



## **Who Benefits from Big Government? A Life Satisfaction Approach**

**Policy Paper no 14**

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# Who Benefits from Big Government?

## A Life Satisfaction Approach\*

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## **Abstract**

Which impact does government size have on life satisfaction, and how do effects of bigger government differ between income groups in society? Previous studies typically employed country averages and thus neglect possibly heterogeneous happiness effects between income groups. The paper addresses empirically the effects of government spending on subjective well-being of individuals belonging to different income groups. Our analysis is based on individual data from 25 European countries participating in the European Social Survey. In contrast to most previous studies we take account of the endogeneity between relative income position and reported life satisfaction by an instrumental variable approach.

Our results suggest, first, that most government spending categories, including social protection, are on average negatively related to individual well-being. Secondly, estimated marginal effects of health, education and social protection spending at different income levels show that spending increases always have a stronger negative effect on high income groups' well-being than on low income groups' life satisfaction. For all government spending categories, marginal happiness effects of higher public spending are clearly negative for income groups at the top.

**Keywords:** Life satisfaction, government size, health spending, education spending, social protection, instrumental variables

**JEL:** I31, H40, H11

## 1 Introduction

Research on the determinants of subjective well-being has become exceptionally popular over the past few decades. Numerous studies report that individual characteristics (e.g., age, personal income status, number of children, health status, marital status, employment status, education level, etc.), macroeconomic (e.g., unemployment rates, inflation, per capita GDP), and institutional variables (governance quality, participation rights, etc.) influence happiness and personal life satisfaction (e.g., Di Tella et al., 2003; Clark et al., 2008; Frey, 2008; Bjørnskov 2012).<sup>1</sup> Less attention has been paid to the impact that certain policies may have on well-being, conditional on personal life situation or distinctive policy preferences.<sup>2</sup> With only a few exceptions (Bjørnskov et al., 2008; Hessami, 2010), research neglects that different groups of society are affected differently by policies.

The present paper tries to fill this gap and examines effects of government size on subjective well-being of individuals belonging to distinctive income groups. In particular, we assess empirically whether government spending on health and education, and general social protection expenditures affect well-being of people at opposing ends of the income distribution scale differently.

Relative income is among the most important determinants of subjective well-being (Clark and Oswald, 1996; McBride, 2001; Ferrer-i-Carbonell, 2005), and policies that alter the distribution of market incomes apparently impact on life satisfaction. It is hardly surprising that social transfers considered to benefit low income earners, financed through taxes on high income earners, will increase well-being of net recipients and will reduce well-being of net contributors. Helliwell and Huang (2008) nevertheless show that once basic needs are met, the main well-being effect comes from improvements of the relative income position rather than from absolute income increases. Yet, government policies not always address relative incomes directly, though they may intend to improve the economic situation especially of low income groups. Health and education policies are expected to increase the well-being of poorer

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<sup>1</sup> Notwithstanding the existing differences, the terms "happiness", "life satisfaction" and "subjective well-being" are used interchangeably in the present paper.

<sup>2</sup> Knoll, et al. (2013) report evidence for positive effects of low economic regulation on subjective well-being. Paradoxically, people who are ideologically opposed to market-oriented policies sometimes benefit most from deregulation in terms of increased life satisfaction.

segments of society by improved economic opportunities; social protection and insurance systems are designed to reduce (life time) income uncertainty which is particularly harmful for low income earners. As a consequence, one would generally expect these policies to provide higher benefits to the poor than to the rich.

Explaining individual well-being by relative incomes is associated with endogeneity issues that are frequently ignored in empirical analyses. Most importantly, personal life satisfaction proves to be a determinant of productivity and success in the labor market (De Neve and Oswald, 2012). Unobservable personality traits influence both choice of occupation, income, and subjective perceptions of well-being. This paper contributes to the empirical life satisfaction literature by addressing endogeneity concerns through an instrumental variables approach.

Summarizing briefly, our results support the idea of differential effects of government size on well-being, conditional on the relative income position. Estimates of the marginal effects of spending at different intra-nation income levels show that higher expenditures almost always have a negative effect on well-being, which is stronger for high income groups than for low income groups. While health, education and social protection spending at least do not reduce the reported subjective well-being of income groups at the bottom of the income distribution, marginal happiness effects of higher spending are clearly negative for the income groups above the 5th income decile. Our results thus support the notion that government spending in European countries has reached a level that is detrimental to overall life satisfaction of citizens.

## **2 Life satisfaction and government size: Related studies**

From a theoretical perspective it is ambiguous whether increased government size has a positive or a negative impact on subjective well-being (Bjørnskov et al., 2007). A hypothetical, benevolent and welfare maximizing government would choose government size according to citizens' preferences. This implies that the marginal costs and (the sum of) marginal benefits of increasing government size are equalized in equilibrium. At the margin, utility (or: well-being) is not affected by government size expansion. In a Public Choice perspective, however, the interplay of politicians, bureaucrats and special interest groups is expected to cause an overexpansion of

political interference; increasing government size should then reduce average overall happiness.

A heterogeneous influence on subjective well-being among different subgroups of society should above all be expected for fiscal policies. In developed countries, substantial shares of public spending are devoted to welfare services and redistribution in favor of the relatively poor - at least rhetorically. The incidence of the associated higher tax burden is often assumed to fall on high income earners, mainly through progressive income and wealth taxation. Hence, from this stand-alone effect, one would expect those at the lower tail of the income distribution to benefit more from big government than individuals at the upper tail.

This does not necessarily imply that in sum the rich lose from big government. If welfare spending reduces income inequality successfully, redistribution might as well increase life satisfaction of high income earners, as people dislike economic inequality for various reasons. Evidence on the relation between inequality and aggregate (country-level) happiness levels, however, is far from being conclusive (Berg and Veenhoven, 2010; Ferrer-i-Carbonell and Ramos 2012; Rözer and Kraaykamp 2012; Hajdu and Hajdu 2014).<sup>3</sup>

Veenhoven (2000) finds no relation between the size of the welfare state and country averages of well-being. Moreover, welfare state size does not seem to be related to increased equality of life satisfaction within a country. Bjørnskov et al. (2007) report that country averages of life satisfaction decrease with higher government consumption in a cross-section of up to 74 countries. The impact appears to be conditional on the effectiveness of the public sector (see also Ott, 2011), the degree of political competition and the ideology of the government. Public investment and social spending seem to be unrelated to aggregate life satisfaction. More recently, Rode (2013) does not find a positive association between government size, as measured by the Economic Freedom of the World-index, and well-being. All papers yet employ well-being data aggregated on the country level.

