

# Biased Perceptions? Consolidating Cross-Country Evidence on Objective and Perceived Inequality

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## Abstract

To evaluate perceptions of inequality a precise survey instrument and an appropriate definition of inequality are needed. Many recent economic works focus on the former issue while disregarding the latter. This work derives a definition of inequality based on Bourdieu's Capital Theory in order to evaluate (mis-)perceptions of inequality and tests a set of hypotheses based on this theory on the data from 18 European countries included in the ISSP survey. The results of a Bayesian mixed effects model indicate that education, occupational prestige, family background, and employment status are important predictors of perceived inequality in addition to income and wealth. Educational mobility also helps to explain cross-country differences in perceptions. No evidence is found for extended reference groups across countries. These results support Bourdieu's Capital Theory and indicate that misperceptions of inequality have frequently been overestimated in previous research.

**Keywords:** inequality, perception, income distribution, socioeconomics, institutions, educational mobility.

**JEL classification:** D31, I24, Z13

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# 1 Introduction

Perceptions of inequality vary widely within and between countries. Although these differences are rooted in objectively differing levels of inequality from one country to the next, individual-level factors such as personal circumstances, life experiences, reference group effects and exposure to media coverage may also play a role. Unsurprisingly, recent papers that compare income inequality using measures of perceived inequality conclude unequivocally that perceptions of inequality are widely biased (Cruces et al., 2013; Engelhardt and Wagener, 2014; Gimpelson and Treisman, 2015; Niehues, 2014). This conclusion might be premature, however, as the following paper will argue.

To evaluate the extent to which perceived inequality deviates from factual inequality, an appropriate definition of inequality is needed. Economists and sociologists are still not agreed on the best concept and strategy for measuring inequality, even when focusing on income inequality alone. Furthermore, it is now generally acknowledged that inequality is not a unidimensional phenomenon that could be measured sufficiently based on a single dimension such as income or wealth. In studies on well-being, a number of researchers (Sen, 1997a; Stiglitz et al., 2009) and policy-oriented institutions (OECD, 2017; UN, 2015) have criticized the focus on single dimensions and have designed concepts to measure the multidimensional distribution of well-being. If inequality is to be treated as a multidimensional concept like well-being, this implies that perceptions of inequality must also be multidimensional. Therefore, the first question addressed in this paper is which dimensions of economic inequality determine people's perceptions of inequality. The second question is how much of the "perception bias" remains after controlling for the influence of other dimensions of economic inequality than income. The third research question is to what extent country-specific institutions explain differences in the perception of inequality as well as differences in the determinants of perceived inequality.

Understanding the determinants of the perception of inequality bears great relevance for economics and is most easily understood when assuming for a moment that average perceived inequality is higher than income inequality would suggest. In this case, the elasticity of consumption patterns that depend more on relative than absolute factors (Duesenberry, 1949; Frank, 2014) would be underestimated when relying on income inequality estimates only. Second, the median voter theorem would predict much lower redistributive preferences when using income inequality than when using perceptions (Meltzer and Richard, 1981). Third, if other dimensions than income drive inequality perceptions, redistributive policies that target income differences only might seem inefficient from the perspective of individuals. In general, if the distribution of income does not match the distribution of other determinants of perceptions, different arbitrary behavioral and policy effects are possible.

The search for relevant dimensions and contestable concepts of social stratification lies at the core of sociology. This is why Bourdieu's distinction between economic, cultural, and social capital provides the theoretical basis for identifying important dimensions of the perception

of inequality (Bourdieu, 1983). In addition, Bourdieu describes how these types of capital are embedded within nation states and therefore provides the foundation for hypotheses of which country-specific institutions affect the relative importance of the various dimensions.

Empirically, the latent variable of perceived inequality is inferred from subjective social status as surveyed by the International Social Survey Program (ISSP, 2017) for 18 European countries. Monetary (income, wealth) and non-monetary dimensions (education, social status, family background, and employment status) serve as the independent variables. Together, the six dimensions of social status in the ISSP are used to approximate the three types of capital defined by Bourdieu. To evaluate the general relevance of each dimension, the present study uses a Bayesian mixed-effects model. Country-specific variables and interaction effects with each dimension aim to identify cross-country differences in levels and the determinants of the country-specific relevance of dimensions.

Overall, the estimation results suggest that income is the most important dimension of social status to explain perceived inequality. The contribution of cultural capital to perceived inequality is robust, substantial, and independent of the proxy choice. While the effect of social capital is significant, the size of the effect remains unclear, possibly due to the weak proxies. At the country level, neither welfare state regimes nor average income levels correlate with cross-country differences in subjective social status. Instead, features of meritocratic institutions, such as educational mobility (an aspect of equality of opportunity in education), seem to leverage individual factors at the cost of background effects. Higher payments into the public school system decrease the correlation between family background and subjective social status, whereas greater educational mobility increases the correlation between income and perceived inequality. The fact that meritocratic institutions alter the relevance of income has important implications. To estimate the so-called perceptions bias without considering meritocratic institutions would overestimate the bias in countries with lower educational mobility and vice versa.

This paper first gives a brief overview of the literature on the perception of inequality and introduces complementary sociological theories that emphasize the multidimensionality and perception of inequality. The second section analyses how perceptions of inequality can be inferred from subjective social status and presents five testable hypotheses. The third section describes the data set and the estimation strategy used in this work. Sections 4 and 5 discuss the results from an individual and a cross-country perspective, respectively. The paper concludes with a short summary and discusses political implications for the debate on inequality.

## **2 Theory and literature survey**

Before discussing economists' and sociologists' distinct views on the perception of inequality, it is important to distinguish the perceived extent of inequality from beliefs about inequality and judgments about inequality. Perceptions refer to the current distribution (what *is*), whereas

beliefs describe a desirable distribution (what *should be*) and judgments evaluate the current situation normatively (Janmaat, 2013, p. 359). ). The present work disregards normative and moral aspects from the analysis of perceived inequality while acknowledging that these aspects may play a role in perceptions.

## 2.1 Perceptions of income inequality

Cross-countries studies have used a number of different approaches to measure perceptions of inequality. Most find wide variation in perceptions of income inequality, but on the national level, findings of over- or underestimation depend critically on the measurement approach used.

Studies using the pay differential between estimated and actual wages for common professions find lower perceived inequality than actual wage inequality in most countries. This is due primarily to their overestimation of wages at the lower end of the earnings distribution and underestimation of the pay gap between low-paying and high-paying professions (Kuhn, 2013; Osberg and Smeeding, 2006; Yanai, 2017). Some authors quantify misperceptions by letting respondents choose between stylized distributions illustrated in bar charts. The difference between the chosen stylized distribution and the actual disposable household income distribution is then interpreted as the misperception of income inequality (Gimpelson and Treisman, 2018; Niehues, 2014).<sup>1</sup> In contrast to the literature on pay differentials, these works find that people overestimate income inequality in Germany, France, and Hungary, but underestimate it in the U.S., Norway, and Switzerland. A third strand of literature relies on respondents point estimates for different locations along the income distribution, either for the top or bottom decile, the mean or their own location. Distributional estimates usually present a more nuanced picture of inequality perceptions, showing a general overestimation of inequality in most western countries (Cruces et al., 2013; Engelhardt and Wagener, 2017) and an underestimation of income inequality in countries like Brazil (Bublitz, 2016). Finally, Engelhardt and Wagener (2014) calculate median-to-mean ratios of subjective social status, which ask respondents to locate themselves on a 10-point scale.<sup>2</sup> Comparing the calculated ratio to ratios for actual income, the authors find that individuals underestimate income inequality in all 26 of the OECD countries in their sample.

The variety of results has led to different explanations that focus on a lack of information, reference groups, or systematic inattention. Based on the reference group hypothesis, Clark and D'Ambrosio (2015) argue that questions using respondents' assessments of their own position to infer the level of inequality tend to yield estimates lower than actual inequality. This is explained by the fact that reference groups are often more homogeneous than countries

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<sup>1</sup>For a discussion of the problematic conversion from a stylized distribution image into a Gini index, see Knell and Stix (2017, 6f.) and Hadavand (2017).

<sup>2</sup>The literature has used different names for subjective social status, such as subjective class identification (Kelley and Evans, 1995), social ladder (Adler et al., 2000; Singh-Manoux et al., 2003), and subjective status location (Evans and Kelley, 2004).

are in reality. Therefore, measures that include a comparative perspective will yield lower subjective estimates of inequality than measures taking an absolute perspective. Reference group effects might explain the different results obtained from pay differentials and point estimates compared to results from stylized distributions and subjective social status. However, much of the variation in perceptions within and between countries and between comparative measures remains unexplained. This residual variation is commonly attributed to a lack of information, but since media coverage has only a short-term impact (Diermeier et al., 2017), this appears to be an inadequate solution that obscures a more fundamental issue.

