*** (0.0586)	0.0673 (0.194)	-0.215*** (0.0602)	0.0879 (0.0957)	-0.324*** (0.0721)
Divorced	0.217*** (0.0552)	0.219*** (0.0554)	0.489** (0.207)	0.208*** (0.0516)	0.372*** (0.0987)	0.230*** (0.0633)
Widowed	-0.210*** (0.0548)	-0.206*** (0.0549)	-0.441** (0.217)	-0.207*** (0.0552)	-0.0832 (0.0937)	-0.271*** (0.0822)
No. Of Children	0.0194* (0.0114)	0.0175 (0.0114)	0.103** (0.0463)	0.00576 (0.0121)	0.0264 (0.0183)	0.0161 (0.0141)
Year dummies	Yes	yes	yes	yes	yes	yes
State dummies	Yes	yes	yes	yes	yes	yes
N	172965	172965	20441	152524	77664	94102
R-sq	0.014	0.015	0.019	0.012	0.017	0.011

Note: Fixed-effects regressions with standard errors adjusted for state-year clustering. \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Reference categories: Age 40-50, Single. Observation numbers differ between Regressions 5 and 6 because subsamples are separated by yearly median income and observation numbers differ by year. Based on SOEP v30.