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<sup>3</sup> Gandelman and Porzecanski (2013) report that income inequality also transforms into happiness inequality, but due to decreasing marginal utility of income happiness inequality is only about half the size of income inequality, as measured by Gini coefficients.

Using individual level data, Bjørnskov et al. (2008) report that government final consumption is not significantly related to individual well-being in a world-wide sample of about 90,000 respondents on average. Yet, government consumption contributes negatively (!) to life satisfaction in a sub-sample of poorer individuals, whereas the effect on high income earners in the sample is not statistically significant. Summing up, evidence supports the view that lower income groups do not benefit from public consumption, though it is not clear if this also holds for social transfer spending and capital expenditures.

Employing panel data from Australia, Frijters, et al. (2012) investigate who benefits most from income in terms of utility gains, and elaborate on consequences for the design of an optimal tax-transfer system. They find that, in order to maximize an additive life satisfaction function, taxes are too high for some groups, like the young, and too low for other groups, as the elderly.

Most closely related to our study is Hessami (2010). She uses individual data from the Eurobarometer surveys and tests if the size and composition of government spending has a positive or negative impact on life satisfaction. In OLS regressions Hessami finds an inversely U-shaped relationship between government size and life satisfaction. Furthermore, at least some of the results indicate that the poor, as well as people who describe themselves as political left-wingers, benefit more from government spending than the rich and respondents with more right-wing attitudes. These studies, however, do not address endogeneity and reverse causality issues mentioned above.

### **3 Data and stylized facts**

The main purpose of the paper is to test the hypothesis that income groups at the bottom of the distribution benefit from increased government spending on health, education, and social protection issues through increased life satisfaction, whereas big government may be detrimental for life satisfaction of high income groups. For this exercise we use data from the European Social Survey (ESS). The ESS has been conducted biannually since 2002 until 2012. Our sample includes 151,244 individual



observations from 25 developed European countries.<sup>4</sup> To assess individual well-being, people are asked to respond to the standard question on a scale from 0 (dissatisfied) to 10 (satisfied): "All things considered, how satisfied are you with your life as a whole these days?" (*STFLIFE*)

While use of the life satisfaction scale is common practice in empirical analyses of determinants for well-being, the definition of government size is more controversial, as it may include regulatory as well as tax and spending measures. We expect government expenditures in various policy fields to have a quite different impact on life satisfaction of rich and poor households. We proxy government size by total general government spending (*GOVTE*), and three spending sub-categories, namely

- total government spending for health (*HEALTH*);
- total government spending for education (*EDUCATION*), and
- total spending for social protection issues (*SOCPROTECT*), which includes inter alia public pensions, unemployment benefits, or family allowances.

The functional spending categories are taken from the COFOG statistics. All data are expressed as a percentage of GDP. The data source is EUROSTAT.

Government expenditures differ substantially in the country sample. Total spending *GOVTE* ranges from 32.1% of GDP to 66.1% of GDP, with a sample mean of 46.3%; the range of government health expenditure (*HEALTH*) is 1.8% to 8.5% of GDP (mean: 6.4%). The sample average of education spending is 5.6% of GDP, with a minimum of 2.9% and a maximum of 8.0% of GDP. And social protection expenditures are in a range of 9.9% to 25.3% of GDP, with a sample mean of 17.2%.

As regards information on relative income, ESS has changed its definition of income categories during the sample period, making a recoding necessary. In survey waves 1 and 2 household income is originally coded into 12 income categories according to intervals (in Euro) being the same across all countries. E.g., the lowest income category comprises annual household income up to 1,800 €, the highest income category

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<sup>4</sup> The countries included are Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and the UK. Not all countries participated in all survey waves, however.

denotes annual household income of more than 120,000 €. <sup>5</sup> Rounds 3-6 employ a relative income concept, i.e. income categories are based on deciles of the national income distribution of the respective year. In order to obtain comparable income categories, we re-coded income variables of all survey waves into deciles, labeled them 0 to 9 (and quartiles 0-3 for the robustness tests), based on the sample distribution in each country and each survey wave. Precisely, we recoded absolute income groups in waves 1 and 2 by dividing the observations of a specific country in a specific wave into 10 equally sized income groups. If absolute and relative income groups overlap, observations are assigned randomly to either the higher or lower decile. This randomization adds some noise to our relative income indicator. See the appendix for descriptive statistics of variables at the individual level and at the country level, respectively.

#### 4 Model and estimation strategy

To assess the impact of government size on life satisfaction, conditional on the relative income position of the respondent, we perform regressions of personal life satisfaction ( $STFLIFE_{ijt}$ ) on government size ( $GOVSIZE_{jt}$ ), individual income position ( $INCOME_{ijt}$ ), and a multiplicative interaction  $GOVSIZE_{jt} * INCOME_{ijt}$  (subscripts 'i' for individuals, 'j' for countries, and 't' for the ESS wave):

$$(1) STFLIFE_{ijt} = \beta_0 + \beta_1 GOVSIZE_{jt} + \beta_2 INCOME_{ijt} + \beta_3 (GOVSIZE_{jt} \times INCOME_{ijt}) + \beta_4 INDCNTRL_{ijt} + \beta_5 MACROCENTRL_{jt} + c_j + \phi_t + \varepsilon_{ijt}$$

Controls include a full array of individual characteristics ( $INDCNTRL_{ijt}$ ) including age, gender, personal health, employment status and educational status, and country-wide covariates ( $MACROCENTRL_{jt}$ ); we use real Gross Domestic Product (GDP) per capita (in

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<sup>5</sup> Further income categories are: 2<sup>nd</sup> category: 1,800€-3,600€; 3<sup>rd</sup> category: 3,600€-6,000€; 4<sup>th</sup> category: 6,000€-12,000€; 5<sup>th</sup> category: 12,000€-18,000€; 6<sup>th</sup> category: 18,000€-24,000€; 7<sup>th</sup> category: 24,000€-30,000€; 8<sup>th</sup> category: 30,000€-36,000€; 9<sup>th</sup> category: 36,000€-60,000€; 10<sup>th</sup> category: 60,000€-90,000€; 11<sup>th</sup> category: 90,000€-120,000€.

logs of PP adjusted international Dollars) and the growth rate of real GDP (data from Eurostat's AMECO data base).<sup>6</sup>

We have observations from a total of almost 150,000 different individuals in six ESS waves between 2002 and 2012. Some countries participated in only one or two survey waves. Survey wave dummies ( $\phi_t$ ) capture any unexplained heterogeneity over time, and a set of country dummy variables ( $c_j$ ) absorbs time invariant unexplained variation across countries.