## 2.2 Multidimensional perceptions of inequality

While the literature cited above extensively discusses potential measurement errors, they do not address the conceptual question of what is being observed or measured in depth. For example, a survey question asking respondents to estimate the income of a blue-collar worker seems to provide little margin of error, but there still is ample space for interpretation and misunderstanding. Should the perceived wage estimate be compared to equalized disposable household income (the amount a worker has available to spend) or to gross earnings (the amount on a worker's paycheck)? Furthermore, a survey question including stylized distribution images might refer to an income distribution, but respondents could understand it as an overall depiction of social stratification including current income, lifetime income, and educational status, or simply as a representation of social classes (Hadavand, 2017). Indeed, qualitative works using the same images confirm that respondents' perceptions of inequality are complex, making reference to "material resources, employment and opportunity, control over circumstances, power, injustice and inclusion, as well as respect and recognition" (Irwin, 2018, p. 218). In the same vein, questions about subjective social status could refer to many other distributions than simply current income.

The underlying problem of measuring perceived inequality seems to be that of multidimensionality. Because most survey questions are generic and subjective, it is difficult to survey respondents' perceptions of an elaborate income concept without changing their priors. The trade-off between precise measurement and distortion of subjective views arises from the deductive approach, which takes the concept of income inequality as given. If instead perceived inequality is taken as given, this allows room for hypothesizing about the role of different dimensions in perceptions of inequality. Conceptually, this approach to perceptions of inequality is abductive instead of deductive, because the research hypotheses are derived from empirical observations and theoretical reasoning (Douven, 2017).

By combining the results of existing empirical works on perceived inequality with Bourdieu's Capital Theory, I derive research hypotheses about relevant dimensions of perceived inequality, thus following an abductive approach. According to Bourdieu, social stratification and the resulting level of inequality is based on the distribution of different types of capital,

which “cannot be subsumed under a single generic concept” (Weininger, 2005, p. 87). The level of stratification as well as the individual position within society is determined by “the overall volume of capital, understood as the set of actually usable resources and powers — economic capital, cultural capital and also social capital” (Bourdieu, 1984, p. 114). According to Bourdieu, cultural and social capital are based on economic capital, but the process of transforming economic capital is costly and risky. To accumulate cultural and social capital, individuals must invest time. Once capital is transformed, these forms of capital cannot be directly traced back to economic capital since they are usually tied to individuals and are consequentially non-tradable (Bourdieu, 1986, p. 254). Therefore, the specific effects of cultural and social capital on subjective social status may differ from the effects of economic capital.

### **Subjective social status and inference**

Give the theoretical debate on the multidimensionality of inequality, the remainder of this section is devoted to strategies for measuring the latent variable of perceived inequality. As previously noted, common survey instruments include stylized distributional images as well as subjective social status. The use of a general question mitigates the trade-off between precise and biased measurement, but raises the challenge of how dimensions relevant to the perception of inequality can be inferred from an abstract question.

The problems inherent in transforming distributional images into distributional statements have been discussed previously (Evans and Kelley, 2017; Knell and Stix, 2017), but how can a perception of inequality be inferred from a subjective social status? The crucial assumption is that every assessment of subjective social status implicitly requires an estimation of the distribution. According to Hout (2008, p. 26), “people have to correctly perceive the extent of social inequality [...] and then correctly find their place in the unequal scheme of things”. Whether people correctly perceive the extent of inequality or not, without the implicit distributional estimate, people cannot position themselves therein. By definition, the dimensions used for the implicit distributional estimate must be the same as for the self-positioning. I therefore infer the relevant dimensions for the perceptions of inequality from the relationship between objective levels of capital and subjective social status.

Two caveats apply, however. First, the implicit distributional estimate might be biased because of reference group effects (Clark and D’Ambrosio, 2015; Evans and Kelley, 2004) and second, moral beliefs about the nature of stratification might bias the influence of the “true” distribution on dimensions of social status (Evans et al., 1992). Subjective social status is therefore a function of the relevant dimensions, the factors determining the reference group, and individuals’ beliefs. Controlling for the influence of the latter two factors is therefore a precondition for identifying the dimensions that matter for perceived inequality.

## **Economic capital**

With subjective social status as a proxy for the perception of inequality and Bourdieu's capital theory as a reference point, the question is which dimensions are relevant for perceiving inequality. Without doubt, control over resources is one of the most powerful sources for the awareness of social status. According to Bourdieu, economic capital "is immediately and directly convertible into money and may be institutionalized in the form of property rights" (Bourdieu, 1983, p. 243). Despite the numerous contradictions discussed in the literature on perceived inequality, income is a relatively stable predictor of subjective social status (Evans and Kelley, 2004; Lindemann and Saar, 2014). Bourdieu's broad definition also implies that wealth, including financial assets and real estate, should potentially correlate with subjective social status, a factor that previous studies have ignored.

## **Cultural capital**

Bourdieu distinguishes between two types of non-monetary capital, the first of which is cultural capital. Common examples of cultural capital are education and occupational prestige. In contrast to Becker's definition of human capital (Becker, 1974), cultural capital includes not only educational titles and skills but also dispositions of mind and body (embodied state) or the possession and use of cultural goods (objectified state). Cultural capital is related to higher subjective social status because of its positive effect on labor market outcomes and because it serves as an institutionalized code. Education in the broad sense allows individuals to be categorized and borders to be drawn between groups, and thereby constitutes a social hierarchy (Weininger, 2005, pp. 87, 104). Once accumulated, it is difficult or impossible to transmit cultural capital, especially in its embodied or objectified state. Therefore, I expect cultural capital to have its own positive effect on subjective social status, independent of economic capital.

## **Social capital**

The second form of non-monetary capital is social capital. It is defined as the (potential) amount of resources available to individuals through their network connections and the resources held within this network. Social capital depends on the former types of capital because social networks require a minimum of homogeneity and continuous investment strategies to accumulate and preserve it (Bourdieu, 1986, p. 249). In modern societies, family and ethnic origin have lost their monopoly power to define group membership and social relationships, but they remain an essential component of social capital (Bourdieu, 1986, p. 250). Therefore, if information on social networks is not available, family background can serve as a proxy to assess the relevance of social capital in subjective social status. Due to inheritance and socialization, however, economic and cultural capital also depend on parental social status. This makes it impossible to differentiate among the effects of different types of capital. In

addition, there is no variation over time, which contradicts the previous statement about the continuous efforts needed to preserve social capital.

The employment status might serve as an alternative proxy for social capital with a greater variation over time. Unemployment goes in hand a loss of skills, human relations, motivation, and social recognition (Sen, 1997b, p. 160). Thus, the decline in subjective social status due to unemployment should exceed the direct monetary effect of lost earnings. When controlling for income effects, the additional employment status should therefore capture the additional effect of social exclusion on subjective social status (Saar et al., 2017, p. 120).

### **Cross-country differences**

To explain the cross-country differences in subjective social status, both reference group theory and Bourdieu's capital theory provide useful hypotheses. The increasing economic and social convergence within Europe and new communication technologies have led to the assumption that reference groups extend across national borders (Whelan and Maître, 2009). If this were the case, countries that are more prosperous would see higher average levels of subjective social status, and the opposite would be the case for poorer countries. Indeed, Lindemann and Saar (2014, p. 13) find that economic prosperity contributes positively to average subjective social status.

In contrast, Bourdieu's capital theory does not suggest a direct level effect on subject social status. Instead, his theory highlights the country-specific institutions that determine the effort needed to convert one type of capital into another. Time and monetary resources are a critical investment to transform economic into cultural capital. An education system that allows for an easy conversion critically influences the relative value of cultural capital compared to economic capital. According to Bourdieu, the scarcity and symbolic value of cultural and social capital increases relative to economic capital if the conversion process more disguised (Bourdieu, 1986, p. 253): Although most modern western societies share the ideal of meritocracy, socialization within the family may disguise the accumulation of social and cultural capital. In empirical studies, the theoretical notion of disguise is approximated by aspects of meritocratic institutions such as educational mobility and equality of opportunity (Causa and Chapuis, 2010; Roemer and Trannoy, 2016), which are closely linked to income inequality regimes (Österman, 2017). Consequentially, a higher degree of educational mobility or the ease of transformation between capital types would predict a higher country-specific relevance of economic capital on subjective social status and thereby explain cross-country differences.

### **Hypotheses**

Based on the aforementioned theories, the following hypotheses will be investigated in the empirical section:

H1: Subjective social status increases with income and wealth, but at a decreasing rate.



- H2: Subjective social status increases with education and occupational prestige.
- H3: Subjective social status correlates positively with family background whereas the opposite holds for unemployment.
- H4: Average subjective social status increases with higher national per capita income.
- H5: Meritocratic institutions increase the correlation between monetary dimensions and subjective social status and decrease the effect of cultural or social capital on subjective social status.

### 3 Data and estimation strategy

To test these hypotheses, this work relies on the International Social Survey Program (ISSP). The ISSP consists of annual household surveys conducted by national institutions. The ISSP study group harmonizes, merges, and publishes the results, whereas the participating countries ensure representative surveys at the national level and provide probabilistic stratification weights (Gendall, 2011). Since 2004, the ISSP has surveyed subjective social status in each wave together with other demographic variables, but only the 2009 wave includes income and wealth variables. This restriction results in a cross-sectional dataset. Missing data on net incomes for some countries further reduces the sample to 18 European countries.<sup>3</sup> After list-wise deletion of missing observations, the empirical analysis is based on a sample of 11,820 observations in total and 269 (Portugal) and 1,944 (France) observations per country.

#### Dependent variable

The question used to survey subjective social status reads: “In our society there are groups which tend to be towards the top and groups which tend to be towards the bottom. Below is a scale that runs from the top to the bottom. Where would you rank yourself on this scale?” (ISSP, 2017). The response scale ranges from 1 (bottom) to 10 (top). The question is framed by various other questions about income distribution, tax fairness, and conflicts between different groups of society, ensuring that the question is understood within a general socioeconomic context. Because the question is generic and avoids any politicized wording, subjective social status is highly comparable across countries (Kelley and Evans, 1995, p. 163). Most importantly, the question does not direct or bias respondents towards any specific interpretation of what social stratification constitutes that could interfere with identifying the determinants of perceived inequality. Finally, the neutral question aims directly at perceptions and not at beliefs or judgments.

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<sup>3</sup>The excluded European countries with gross income only are Cyprus, Croatia, Denmark, Finland, Lithuania, Norway, and Sweden.

Table 1: Descriptive statistics for subjective social status

country	N	mean	sd	skewness	kurtosis	p(JB-test)
AT	555	5.945	1.38	-0.46	3.29	0.000
BE	667	5.868	1.48	-0.57	3.39	0.000
BG	270	3.897	1.68	-0.00	2.35	0.091
HR	296	4.422	1.62	0.02	3.11	0.916
CZ	721	4.743	1.60	-0.22	2.88	0.043
EE	634	4.952	1.67	-0.20	2.82	0.077
FR	1944	4.818	1.60	-0.09	2.68	0.005
DE	901	5.680	1.51	-0.53	3.08	0.000
HU	504	3.805	1.44	0.06	2.62	0.194
IT	572	4.424	1.57	-0.16	2.90	0.257
LV	620	4.368	1.76	0.24	2.62	0.008
PL	928	5.170	1.61	-0.20	2.92	0.046
PT	269	4.558	1.95	0.05	2.18	0.022
SK	741	4.670	1.54	-0.13	3.05	0.318
SI	349	4.911	1.54	-0.25	3.30	0.083
ES	428	5.157	1.40	-0.39	3.52	0.000
CH	729	5.767	1.53	-0.42	3.21	0.000
GB	692	5.321	1.63	-0.26	2.90	0.018
total	11820	5.004	1.68	-0.21	2.72	0.000

Note: Descriptive statistics using survey weights. The JB normality test is based on Jarque and Bera (1987) using unweighted data. Source: ISSP (2017).

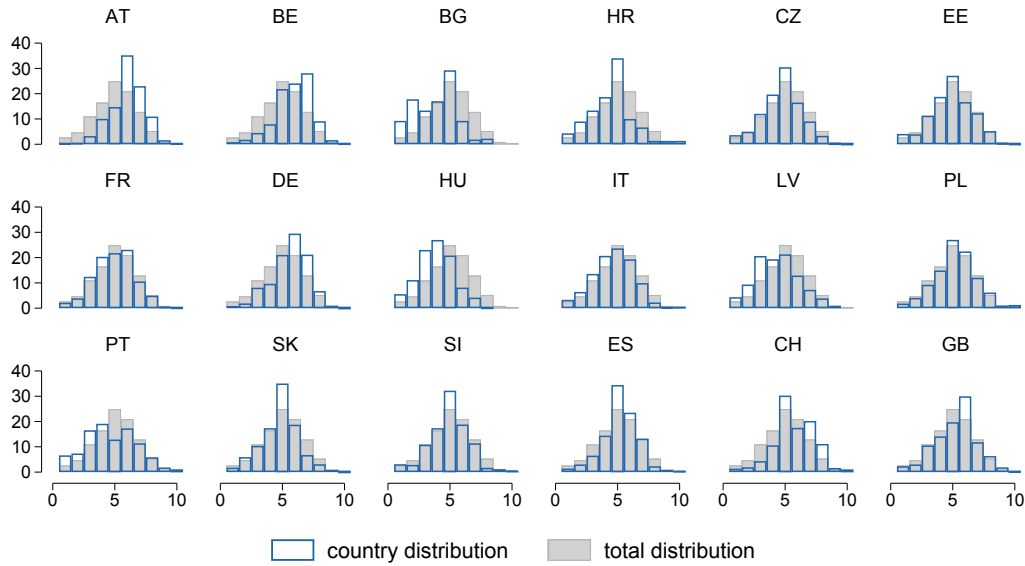
Average subjective social status ranges from 3.8 in Bulgaria and Hungary to 5.9 in Austria in the selected sample. Table 1 indicates subjective social status is lower on average in Southern and Eastern Europe (4.67, SE: 0.020) than in Central and Northern Europe (5.39, SE: 0.021). In general, subjective social status is centered around the mean, but there is a notable variation between countries. Figure 1 compares the distribution of the total sample with each country. Especially in Bulgaria, Hungary, Italy, Latvia, and Portugal, the distribution is skewed towards the bottom. Formally, the Jarque-Bera test for normality rejects the null hypothesis for seven countries ( $\alpha < .01$ ), whereas in ten countries, the distribution is close to normal ( $\alpha > .05$ ). The normal distribution found for many countries stresses the bias to the mean of subjective social status potentially induced by reference groups processes. However, the cross-country variation of means and the skewed distribution to the lower end in various countries indicates that reference group effects alone are not sufficient to explain the distribution of subjective social status.

## Independent variables

Income and wealth, the two proxies for economic capital were transformed to ensure comparability between individuals and countries. Disposable household income was equivalized by the OECD scale and converted into constant purchasing power standards (PPS). The top 0.1% incomes in each country have been winsorized to limit the impact of outliers. The survey defines wealth as the sum of current cash value of housing and financial assets and limits the possible answers to positive values, resulting in variables censored at zero. The stock of wealth was not equivalized at the household level, but also transformed into PPS (European Commission, 2014).

Economic capital correlates indeed with higher subjective social status, but the relationship is relatively weak. According to Figure 2a, the distribution of subjective social status and

Figure 1: Distribution of subjective social status in 18 European countries



Note: Histogram of subjective social status for each country and the total sample using survey weights. Source: ISSP (2017).

the respective income deciles seem unrelated<sup>4</sup>, but within each item, average incomes rise (Figure 2b). While average incomes increase with subjective social status, the variation within each item rises too. Together, both figures also reveal the special case of individuals who rank themselves in the top category. There are very few of them ( $N = 48$ ), and their decision does not seem to correlate with their income position. I have therefore excluded the top category of subjective social status from the sample.<sup>5</sup>

Education and occupational prestige serve as proxies for cultural capital. In reference to the investment of time to accumulate cultural capital, education is measured in years. To approximate status effects beyond the level of attained education, I rely on occupational prestige, which is derived by transforming occupational codes (ISCO88) into the Standard International Occupational Prestige Scale (SIOPS) ranking occupations according to their prestige on a scale from 6 to 78.<sup>6</sup>

Because the survey lacks common proxies of social capital such as the number and strength of social networks, I rely on family background and employment status. The subjective social status of the parental household, as perceived by the respondent, yields the proxy for family background. Alternative measures such as the number of books in the household at the age of 15 or the occupational prestige of parents were considered but ultimately ruled out because of missing observations.<sup>7</sup> Employment status complements family background as the second