Our data has a clustered multi-level structure. Life satisfaction, income position and further control variables are from an 'individual level'. Here, observations share the same institutional and macroeconomic environment, i.e., they are nested in identical macro structures. Macro level data comprise various *GOVSIZE* variables and the above mentioned macro control variables. Employing standard OLS to mixed-level data would lead to exaggerated significance levels for the coefficient estimates because observations within a country are not independent (Moulton, 1990). To account for this bias, a customary approach is to employ robust standard errors, clustered at the country-level. As the number of countries (25) is too small to neglect serial correlation issues for macro covariates, we also applied a bootstrapping procedure with 1000 repetitions. Although bootstrapped standard errors are a little bit higher, none of our reported results change. Results are available upon request.

## 5 Results from baseline OLS regressions

Table 1 displays results from simple OLS-estimates. Results are shown for all measures of government size. For the moment we do not take into account endogeneity of life satisfaction and relative income position. However, we include interaction terms of *INCOME* and *GOVSIZE* measures.

In all specifications, controls are in line with theoretical considerations and previous empirical investigations. Women report higher life satisfaction than men. We also observe the usual u-shaped relation of age to life satisfaction, while the number of education years appears to have an inverse u-shaped relationship with happiness

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<sup>6</sup> We also employed income inequality measures as macro control variables but these never turned out to be statistically significant.

levels. Being unemployed reduces life satisfaction substantially, and the effect is most pronounced for people who are still looking for a job. A bad individual health status is negatively associated with reported well-being, while retiring and having children at home are positively related to life satisfaction. GDP per capita is positively associated with personal well-being, while GDP growth is not significant, indicating that our STFLIFE measure is more responsive to longer-run developments.

Table 1: Interaction effects: Life satisfaction, income position and government size

	(1) GOVTE	(2) HEALTH	(3) EDUCATION	(4) SOCPROTECT
<b>GOVSIZE</b>	<b>-0.017</b>	<b>-0.033</b>	<b>-0.033</b>	<b>-0.059</b>
	0.108	0.527	0.739	0.174
<b>income deciles</b>	<b>0.147</b>	<b>0.154</b>	<b>0.206</b>	<b>0.125</b>
	0.047	0.002	0.000	0.008
<b>income x GOVSIZE</b>	<b>-0.001</b>	<b>-0.006</b>	<b>-0.017</b>	<b>-0.001</b>
	0.609	0.359	0.032	0.753
<i>Marginal effect of GOVSIZE:</i>				
<b>at 1st income decile</b>	<b>-0.017</b>	<b>-0.033</b>	<b>-0.033</b>	<b>-0.059</b>
	0.108	0.527	0.739	0.174
<b>at 5th income decile</b>	<b>-0.020</b>	<b>-0.058</b>	<b>-0.100</b>	<b>-0.062</b>
	0.008	0.173	0.242	0.114
<b>at 10th income decile</b>	<b>-0.023</b>	<b>-0.090</b>	<b>-0.184</b>	<b>-0.066</b>
	0.013	0.097	0.025	0.079
Male	-0.122	-0.122	-0.122	-0.122
	0.000	0.000	0.000	0.000
Age	-0.042	-0.042	-0.041	-0.042
	0.000	0.000	0.000	0.000
age (sq.)/100	0.050	0.050	0.050	0.050
	0.000	0.000	0.000	0.000
health (subjective)	-0.660	-0.660	-0.660	-0.660
	0.000	0.000	0.000	0.000
ys of education	0.046	0.044	0.045	0.046
	0.001	0.002	0.002	0.002
ys of education (sq.)/100	-0.138	-0.135	-0.136	-0.139
	0.001	0.002	0.001	0.001
looking for job (d)	-0.995	-1.000	-0.994	-0.994
	0.000	0.000	0.000	0.000
unemployed (d)	-0.640	-0.644	-0.641	-0.640
	0.000	0.000	0.000	0.000
retired (d)	0.207	0.209	0.206	0.208
	0.000	0.000	0.000	0.000
children (d)	0.101	0.099	0.102	0.100
	0.000	0.000	0.000	0.000
GDP per capita (log)	1.856	2.197	2.106	1.493
	0.014	0.005	0.004	0.052
GDP growth (%)	0.011	0.016	0.015	0.006
	0.682	0.553	0.597	0.836
Adj. R-Squared	0.271	0.271	0.271	0.271
No. of Clusters	25	25	25	25
No. of Cases	151244	151244	151244	151244

Note: OLS with clustered standard errors. All estimates include country and wave fixed effects. p-values in second row.

In line with expectations, people living in high income households report higher levels of life satisfaction. The estimated marginal effect of one step upwards on the income deciles ladder varies between +0.13 and +0.21, and is highly significant across all model specifications. The GOVSIZE variables are all negatively related to STFLIFE, but not significant at conventional levels. All interactions INCOME\*GOVSIZE have a negative sign. Yet, only the interaction of INCOME\*EDUCATION has a coefficient that is also statistically significant from zero.

Coefficients of INCOME and GOVSIZE, however, must not be read independently from the interaction term. For example, the coefficient of the GOVSIZE variables in Table 1 only shows the marginal effect of increased spending on life satisfaction of respondents from the lowest income decile. Simple OLS results indicate that neither total spending (GOVTE), nor HEALTH, EDUCATION, or social protection (SOCPROTECT) spending have any effect (positive or negative) on life satisfaction for members of the 1<sup>st</sup> income decile. Although such benefits are certainly aimed to insure citizens against all kinds of income losses from risks, e.g. unemployment, injuries and disease, they do not appear to impact positively on life satisfaction of the poorest deciles.

Turning to the 10<sup>th</sup> income decile, all spending categories are negatively related to life satisfaction of the income group at the top, meaning that increases in public spending generally reduce their happiness levels, probably through the impact on tax burdens. Coefficients are statistically significant and substantially bigger than for the lowest income decile.

In the middle of the income distribution (5<sup>th</sup> decile) we find a significantly negative relationship to life satisfaction of GOVSIZE increases in the case of total spending GOVTE, and social protection spending SOCPROTECT (borderline significant, p-value of 0.114). Education and health spending in general are not related to life satisfaction at the 5<sup>th</sup> income decile.

In general, the coefficients of the average marginal effects are small (close to zero) in all specifications. For total expenditures, as well as for health and social protection spending coefficients are also not significant at any conventional level. Note that the marginal effect gets considerably large for higher income levels, anyway.

## **6 Accounting for endogeneity of personal income**

The relationship between individual income position and reported happiness may yet be characterized by reverse causality or driven by omitted variables. Powdthavee (2010, p. 78) lists five major sources for a potential bias of life satisfaction-income estimates: Reverse causality could lead to an overestimation as happy people tend to be more productive and have higher wages compared to unhappy ones. If relative income is more important than absolute income levels, missing information on the income of relevant peer groups biases estimates downwards. Sources for an omitted variable bias come from the difficulty to control for the adaptation and aspiration to income and several factors related to an individual's use of time for family and work. As some of these factors point to an overestimation of the real effect in simple OLS-regressions, while others suggest an underestimation, the overall effect is not clear a priori. Except for a few quasi-experimental studies (e.g. Frijters et al., 2004; Gardner and Oswald, 2007) endogeneity issues are, however, rarely addressed adequately.

Recently, a few studies use an instrumental variables two stage-least squares (TSLS) approach to overcome a potential bias. Lydon and Chevalier (2002) predict income in a first stage by the income of one's spouse or partner. Powdthavee (2010) instruments real equivalent household income by the proportion of household members reporting payslip information from the British Household Panel Survey (BHPS). Luttmer (2005) instruments household earnings by aggregated earnings information of industries and occupations at a given point in time. Knight et al. (2009) employs two main sources of income as instruments: The years of education of the respondent's father and the respondent's own productive assets. All in all the findings of available IV-studies show a considerably stronger effect of individual income position on subjective well-being. This may explain why most studies report surprisingly low effects of income on life satisfaction: OLS simply appears to underestimate the causal effect.

Finding good instruments for relative income levels of survey respondents is crucial to identify causal effects here. Following Luttmer (2005) and Knight et al. (2009), we instrument individual income positions by two excluded instrumental variables, i.e. the mean income of respondents with the same occupation and in the same residence

country as the respondent, and the mean income of respondents with the same education level of the respondent's father.

Using average income levels of different occupations assumes that occupation categories determine labor market income to a considerable degree, without having a direct effect on people's life satisfaction. ESS provides information on respondents' occupations using the ISCO 88- and ISCO 08-classification of occupations.<sup>7</sup> We use average income of sub major groups (i.e. the first two digits of the ISCO-classification scheme) as instruments. From a conceptual point of view, the ISCO-classification groups together different jobs according to the similarity of skills considering both similarity in skill levels and skill specialization (Hoffmann and Scott 1993). Except for the "Armed forces", occupations in each sub major group can be considered to be at the same broad skill level. As occupations with higher skill levels and higher skill specialization require more human capital and higher abilities we expect these occupations to be correlated with higher relative income levels.

Concerns relate to the validity of the instrument. Working in different occupations does not only explain different income levels; it may also contribute to job satisfaction, and therefore life satisfaction, directly. Working as a highly specialized expert or as a manager with large discretionary power may be more satisfactory than doing repetitive tasks as a machine operator or a freight handler. Note, however, that sub-major occupation groups are broadly similar in required skill level and skill specialization; nevertheless they comprise occupations that are sufficiently diverse in their tasks, social interaction and status. Hence, job characteristics relevant for life satisfaction do not only vary across sub major groups but also within these groups. For example, the group "Sales and Services Elementary Occupations" comprises both "Garbage collectors" and "Door-to-door and telephone salespersons". The group "Life Science and Health Associate Professionals" includes "Farming and forestry advisers", "Pharmaceutical assistants" and "Faith healers". We presume that characteristics of these jobs are more important for the direct effect on life satisfaction than differences between sub major groups.

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<sup>7</sup> In order to obtain comparable occupation information over all waves, we have recoded the ISCO 88-information into the ISCO 08-scheme according to the correspondence table of the ILO (<http://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm>)



Second, we rely on the identifying assumption that parents' education has an impact on their children's relative income position. There is evidence for intergenerational income transmission taking place with education being an important factor.<sup>8</sup> Hence, we expect that the father's education level is correlated with respondent's income. Indeed, first stage regressions using mean income by fathers' education levels as single instrument (not reported here) confirm a strong relationship. Again, one may be concerned if well-educated parents pass life satisfaction on to their children which would challenge the exogeneity assumption. Children may inherit character traits that facilitate to find a positive attitude towards life. Children from highly educated parents are more likely to receive higher education themselves. As we control for education levels of respondents this channel should not bias our estimates. The most obvious direct life satisfaction impact is through social contacts. Being surrounded by (un)happy family members may considerably influence own life satisfaction. However, social interactions with family members are reduced if respondents are getting older. As the mean age of respondents is about 48 years, this direct effect is expected to be rather small. Finally, interaction terms of INCOME and GOVSIZE measures are instrumented by corresponding interactions of excluded instruments and GOVSIZE. In contrast to analyses which rely on country averages instead of individual level data of life satisfaction, endogeneity of macroeconomic policy measures is no cause for major concern.