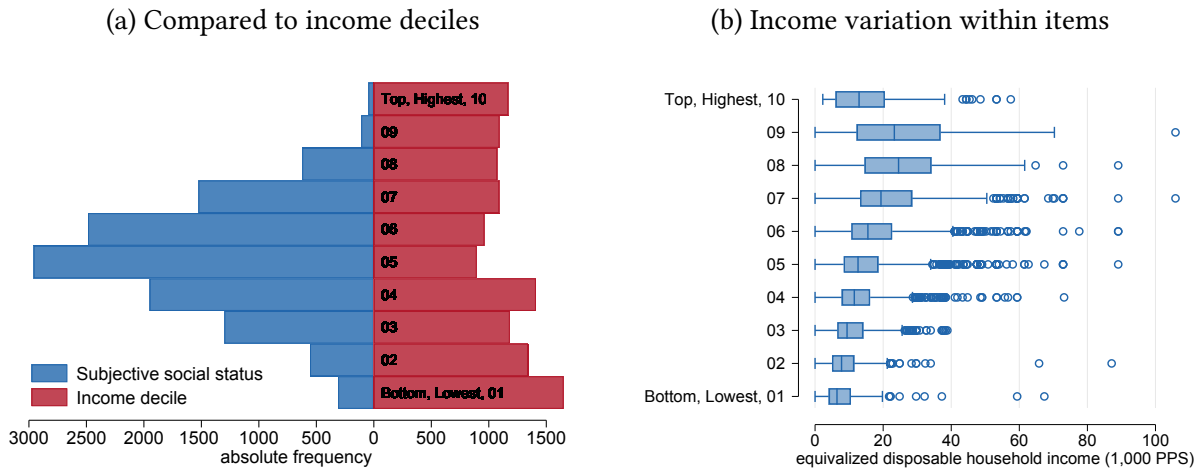
<sup>4</sup>In terms of income, the ISSP is not as representative as classical household panel surveys such as SOEP (Germany) or BHPS (UK). To assess the relative income position of a household, the decile ranges from EU-SILC are used

<sup>5</sup>All results are robust to this exclusion and available upon request.

<sup>6</sup>The index is obtained by prestige evaluations from more than 55 countries. See Treiman (1977) for details and Ganzeboom and Treiman (1996) for a comparison.

<sup>7</sup>Additional results including those proxies can be found in Models (3) and (4) of Table A.4.

Figure 2: Subjective social status and disposable household income (pooled sample)



Note: The two frequency histograms compare household subjective social status (blue) to their income decile (red), based on the equalized disposable household income from ISSP (2017) and decile ranges from EU-SILC (2018)

Note: The boxplot shows the distribution of the equalized disposable household income within each category of subjective social status (bar: interquartile range, line: mean, circle: outside values). Source: ISSP (2017).

proxy because it is time-variant and easier to survey. To obtain a parsimonious estimation model, the dummy variable indicates either unemployment (1) and employment or other status (0).

Table 2: Correlation matrix for subjective social status and independent variables

	topbot	pwinc	wealth	educyrs	siops	ptopbot	unemploy
Subjective social status	1						
income	0.401***	1					
wealth	-0.0164 <sup>+</sup>	-0.0242**	1				
education (years)	0.238***	0.318***	0.0146	1			
occupational prestige	0.316***	0.424***	0.00100	0.469***	1		
family background	0.526***	0.152***	-0.00173	0.165***	0.144***	1	
unemployed	-0.137***	-0.183***	-0.00164	-0.0466***	-0.126***	0.00450	1

Note: <sup>+</sup> p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. Pairwise correlation coefficients using survey and population weights. Source: ISSP (2017).

The correlation of the independent variables with subjective social status seems to support most of the hypotheses, as Table 2 shows. Income, education, occupational prestige, and family background are positively correlated with subjective social status, whereas being employed correlates negatively with the perceived social status. The surprising result that wealth decreases with income according to the survey data could be explained by either a highly nonlinear relationship or poor measurement of the wealth variable. The high correlation among some independent variables, especially occupational prestige, income, and education, points to potential problems regarding multicollinearity that will be discussed later on.

## Controls

In line with previous research on subjective social status and life satisfaction, the model controls for age, squared age, and sex. In addition, as subjective social status might be related to religious

service attendance, marital status, political preferences, and household composition, those variables have also been included as controls. As mentioned above, subjective social status addresses perceptions and not beliefs or judgments. However, respondents might see the disclosure of their own perceived status as a statement in itself. Thus, moral considerations or psychological status could bias such a personal statement. With respect to psychological traits, Singh-Manoux et al. (2003) find that neither hopelessness, mental illness, optimism, nor vigilance correlate with subjective social status. Nevertheless, to consider the impact of an individual's moral beliefs about their own status, a dummy has been included to control for the fact that the person perceives their own income to be (much) lower than deserved.

## Methods

The estimation model takes into account the hierarchical structure of the data by assuming a mixed model with fixed effects within regions and random effects between regions and countries. The mixed model enables, first, joint estimation of the effect of individual and country-specific variables as well as the interaction between both, compared to a county fixed-effects model. Second, by including regional random effects at the second level, the model makes it possible to control for reference group effects due to spatial proximity. For individual  $i$ , region  $j$ , and country  $k$ , I consider the following reduced-form model to explain subjective social status  $p$ :

$$p_{ijk} = \beta_0 + \beta_1 inc_{ijk} + \beta_2 inc_{ijk}^2 + \beta_1 w_{ijk} + \beta_2 w_{ijk}^2 + \Gamma_1' I_{ijk} + \Gamma_2' Z_{ijk} + u_{jk}^{(2)} + u_k^{(3)} + \varepsilon_{ijk} \quad (1)$$

Basically, Model 1 assumes country- and region-specific slopes, zero mean and variance for the random intercepts at the region ( $u_{jk}^{(2)}$ ) and country ( $u_k^{(3)}$ ) level, and no correlation among the error terms. At the individual level, subjective social status is explained by income ( $inc$ ) and wealth ( $w$ ), their respective quadratic terms, the vector of covariates approximating cultural and social capital ( $I_{ijk}$ ), and the vector of control variables ( $Z_{ijk}$ ).

Despite the fact that subjective social status is ordinal scaled, a linear estimation model is more efficient because the number of realizations is high (nine) and the dependent variable closely follows a normal distribution.<sup>8</sup> The quadratic terms of the monetary variables control for a nonlinear relationship of income and wealth with subjective social status. Unlike a log transformation, zero values can be included, which is especially relevant for wealth.

The assumption of a random region and country sample is critical for mixed-effects models because a violation can lead to biased estimates and standard errors. To obtain unbiased and stable results for a linear model, Bryan and Jenkins (2016) show by Monte Carlo simulation that at least 25 random effects observations are needed. The 256 regions easily fulfill this requirement

<sup>8</sup>If the distribution of the dependent hybrid discrete choice variable is normal and the number of realizations is high, hybrid models do not perform better than continuous models (Bahamonde-Birke and Ortúzar, 2017).

at the regional level, but 18 countries at the country level demand further responses. Two measures have been applied to address the small  $N$  problem at the country level. First, the model was restricted to random intercepts only, because the additional degrees of freedom introduced by random slopes would amplify the problem of biased estimates (Bryan and Jenkins, 2016, p. 14). Second, the model was estimated using a Markov chain Monte Carlo (MCMC) method with Gibbs sampling, which performs better for small numbers of countries (Browne and Draper, 2006; Stegmüller, 2013). Two-step estimation methods are an alternative (Donald and Lang, 2007), but they do not allow the simultaneous estimation of individual and country effects. Using MCMC, the effective sample size (ESS) for the variance estimates was still relatively small because of the small  $N_k$  problem. Therefore, the model was reparametrized by hierarchical centering at the country level to increase the number of independent estimates. After 10,000 iterations (with a burn-in phase of 2,500) the number of ESS reached at least 8,000 for each estimate. All estimations were carried out using Stata, MLwiN (Rasbash et al., 2015) and the ado runmlwin (Leckie and Charlton, 2013).

## 4 Does income play a role in subjective social status?

Strong evidence was found that both monetary and non-monetary factors are correlated with subjective social status, as Table 3 reports. The empty model, without any covariates, emphasizes how the variation between regions and countries contributes to total variation. The major part of the joint contribution (17.8%) stems from cross-country differences (14.7%) in subjective social status. Nevertheless, the three-level model including the regional level outperforms a two-level model including only the country level, since the Deviance Information Criteria (DIC) is smaller for the former model (see Table A.3).