## **7 Results from Two-Stage-Least-Squares regressions**

Before presenting the results, note that using two excluded instruments enables us to perform over-identification tests. Assuming exogeneity of one set of instruments does not allow to refuse the other set of instruments as endogenous: Hansen's J-statistics in all specifications are sufficiently low; we cannot reject the null hypothesis of the other instruments being exogenous at any conventional level of confidence. This indicates

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<sup>8</sup> For an overview see D'Addio, (2007) pp. 39 ff. and Bowles and Gintis (2002), pp. 17 f.

that the instruments are appropriately uncorrelated with the disturbance process. The results of the second stage estimates are displayed in Table 2.<sup>9</sup>

*Table 2: Two stage least squares regression: Life satisfaction, income position and government size*

	(1) GOVTE	(2) HEALTH	(3) EDUCATION	(4) SOCPROTECT
<b>GOVSIZE</b>	<b>-0.002</b>	<b>0.014</b>	<b>0.120</b>	<b>-0.011</b>
	0.922	0.878	0.380	0.843
<b>income deciles</b>	<b>0.360</b>	<b>0.287</b>	<b>0.457</b>	<b>0.317</b>
	0.103	0.025	0.000	0.030
<b>income x GOVSIZE</b>	<b>-0.004</b>	<b>-0.018</b>	<b>-0.051</b>	<b>-0.008</b>
	0.371	0.327	0.010	0.287
<i>Marginal effect of GOVSIZE:</i>				
<b>at 1st income decile</b>	<b>-0.002</b>	<b>0.014</b>	<b>0.120</b>	<b>-0.011</b>
	0.922	0.878	0.380	0.843
<b>at 5th income decile</b>	<b>-0.018</b>	<b>-0.059</b>	<b>-0.083</b>	<b>-0.045</b>
	0.008	0.145	0.285	0.210
<b>at 10th income decile</b>	<b>-0.039</b>	<b>-0.151</b>	<b>-0.338</b>	<b>-0.088</b>
	0.100	0.106	0.000	0.029
Adj. R-Squared	0.128	0.128	0.126	0.128
No. of Cluster	25	25	25	25
No. of Cases	151244	151244	151244	151244
F-test (Kleibergen-Paap)	19.672	19.194	20.362	19.202
p-value (Hansen J)	0.742	0.872	0.461	0.652

Note: TSLS with clustered standard errors, robust p-values below bold coefficients. Further covariates: See Table 2. Instrumented variables: income deciles and income deciles x GOVSIZE. Excluded instruments in 1st stage regressions are (1) mean income of respondents in the same occupation as the respondent, (2) the reported education level of the respondents father and (3) interaction effects of income decile and the respective GOVSIZE indicator with mean income of respondents and reported education level of the respondents father.

Coefficient estimates of INCOME are substantially higher in our IV-estimates as compared to simple OLS in Table 2, which is in line with results from previous research. INCOME appears to be a much stronger predictor for individual well-being when appropriately instrumented, and it also holds for the estimated coefficients of interaction terms, that are much larger than in our OLS-estimates. In all regressions the interaction term has the expected negative sign, and as compared to simple OLS regressions gain significance all specifications.

<sup>9</sup> We do not report the whole set of control variables, as estimates are highly stable. Of course, results are available on request.

Figure 1: Marginal effects of total government spending on life satisfaction, conditional on income decile (based on TSLS-estimates in table 2)

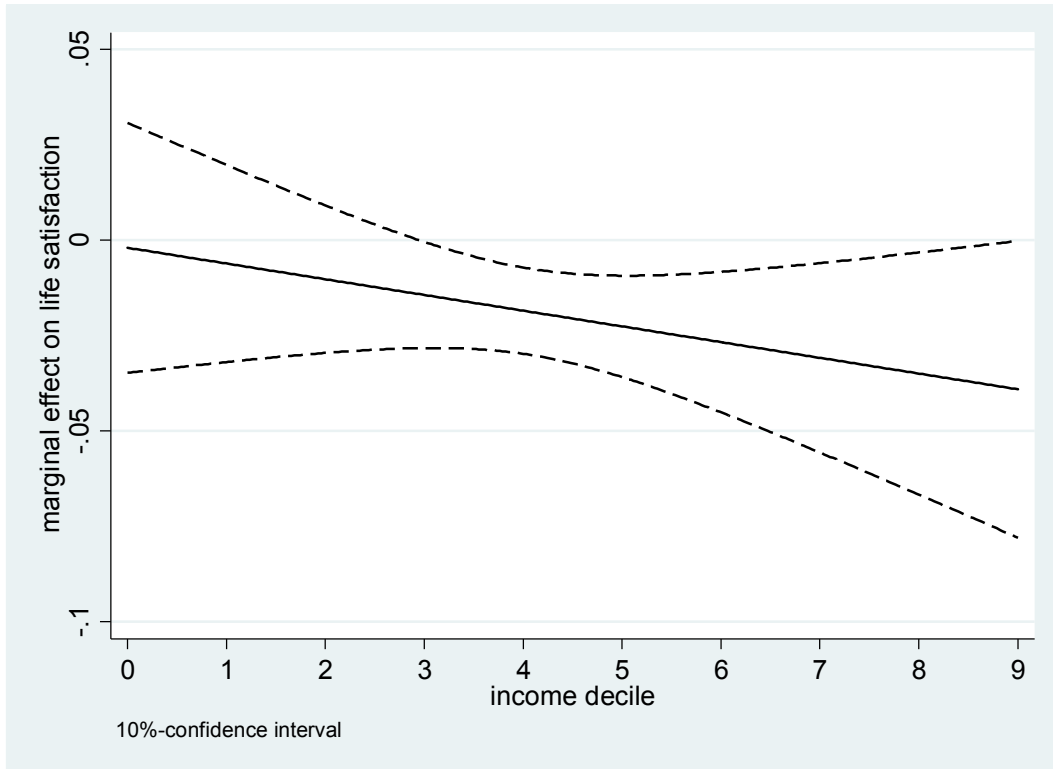


Figure 2: Marginal effects of government health spending on life satisfaction, conditional on income decile (based on TSLS-estimates in table 2)

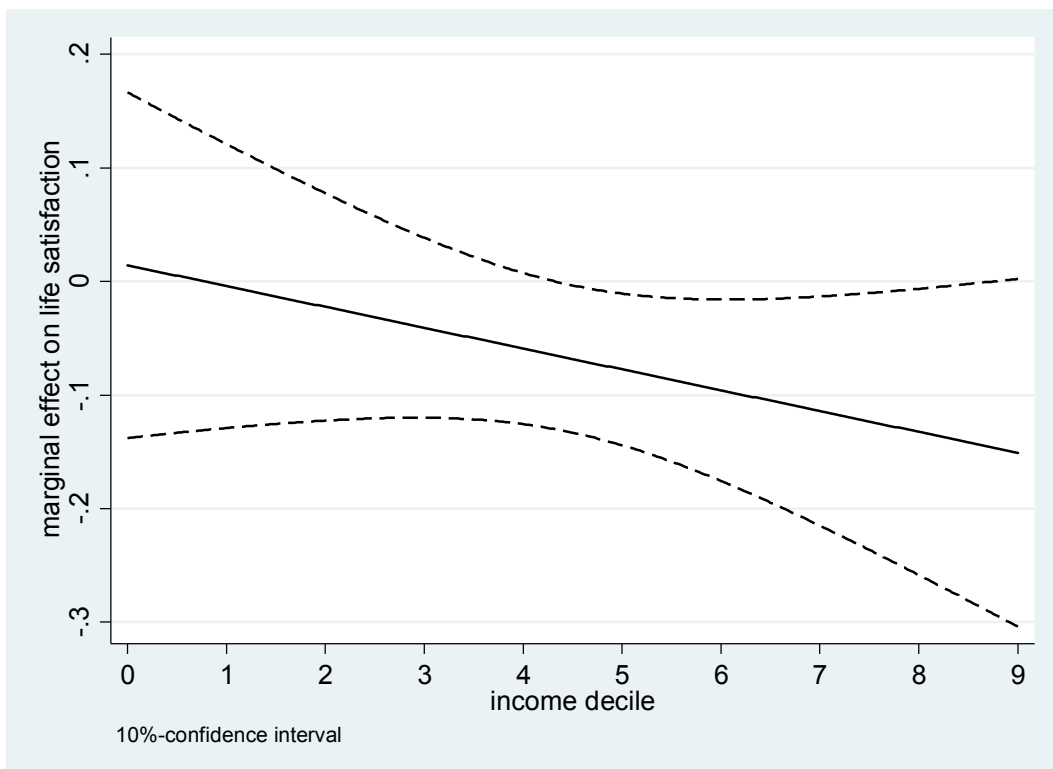


Figure 3: Marginal effects of government education spending on life satisfaction, conditional on income decile (based on TSLS-estimates in table 2)

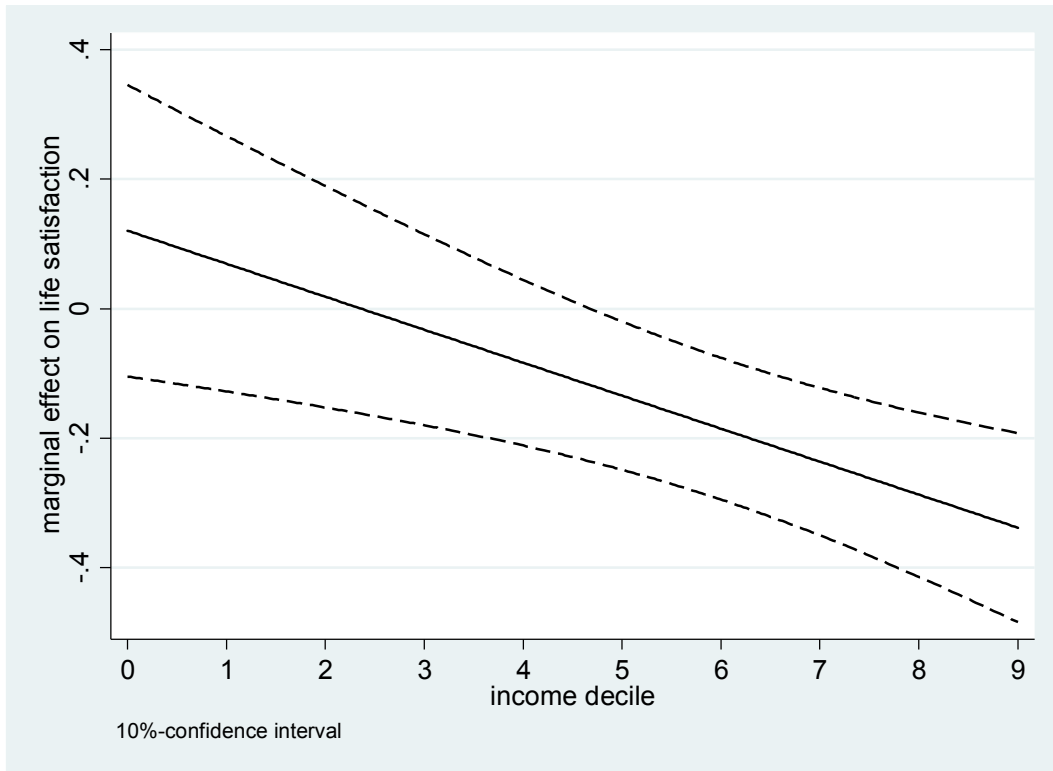
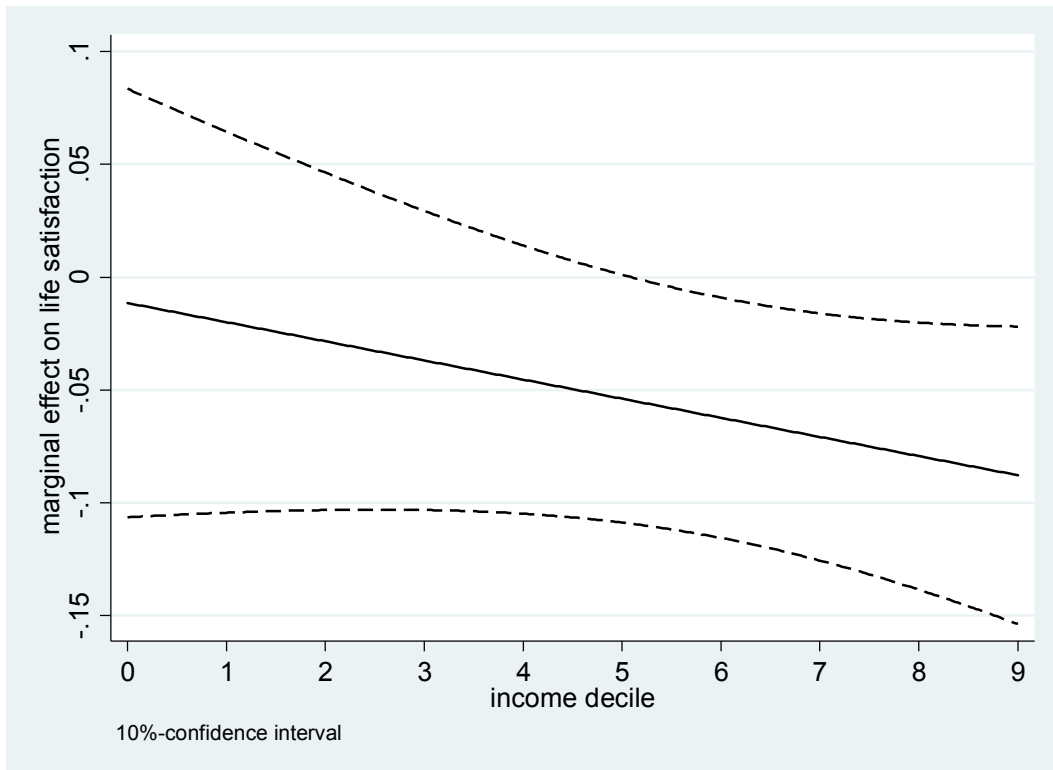