The consecutive models in Table 3 suggest that income and wealth are positively and significantly correlated with subjective social status, whereas the small but significant quadratic terms confirm the nonlinear relationship (Model 2). By adding the proxies for cultural and social capital, Model (3) performs even better, as the DIC declines further. The final Model (4) complements the previous ones by including control variables. The fit increases further while the parameter estimates of the variables of interest do not change substantially compared to Model (3). Overall, the results of Model (4) tend to confirm hypotheses H1 to H3.

The positive parameter estimates for income and wealth corroborate previous findings (Lindemann and Saar, 2014, p. 22; Singh-Manoux et al., 2003, p. 1330), but provide additional insights on the relevance of economic capital in perceptions of inequality. In general, my results show income and wealth to be stronger predictors of subjective social status than previous studies. One explanation is the use of disposable and equalized household income, which is closer to people's lived realities than more imprecise income definitions or relative income

Table 3: Random only and random intercept models with individual attributes

	(1)	(2)	(3)	(4)
dependent variable		subjective social status		
income		.1177*** (.0037)	.0765*** (.0034)	.0674*** (.0036)
income <sup>2</sup>		-.0011*** (6.2e-05)	-7.4e-04*** (5.6e-05)	-6.2e-04*** (5.6e-05)
wealth		.0021*** (1.3e-04)	.0016*** (1.1e-04)	.0014*** (1.2e-04)
wealth <sup>2</sup>		-8.8e-07*** (9.3e-08)	-6.9e-07*** (8.2e-08)	-5.9e-07*** (8.2e-08)
education (years)			.0311*** (.0037)	.0305*** (.0037)
occupational prestige			.0126*** (.001)	.012*** (.001)
family background			.3365*** (.0066)	.3285*** (.0065)
unemployed			-.5148*** (.0483)	-.5044*** (.0485)
cons	4.916*** (.159)	3.47*** (.1221)	1.474*** (.1094)	2.241*** (.1612)
var( $u_k$ )	.4384*** (.1816)	.2316*** (.0928)	.1586*** (.0659)	.1568*** (.0648)
var( $u_{jk}$ )	.091*** (.0153)	.0385*** (.0089)	.0293*** (.0067)	.0265*** (.0064)
var( $\epsilon$ )	2.447*** (.032)	1.982*** (.0258)	1.53*** (.0198)	1.481*** (.0195)
controls	–	–	–	Yes
N	11820	11820	11820	11820
$ICC_{jk}$	0.178	0.120	0.109	0.110
$ICC_k$	0.147	0.103	0.0923	0.0942
DIC	44264.4	41744.2	38686.3	38308.4

Note: Income and wealth in thousand pps. Bayesian MCMC estimation with a burn-in of 2,500 and 10,000 iterations. Source: ISSP (2017). + p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

indicators such as deciles or quartiles.<sup>9</sup> In addition, the negative and significant parameter estimates of the quadratic terms confirm the marginal decreasing utility of income and wealth. Subjective social status is predicted to rise by 0.0523 if the average income increases by 1.000 PPS. In contrast, the same income increase for an individual in the ninth income decile increases subjective social status by only 0.0305.<sup>10</sup> In summary, the decline of the DIC from Model (1) to Model (2) and the significant estimates in Model (4) lend support to the hypothesis that subjective social status increases with income and wealth (H1). However, it is crucial to note that the relevance of income and wealth declines once cultural and social capital proxies are included in the model.

The most striking result from Model (4) is the decline of the parameter estimates for income and wealth compared to Model (2). By including additional dimensions and control variables, the relationship between income and subjective social status is reduced by roughly half, including the quadratic terms. This result further supports the hypothesis that the relevance of income

<sup>9</sup>An alternative specification replacing absolute income with the income percentile (Table A.3) was rejected because of a lower model fit.

<sup>10</sup>The concave function predicts a negative influence of income on subjective social status for high income (wealth) households. In practice, however, the turning point predicted by Model (4) is greater than the top 1% average income (108.7 > 53.2) and wealth (2372.8 > 1165.4).

for perceived inequality is overestimated. The same finding also holds for wealth, even if the relative decline of the estimate is smaller.

Cultural capital, approximated by education and occupational prestige, correlates with higher subjective social status. The effect size of education is moderate as four additional years of education (equivalent to tertiary education) go hand in hand with a 0.12 increase in subjective social status. According to Model (4), when an individual goes from being a regular economist (SIOPS: 60) to a full professor (SIOPS: 78), their subjective social status is predicted to rise by 0.216. Despite the low effect sizes, the results lend support to the hypothesis that cultural capital goes hand in hand with higher social status (H2).

Similar, family background, approximated by parents' subjective social status, predicts higher subjective social status, whereas being unemployed has the opposite effect. However, the total effect size of family background should be interpreted with caution because 34.5% of all individuals report the same subjective social status for themselves as they do for their parents. Excluding those observations from the sample reduces the estimated effect size to 0.178 (s.e.: 0.008). However, the reduced model as well as alternative specifications using the number of books in the parental household or the maximum occupational prestige of the parental household predict a significant and positive relationship (Table A.3). The relevance of family background suggests a persistence of subjective social status across generations, yet the proxy is too ambiguous to identify an effect of social capital.

Albeit unconventional, the unemployment dummy represents the second proxy for social capital. As the model already controls for income effects, the negative and significant estimate indicates a potentially strong influence of unemployment that goes beyond the income loss. The effect of being unemployed on subjective social status is considerable and equivalent to an annual income loss of 9.6443 PPS for an average income household. No additional insights are gained when distinguishing between different employment statuses. Only unemployment is significantly different from being employed full-time, whereas the effects of part-time employment or no labor market participation have no different effect (see Table A.3). Given the weak proxies, some caution is warranted, although the significant estimates seem to confirm that subjective social status increases with social capital (H3).

Because of the focus on perceptions and the empirical design limited by the available data, the results might suffer from a number of potential estimation biases. To account for omitted variables bias, Model (4) includes several control variables, which are left out of Table 3 due to space limitations and reported in the Appendix (Table A.3). In summary, subjective social status decreases with a lack of political preferences and increases with religious service attendance when individuals are married and perceive their own income as deserved. Besides the further reduction of the income parameter estimate, the results mirror Model (3) without controls.

The second concern is the correlation between income, education, and occupational prestige (Table 2), which might lead to multicollinearity. However, the variance inflation factor for a linear model without the polynomials for income, wealth, and age is only 1.87, well below



common thresholds. In addition, in light of the carefully selected variables, potentially inflated standard errors are the lesser evil compared to dropping variables and suffering a potential omitted variable bias.

The potential misspecification error due to the assumption of orthogonal country-specific error terms is the third concern. Estimating a random-effects model when the error terms are correlated between countries would be inefficient. However, if the alternative model with country fixed effects is tested against the favored specification, the null hypothesis of the Hausman test cannot be rejected ( $\chi^2 = 7.46, p = 0.976$ ). Indeed, the parameter estimates for both models are relatively similar (Table A.3).

The fourth and most serious concern when working with perceptions as a dependent variable is endogeneity. A battery of individual characteristics could cause changes in subjective social status, which simultaneously correlate with outcomes of the independent variables. Potential candidates are individuals' beliefs about fairness and justice as well as their psychological well-being that can lower subjective social status at the same time as diminishing efforts to accumulate economic, cultural, or social capital. However, Singh-Manoux et al. (2003) find that subjective social status is not related to psychological biases such as hopelessness, mental illness, optimism, or vigilance. Because the ISSP lacks data on psychological well-being, a control for the perception of fairness is included. The two dummy variables control whether the individual's own income is considered to be (much) lower than deserved. Higher dissatisfaction with the individual's own income translates into significantly lower subjective social status, as also reported by Oddsson (2018, p. 13), who finds a negative effect of inegalitarian social views. Although the results of Model (4) suggest that the main results are robust to the inclusion of the selected variables, more efficient methods of controlling for individual effects, such as a panel estimation, would be desirable.

Overall, the results presented in Table 3 have provided tentative evidence for the case that subjective social status is correlated not only with economic capital (H1), but also with cultural (H2) and social capital (H3). Leaving out the latter two types of capital results in a model with a lower fit, while at the same time, the effect of income and wealth is markedly overestimated.