Figure 4: Marginal effects of government social protection spending on life satisfaction, conditional on income decile (based on TSLS-estimates in table 2)



Looking at the marginal effects of our GOVSIZE measures at different relative income levels, we find neither positive nor negative effects at the 1<sup>st</sup> income decile. In fact, estimated coefficients are far from being significant at any conventional confidence level. On the other hand, respondents from high income households at the top of the distribution report reduced well-being when spending is increased. The effects are quite strong. For example, a one percentage point increase of education spending over GDP, that is approximately one standard deviation in the sample, reduces reported life satisfaction by 0.33 points, i.e., 0.19 standard deviations in this income group.

To get a better impression of the effects of spending increases we refer to a graphical presentation in Figures 1 – 4. The figures display marginal effects of different measures of GOVSIZE on life satisfaction conditional on the respondent's income decile 0-9. The corresponding 10%-confidence bands are derived from the IV-estimates of Table 2.

As regards total government expenditure (GOVTE), displayed in Figure 1, we observe a negative impact of higher spending on life satisfaction across all income deciles. The effect is significant at the 10%-level for all but the two income deciles at the bottom of the income distribution. Yet, the effects are economically not very strong.

The marginal effects on life satisfaction of government health spending (HEALTH), conditional on income of the respondents, are shown in figure 2. Marginal effects are negative across all income levels except for the one at the bottom. Effects are statistically significant for households situated above the 5<sup>th</sup> income decile.

Strong income-conditional effects of education spending are displayed in figure 3. A marginal increase of EDUCATION is associated with a large positive life satisfaction effect for the 1<sup>st</sup> income decile which is, however, not significant. The marginal effect turns negative for the 4<sup>th</sup> income decile and reaches large and significant negative values from the 6<sup>th</sup> up to the 10<sup>th</sup> deciles.

Finally, figure 4 displays a significant negative relation between social protection spending and individual well-being levels for all income deciles. This seemingly surprising result may be caused on the one hand by the fact that SOCPROTECT is a very heterogeneous spending category, including old age pensions, unemployment benefits, family allowances etc. Expenditures therefore by construction benefit not

only the poor but more or less all segments of society. On the other hand, high social protection spending is usually associated with a substantially higher tax burden. In combination with a lack of ‘marksmanship’, i.e. redistributive targets are not met, this may lead to an overall negative assessment of social protection spending.

Summing up so far, we find that different income groups indeed report different life satisfaction effects of marginal increases in government size. In all cases, it is the higher income earners whose individual well-being is negatively associated with increases of government size. Surprisingly, we do not find any positive well-being effect of increased spending for low income groups.

## **8 Robustness check with income quartiles**

Our research question requires identification of a causal effect of government size on individual well-being for a given income position of individuals. If redistributive government activities influence the income levels during the period of observation, reported income depends on government spending itself, as well as on the associated higher tax burden. This causes potential concerns for our estimates, as beneficiaries may advance to higher income deciles and therefore report higher life satisfaction. To test robustness and to reduce potential biases of results, we restrict the number of income classes to quartiles in Table 3, as this makes it less likely that a person moves to different income classes as a consequence of government spending or taxation.<sup>10</sup>

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<sup>10</sup> We owe this idea to Justina A.V. Fischer.

Table 3: Two stage least squares regression: Life satisfaction, income position and government size (using income quartiles)