## 5 Cross-country differences

The unexplained variance between countries still amounts to 15.6% of the total unexplained variance in the previous model. I therefore turn to the question of what drives differences in subjective social status between European countries. The first hypothesis (H4) proposed that subjective social status is higher in countries with higher income because individuals' reference groups extend across national borders. To that end, the level of GDP per capita was included while subsequent models controlled for the short-term effects of the financial crisis by including the GDP growth rates and changes in unemployment rate for the three years ahead of the survey.

Table 4: Random only and random intercept models with individual attributes

dependent variable	subjective social status			
	GDP per capita		unemployment rate	
independent variables	(1)	(2)	(3)	(4)
level (in survey year)	.0094 <sup>+</sup> (.0074)	.0112 <sup>+</sup> (.0077)	.0125 (.0215)	.0158 (.0457)
$\Delta_t$		.0421 (.0408)		9.4e-04 (.0061)
$\Delta_{t-1}$		-.0414 (.0345)		-.0014 (.0073)
$\Delta_{t-2}$		.0748* (.0424)		9.4e-04 (.0191)
$\text{var}(u_k)$	.0877*** (.0439)	.0857*** (.0533)	.0971*** (.0488)	.1359*** (.083)
$\text{var}(u_{jk})$	.0268*** (.0063)	.0272*** (.0065)	.027*** (.0064)	.0272*** (.0064)
$\text{var}(\epsilon)$	1.48*** (.0194)	1.48*** (.0194)	1.48*** (.0194)	1.48*** (.0194)
N	11,820	11,820	11,820	11,820
$ICC_{jk}$	0.0718	0.0709	0.0773	0.0992
$ICC_k$	0.0550	0.0538	0.0605	0.0827
DIC	38,307.0	38,306.6	38,307.0	38,306.9

Note: In addition to all variables of Model (4) in Table 3 (results omitted), the models include levels of per capita GDP and unemployment, the respective growth rates over the last three years, and dummy variables controlling for the year of the survey. Bayesian estimation with a burn-in of 2,500 and 10,000 iterations. Source: ISSP (2017). <sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . S.E.s in parentheses.

Table 4 presents no convincing evidence for extended reference groups. In fact, contrary to Lindemann and Saar (2014), I find the effect of national income to be positive but barely significant. One reason for the weak support for the extended reference group theory might be the high level of economic development in most European countries compared to other regions of the world. This result also contrasts with other works, which find per capita GDP to moderate cross-country differences in life satisfaction or happiness (Kelley and Evans, 2017).

Alternatively, perceptions might be more sensitive to changes in economic development in the short term rather than to absolute differences. Indeed, Model (2) confirms a sizable correlation between the rates of GDP growth two years before the survey took place and subjective social status, which is significant at the 5% level. The evidence is even weaker for unemployment, an alternative indicator of the current macroeconomic situation. The level of unemployment is not related to average subjective social status, and recent changes in the unemployment rate in the two years before the survey cannot predict subjective social status. Because the estimated parameters for the growth rates might suffer from autocorrelation bias, a Wald test for all growth rate estimates being equal to zero is tested for Models (2) and (4). The Wald test provides strong evidence that neither the estimates for GDP growth rates ( $\chi^2(3) = 3.21, p = 0.3607$ ) nor for unemployment ( $\chi^2(3) = 0.10, p = 0.9919$ ) are different from zero.

Other variables that have been included to test their relevance for cross-country comparisons include life expectancy, average education, private wealth, income inequality, and public expenditures. Except for a dummy variable identifying southern European countries, none of

the variables contributes significantly to cross-country differences in subjective social status. In Spain, Portugal, and Italy, subjective social status is lower than the average (4.71), but still 0.72 (s.e.: 0.268) higher than predicted by the other variables in the model (see Model 3, Table A.3).

## 6 Educational mobility, opportunities and perceived inequality

As outlined in hypothesis H5, the effect of social mobility in the education system on subjective social status should be indirect, not direct. In countries with greater mobility and lower inequality of opportunity, effort matters more for outcomes than circumstances. The hypothesis is that this translates into a stronger relationship between outcomes and factors determined by effort and perceived inequality than between factors related to social circumstances. Therefore, Model 1 is re-estimated as with an interaction term between the respective individual factors ( $I_{ijk}^*$ ) and institutional proxies ( $C_k$ ):

$$p_{ijk} = \beta_0 + \Gamma_1' I_{ijk}^* + \Gamma_2' Z_{ijk} + \Gamma_3' C_k + \Gamma_4' I_{ijk}^* * C_k + u_{jk}^{(2)} + u_k^{(3)} + \varepsilon_{ijk} \quad (2)$$

Five proxies aim to assess the level of meritocracy and educational mobility. *PRIV\_EXP*, the first proxy, addresses the question of who pays for education by indicating the share between aggregate public and private education expenditures (Eurostat, 2018). Assuming that public education expenditures are more progressive than private ones, I interpret a higher public share as an ex-ante measure of potential educational mobility.

The next set of variables aims to approximate mobility within the education system ex-post. An education system that provides equal opportunities and minimizes the influence of social circumstances will have an impact on the mode of capital transformation and the perception of inequality. The proxy *PISA\_INDIVIDUAL* is derived from country-specific regressions of individual background and school factors on PISA reading outcomes and indicates the relation between individual background factors and educational outcomes (OECD, 2010, Table A1.2).<sup>11</sup> Dividing the estimate by average achievement in each country prevents any bias induced by the overall quality of the education system. In line with hypothesis H5, I expect similar effects as for the previous proxy *PRIV\_EXP*. As a control, the school-specific effects from the same hierarchical regression are included (*PISA\_SCHOOL*). A smaller school-specific impact on education outcomes should indicate an education system that effectively provides more equal opportunities. Reversing the variable eases the interpretation, because by assumption I expect an effect in the opposite direction to the other variables.

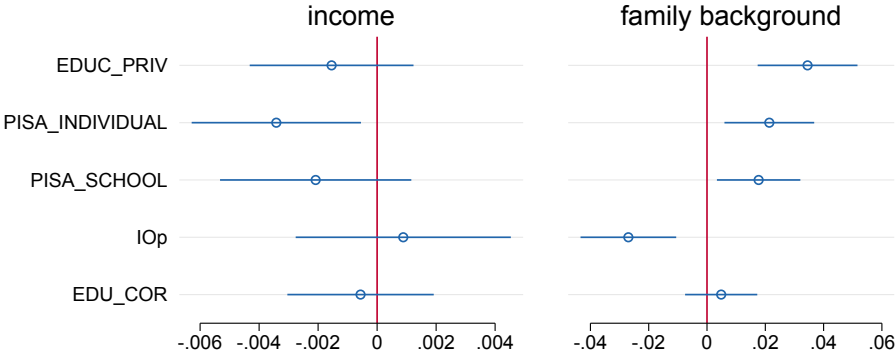
A second indirect approach to measure inequality of opportunity is to control for the influence of all factors on individuals' achievements that are beyond their control. The explained

<sup>11</sup>Theoretically, this model and all of the following proxies rest on the assumption, that students enter school with the same genetic predispositions in terms of intelligence and ability.

variation in outcomes is then defined as a lower bound of inequality of opportunity (Ferreira and Peragine, 2016, 763f.). Ferreira and Gignoux (2014) regress a battery of background factors on individuals' education outcomes (PISA reading scores) to derive the share of educational inequality that is explained by circumstances.<sup>12</sup> Accordingly, the fit of the regression model measured by  $r^2$  yields an estimate of educational inequality of opportunity (*IOp*). Higher *IOp* should predict a stronger relationship between family background with perceived inequality and vice versa for the interaction with income.

Finally, the persistence in education might differ not only between countries but also by generation and gender. Therefore, the cohort and gender-specific correlation between individual and parental education (*EDU\_COR*) is used as the last proxy (GDIM, 2018; Narayan et al., 2018). Similar to the previous proxies, a higher correlation should reduce the effect of income while increasing the effect of family background on subjective social status.

Figure 3: Interaction between educational mobility and factors explaining subjective social status



Note: The figure shows the point estimates and 95% confidence intervals for each interaction effect between the respective proxies measuring the design of the education system and income (left) or family background (right). The dependent variable is always subjective social status. Detailed estimation results are reported in Tables A.6, A.7, A.8, A.9, and A.10. Source: ISSP (2017).

Figure 3 illustrates the findings on the relevance of meritocratic institutions for perceptions of inequality. In order to facilitate the interpretation of the variables, the proxies have been z-standardized using survey and population weights. Thus, all estimates indicate the predicted effect of a change of average meritocracy or educational mobility by one standard deviation. The left-hand graph indicates that the relationship between income and subjective social status is stronger in countries with better meritocratic institutions. Across the different proxies, higher educational immobility and greater private education expenditures correlate with a weaker relationship between income and subjective social status. However, the estimates are only significant for the proxy measuring the relevance of individual effects on PISA reading scores.

The right-hand graph indicates a stronger interaction effect with family background since most estimates have the expected positive sign and three out of five estimates are significant.

<sup>12</sup>Individual circumstances include gender, father's and mother's education, father's occupation, language spoken at home, migration status, access to books at home, durables owned by the households, cultural items owned, and the location of the school attended (Ferreira and Gignoux, 2014, p. 231).

In countries with a higher ratio of private to public education expenditures (*EDUC\_PRIV*), a greater impact of individual background (*PISA\_INDIVIDUAL*), and a more unequal school system (*PISA\_SCHOOL*), the correlation between the individual's own family background and subjective social status is higher.

However, the results for the IOp proxy contradict the evidence above. The reason for this unexpected result is likely related to the significant level effect predicting lower subjective social status with higher level of IOp (Table A.9). Because IOp is a lower bound estimate, the omission of relevant circumstances for educational outcomes might be correlated with lower average subjective social status. However, the individual estimates for *PISA\_INDIVIDUAL* and *PISA\_SCHOOL* might suffer from the same omitted variable bias. Thus, the reasons for this result are not yet entirely understood and require further investigation.

Overall, the results displayed in Figure 3 indicate that greater equality of educational opportunity goes hand in hand with a greater influence of income on perceptions of inequality. In addition, family background becomes more relevant for perceptions of inequality in countries that provide lower than average educational mobility. These findings lend support to the critical role of the education system, not only for social stratification as predicted by Bourdieu's Capital Theory, but also for perceptions of inequality. Individuals seem to be aware of the fact that the potential to transmit capital is disguised by an rigid education system that allows little mobility, and adapt their perceptions accordingly by adjusting the value they assign to income or family background in forming perceptions of their own status.

As a side note, the results also point to the fact that Bourdieu's Capital Theory is to some extent incompatible with the literature on equality of opportunity, which distinguishes between effort and circumstances. Wealth is considered economic capital because it is easily converted into money and transmitted between individuals. However, the estimated interaction effects between wealth and proxies of educational mobility do not mirror the results for income. Indeed, one could consider wealth to be more a proxy of circumstances than of effort.

Nevertheless, the proxies chosen to measure the level to which the transmission between different types of capital is disguised seem to be reasonable. Even though not all interaction effects are found to be significant, the models that include the interaction effects see a drop in the unexplained variance at the country and regional level from 5.3% down to 3.3% on average (see Tables A.6 to A.10).

## 7 Conclusions

Prior work has shown that individuals' perceptions of inequality do not mirror the income distribution and has therefore concluded that individuals perceptions about the extent of inequality are wrong. Gimpelson and Treisman (2018), for example, state that "uncertainty and misperception are extremely widespread" (2018, p. 28). Previous authors have used various empirical strategies to minimize error in the measurement error of perceived inequality. However,

most studies have ignored the multidimensional nature of inequality and the problems inherent in evaluating perceived inequality in relation to income inequality. Therefore, a number of contradictory explanations exist for cross-country differences in the perception of inequality. This paper has proposed a theoretical rationale based on Bourdieu's Capital Theory to evaluate the relevance of multiple factors in the perception of inequality in comparison to income, and has tested whether cross-country differences in perceived inequality are related to the design of the education system.

Based on the ISSP wave on social inequality from 2009, this work estimated a mixed-effects model including 18 European countries and using subjective social status as the proxy to infer the perceived extent of inequality. The Bayesian estimation method ensured valid estimates despite the low number of countries. The results challenge the view that income and wealth alone are sufficient to explain perceived inequality. Instead, the results suggest that cultural and social capital contribute substantially to subjective social status and the implicit distribution behind this assessment. According to the model, perceived social status increased with income and wealth at a declining rate. At the same time, education, occupational prestige, family background, and unemployment explained a similar portion of the total variance as the previous two variables. These results are in general agreement with previous sociological works investigating perceptions of class and status (Evans and Kelley, 2004). However, this work finds a stronger relationship between income with subjective social status, possibly due to the more rigorous income definition and the fact that previous sociological works neglected wealth.

The second aim of this paper was to investigate the considerable cross-country differences in perceived inequality. In contrast to Lindemann and Saar (2014), the results provide no strong evidence in favor of extended reference groups within Europe. Average income differences between countries have little explanatory power, whereas subjective social status changed moderately in countries with recent growth spells. In line with the final hypothesis, the results provide tentative evidence of the moderating effect of the education system. By including interaction effects between proxies of educational mobility and the six respective dimensions of social status, the model showed family background to have stronger predictive power for subjective social status in countries with less educational mobility. Conversely, in countries with greater educational mobility and lower inequality of educational opportunities, the results tend to support a stronger correlation between income and perceived inequality. Proxies were carefully selected to measure differences in educational mobility instead of average education outcomes. Thus, the model avoided a setup in which individuals' perceptions would simply align more closely with the factual income distribution in countries with higher average education levels. To sum up the results in the terminology of Bourdieu, not only does the education system disguise the transmission of economic, social, and cultural capital in ways that are relevant for social stratification; it also moderates the relevance of these types of capital for individuals' perceptions of inequality.

The policy implications of these findings are straightforward. Making individuals aware of the factual income distribution will not eradicate “misperceptions” of inequality, particularly since other dimensions of social status affect people’s perceptions of inequality and may in turn limit how they receive and evaluate information on income inequality at the individual level. Instead, if the effect of circumstances on educational outcomes could be reduced, this would increase not only educational mobility but potentially increase the relative importance of economic capital and thereby also decrease the deviation between perceived inequality and the income distribution.

An important question that should be tackled in future research is whether the correlation between subjective social status and the respective factors can help to determine the relative importance of different inequality dimensions for the construction of composite inequality measures (Decancq and Lugo, 2013). Future work should also investigate the validity of the results by using alternative measures of perceived inequality or by applying the same method to world regions that differ economically and culturally from the European country sample analyzed in this work. Finally, it could be worthwhile to investigate how economic behavior that depends on relative assessments such as consumption and savings might be related to other dimensions than income.

## A Appendix

Table A.1: Descriptive statistics for independent variables

	mean	sd	min	max
disposable household income (PPS K)	24.8	17.4	0	113
total net wealth (PPS K)	126	215	0	2561
education in years	12.4	3.77	1	63
occupations prestige (SIOPS)	41.2	13.5	12	78
parent subjective social status	4.84	1.86	1	10
employment status (dummy)	.0669	.25	0	1
age	48.1	15.9	16	99
female (dummy)	.516	.5	0	1
religious service attendance	.545	.498	0	1
urban region (dummy)	.628	.483	0	1
small or no political interest (dummy)	.147	.354	0	1
EDUC_PRIV	.803	.399	.441	2.3
PISA_INDIVIDUAL	2.5	1.43	.332	5.8
PISA_SCHOOL	-14.4	5.87	-24.2	-3.9
Inequality of Opportunity	.299	.0378	.207	.38
Intergenerational correlation	.447	.0922	.137	.73

Source: ISSP (2017)



Table A.2: Comparison to two-level and country fixed-effects model

	(1)	(2)	(3)
dependent variable	subjective social status		
income	.0674*** (.0036)	.0668*** (.0035)	.0672*** (.0036)
income <sup>2</sup>	-6.2e-04*** (5.6e-05)	-6.1e-04*** (5.6e-05)	-6.1e-04*** (5.7e-05)
wealth	.0014*** (1.2e-04)	.0014*** (1.2e-04)	.0014*** (1.2e-04)
wealth <sup>2</sup>	-5.9e-07*** (8.2e-08)	-5.8e-07*** (8.1e-08)	-5.9e-07*** (8.2e-08)
education (years)	.0305*** (.0037)	.0301*** (.0037)	.0307*** (.0036)
occupational prestige	.012*** (.001)	.012*** (.001)	.012*** (.001)
family background	.3285*** (.0065)	.3279*** (.0065)	.328*** (.0066)
unemployed	-.5044*** (.0485)	-.5141*** (.0485)	-.5055*** (.0488)
cons	2.241*** (.1612)	2.263*** (.1591)	2.883*** (.1518)
var( $u_k$ )	.1568*** (.0648)		
var( $u_{jk}$ )	.0265*** (.0064)	.1535*** (.0607)	.0271*** (.0064)
var( $\epsilon$ )	1.481*** (.0195)	1.503*** (.0197)	1.481*** (.0193)
controls	Yes	Yes	Yes
N	11820	11820	11820
DIC	38308.4	38395.1	38307.7

Note: Model (1) is the final model of Table 3. Model (2) excludes random region effects ( $\text{var}(u_{jk})$ ). Model (3) assumes country fixed effects and random effects at the regional level. Bayesian MCMC estimation with a burn-in of 2,500 and 10,000 iterations. Source: ISSP (2017). +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . S.E.s in parentheses.