	(1) GOVTE	(2) HEALTH	(3) EDUCATION	(4) SOCPROTECT
<b>GOVSIZE</b>	<b>-0.003</b>	<b>0.052</b>	<b>0.118</b>	<b>-0.046</b>
	0.891	0.551	0.407	0.394
<b>income quartiles</b>	<b>1.067</b>	<b>0.791</b>	<b>1.239</b>	<b>0.885</b>
	0.084	0.025	0.000	0.016
<b>income x GOVSIZE</b>	<b>-0.014</b>	<b>-0.054</b>	<b>-0.141</b>	<b>-0.026</b>
	0.296	0.293	0.007	0.207
<i>Marginal effect of GOVSIZE:</i>				
<b>at 1st income quartile</b>	<b>-0.003</b>	<b>0.052</b>	<b>0.118</b>	<b>-0.046</b>
	0.891	0.551	0.407	0.394
<b>at 2nd income quartile</b>	<b>-0.017</b>	<b>-0.003</b>	<b>-0.023</b>	<b>-0.072</b>
	0.145	0.955	0.828	0.088
<b>at 3rd income quartile</b>	<b>-0.030</b>	<b>-0.057</b>	<b>-0.164</b>	<b>-0.097</b>
	0.000	0.294	0.064	0.009
<b>at 4th income quartile</b>	<b>-0.044</b>	<b>-0.112</b>	<b>-0.306</b>	<b>-0.123</b>
	0.016	0.232	0.002	0.004
Adj. R-Squared	0.123	0.123	0.120	0.123
No. of Cluster	25	25	25	25
No. of Cases	151244	151244	151244	151244
F-test (Kleibergen-Paap)	19.375	19.278	20.604	19.148
p-value (Hansen J)	0.917	0.713	0.521	0.904

Note: TSLS with clustered standard errors, robust p-values below bold coefficients. Further covariates: See Table 2. Instrumented variables: income quartiles and income quartiles X GOVSIZE. Excluded instruments in 1st stage regressions are (1) mean income of respondents in the same occupation as the respondent, (2) the reported education level of the respondents father and (3) interaction effects of income quartile and the respective GOVSIZE with mean income of respondents and reported education level of the respondents father.

The revised specifications confirm our main results. The lowest income quartile does not observe statistically significant effects of government size on subjective well-being. Again, the effect of increased government size depends on the relative income levels of respondents. Compared to lower income quartiles, respondents in higher income quartiles are substantially worse off if government size is increased. This income-conditional effect of government activities seems to be most pronounced with regard to education expenditures. The interaction terms of other government size measures also indicate a substantial decline of the life satisfaction-effect for higher income quartiles. Marginal effects of the expenditure measures for the top income quartile are significant (except for HEALTH) and negative, ranging between -0.044 (GOVTE) and -0.31 (EDUCATION).

## **9 Conclusions**

What effect does government size have on life satisfaction levels, and how do effects differ between income groups of society? The paper addresses effects of government size, as measured by a set of spending variables, on subjective well-being of individuals belonging to different income groups. The analysis is based on individual data from more than 150,000 respondents in 25 European countries participating in the European Social Survey. In contrast to many previous studies we take account of the endogeneity between relative income position and reported life satisfaction with an instrumental variables approach.

First, our results indicate that the expected positive impact of relative income position on subjective well-being is substantially stronger when the individual income variable is instrumented appropriately. There is clear evidence of an endogeneity of relative income and life satisfaction, as theory would suggest. Second, our investigations support the view that increased public spending has differential effects on well-being, depending on income position and spending category.

Estimates of marginal effects of different spending categories at different income levels show that increases in spending regularly have a strong negative effect on higher income groups. Surprisingly, low income groups do not appear to benefit from higher spending. While social protection, health and education spending at least do not reduce the reported subjective well-being of income groups at the bottom of the



income distribution, marginal happiness effects of higher spending are clearly negative for the highest income groups in case of these spending categories. Even expenditures for social protection show a negative marginal well-being impact across all income groups, although the effects are not statistically significant at the bottom of the distribution.

Summing up, our estimates support the notion that in the sample of developed European countries government spending has reached a level that is detrimental to overall life satisfaction of citizens. As in most of our estimates we do not find a positive effect of spending increases on life satisfaction, even for respondents at the bottom of the income distribution, the results strengthen the view that a high tax burden associated with expansion of social security systems, harms not only the top income earners but eventually all income segments of society.

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## Appendix: Descriptive Statistics

**Table A1: Summary statistics of individual characteristics**

Variable	Count	mean	sd	min	max
life satisfaction	151244	7.099	2.183	0	10
income quartiles	151244	1.546	1.113	0	3
income deciles	151244	4.621	2.803	0	9
Male	151244	0.498	0.500	0	1
Age	151244	48.267	16.798	15	103
age (sq.)/100	151244	26.119	17.034	2	106
health (subjective)	151244	2.165	0.892	1	5
ys of education	151244	12.656	4.042	0	56
ys of education (sq.)/100	151244	1.765	1.098	0	31
looking for job (d)	151244	0.038	0.192	0	1
unemployed (d)	151244	0.014	0.118	0	1
retired (d)	151244	0.220	0.414	0	1
children (d)	151244	0.297	0.457	0	1
Father's education: not comparable (d)	151244	0.024	0.153	0	1
Father's education: no secondary level (d)	151244	0.329	0.470	0	1
Father's education: lower secondary level (d)	151244	0.205	0.404	0	1
Father's education: upper secondary level (d)	151244	0.280	0.449	0	1
Father's education: post secondary level (d)	151244	0.022	0.146	0	1
Father's education: tertiary level (d)	151244	0.138	0.345	0	1
Father's education: other (d)	151244	0.002	0.048	0	1

**Table A2: Summary statistics of country variables**

Variable	count	Mean	sd	min	max
GDP per capita (log)	119	3.807	1.352	1.839	7.741
GDP growth (%)	119	1.123	2.330	-5.744	7.412
GOVTE (% of GDP)	119	46.268	6.088	32.085	66.073
HEALTH (% of GDP)	119	6.377	1.425	1.841	8.466
EDUCATION (% of GDP)	119	5.622	1.044	2.928	8.003
SOCPROTECT (% of GDP)	119	17.237	3.655	9.912	25.253

## **Project Information**

### **Welfare, Wealth and Work for Europe**

#### **A European research consortium is working on the analytical foundations for a socio-ecological transition**

##### **Abstract**

Europe needs change. The financial crisis has exposed long-neglected deficiencies in the present growth path, most visibly in the areas of unemployment and public debt. At the same time, Europe has to cope with new challenges, ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWforEurope – a European research consortium is laying the analytical foundation for a new development strategy that will enable a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four-year research project within the 7<sup>th</sup> Framework Programme funded by the European Commission was launched in April 2012. The consortium brings together researchers from 34 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). The project coordinator is Karl Aiginger, director of WIFO.

For details on WWWforEurope see: [www.foreurope.eu](http://www.foreurope.eu)

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