Table A.3: Random intercept models with additional controls

	(1)	(2)	(3)	(4)	(5)
dependent variable	subjective social status				
cons	2.241*** (.1612)	2.957*** (.2118)	3.824*** (.1838)	3.519*** (.1971)	2.296*** (.1626)
income	.0674*** (.0036)	.0764*** (.0045)	.0723*** (.004)	.0737*** (.0042)	.0664*** (.0036)
wealth	.0014*** (1.2e-04)	.0016*** (1.5e-04)	.0018*** (1.3e-04)	.0016*** (1.3e-04)	.0014*** (1.2e-04)
education (years)	.0305*** (.0037)	.0333*** (.0047)	.0482*** (.0041)	.0504*** (.0042)	.0299*** (.0036)
occupational prestige	.012*** (.001)	.0135*** (.0014)	.014*** (.0012)	.0136*** (.0012)	.0121*** (.001)
family background	.3285*** (.0065)	.178*** (.008)			.3282*** (.0066)
unemployed	-.5044*** (.0485)	-.6249*** (.0643)	-.4613*** (.054)	-.484*** (.0562)	
age	-.0154*** (.0045)	-.0221*** (.0061)	-.0278*** (.0049)	-.025*** (.0052)	-.0174*** (.0045)
age <sup>2</sup>	1.3e-04** (4.3e-05)	1.8e-04** (5.9e-05)	2.0e-04*** (4.7e-05)	1.7e-04*** (5.0e-05)	1.6e-04*** (4.5e-05)
sex	-.0397* (.0232)	-.0282 (.0307)	-.042+ (.0256)	-.044* (.0263)	-.0375+ (.0237)
not married	-.1372*** (.033)	-.1527*** (.0435)	-.1133*** (.0364)	-.1201*** (.0377)	-.1399*** (.033)
relig. service attendance	.0919*** (.0251)	.1212*** (.033)	.1265*** (.0276)	.135*** (.0291)	.0929*** (.0248)
no party preference	-.1248** (.0441)	-.1635** (.0587)	-.1333** (.0493)	-.1489** (.0524)	-.1256** (.0451)
Just pay (reference category: deserved)					
much less	-.5458*** (.0338)	-.5882*** (.0452)	-.622*** (.0378)	-.6403*** (.0389)	-.5487*** (.0337)
less	-.2053*** (.0259)	-.2074*** (.0344)	-.2569*** (.0291)	-.2456*** (.0294)	-.2083*** (.0261)
Household structure (reference category: couple)					
single	-.0247 (.0399)	-.0379 (.0527)	.0074 (.0444)	.0038 (.0466)	-.0261 (.0401)
single + children	.0154 (.0692)	-.0467 (.0908)	-.0137 (.0761)	-.0124 (.0805)	.0076 (.0695)
couple + children	.1393*** (.0357)	.1903*** (.0472)	.1562*** (.0394)	.1686*** (.0411)	.1331*** (.0353)
3+ generations	.1161*** (.0342)	.1275** (.0447)	.1262*** (.0375)	.1284*** (.0392)	.1084** (.034)
Alternative family background specifications					
# of books in parental household			2.8e-04*** (5.8e-05)		
occupational prestige of parents				.0066*** (.0012)	
Employment status (reference category: full-time)					
unemployed					-.5189*** (.0499)
other					-.0646* (.0341)
less than part-time					.0113 (.1056)
part-time					.0298 (.044)
var( $u_k$ )	.1568*** (.0648)	.2396*** (.1007)	.2457*** (.1007)	.265*** (.1124)	.1566*** (.0655)
var( $u_{jk}$ )	.0265*** (.0064)	.0395*** (.0099)	.0331*** (.0078)	.0328*** (.0077)	.0273*** (.0063)
var( $\epsilon$ )	1.481*** (.0195)	1.694*** (.0278)	1.797*** (.0239)	1.768*** (.0247)	1.48*** (.0195)
N	11820	7733	11595	10630	11820
ICC <sub>jk</sub>	0.110	0.141	0.134	0.144	0.111
ICC <sub>k</sub>	0.0942	0.121	0.118	0.128	0.0941
DIC	38308.4	26141.4	39823.7	36339.7	38308.7

Note: Model (1) is the final model of Table 3. Model (2) includes only the observations where subjective social status is different from parents. Models (3) and (4) include alternative proxies for family background while Model (5) differentiates among five employment status categories. Bayesian MCMC estimation with a burn-in of 2,500 and 10,000 iterations. Source: ISSP (2017). + p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

Table A.4: Control variables at the country level

	(1)	(2)	(3)	(4)	(5)
dependent variable	subjective social status				
cons	1.785*** (.3588)	2.045*** (.2799)	.9671* (.5804)	-.8238 (4.072)	1.303* (.6939)
income	.0671*** (.0036)	.0676*** (.0036)	.0671*** (.0036)	.067*** (.0035)	.0671*** (.0035)
income <sup>2</sup>	-6.1e-04*** (5.7e-05)	-6.2e-04*** (5.7e-05)	-6.1e-04*** (5.7e-05)	-6.1e-04*** (5.7e-05)	-6.1e-04*** (5.7e-05)
wealth	.0014*** (1.2e-04)	.0014*** (1.2e-04)	.0014*** (1.2e-04)	.0014*** (1.2e-04)	.0014*** (1.2e-04)
wealth <sup>2</sup>	-5.9e-07*** (8.2e-08)	-5.9e-07*** (8.2e-08)	-5.9e-07*** (8.1e-08)	-5.9e-07*** (8.2e-08)	-5.9e-07*** (8.2e-08)
education (years)	.0307*** (.0037)	.0305*** (.0037)	.031*** (.0036)	.0306*** (.0036)	.0307*** (.0037)
occupational prestige	.012*** (.001)	.012*** (.001)	.012*** (.001)	.012*** (.001)	.012*** (.001)
family background	.3281*** (.0065)	.3281*** (.0066)	.3283*** (.0066)	.3283*** (.0066)	.3282*** (.0066)
unemployed	-.5044*** (.0486)	-.5043*** (.0483)	-.5061*** (.0482)	-.5053*** (.0486)	-.5048*** (.0486)
Survey year (reference: 2009)	ref.	ref.	ref.	ref.	ref.
2008	-.4539 (.3715)	-.0481 (.2496)	-.1751 (.1839)	-.1596 (.2305)	-.2385 (.2067)
2010	.1713 (.4306)	.5222** (.1929)	.7881*** (.1777)	.6452** (.216)	.61** (.2089)
2011	-.0681 (.4494)	-.4808+ (.3417)	-.6391* (.3569)	-.3108 (.4096)	-.2857 (.4039)
GDP per capita	.0112+ (.0077)		.0235* (.0131)	.0029 (.0166)	.013* (.0078)
GDP growth rate ( $t$ )	.0421 (.0408)				
GDP growth rate ( $t - 1$ )	-.0414 (.0345)				
GDP growth rate ( $t - 2$ )	.0748* (.0424)		.0427* (.0204)	.0355+ (.0251)	.0344+ (.0249)
unemployment rate ( $t$ )		.0125 (.0215)			
Welfare state regime (ref.: central Europe)			ref.		
southern Europe			.7202** (.2688)		
post-socialist			.319 (.3056)		
liberal			.325 (.2798)		
life expectancy				.0353 (.0573)	
gini coefficient					.0114 (.0186)
var( $u_k$ )	.0857*** (.0533)	.0971*** (.0488)	.0502*** (.0357)	.0858*** (.0472)	.086*** (.0473)
var( $u_{jk}$ )	.0272*** (.0065)	.027*** (.0064)	.0268*** (.0065)	.027*** (.0061)	.0271*** (.0062)
var( $\epsilon$ )	1.48*** (.0194)	1.48*** (.0194)	1.481*** (.0197)	1.481*** (.0194)	1.481*** (.0194)
N	11,820	11,820	11,820	11,820	11,820
ICC <sub>jk</sub>	0.0709	0.0773	0.0494	0.0708	0.0709
ICC <sub>k</sub>	0.0538	0.0605	0.0322	0.0539	0.0540
DIC	38,306.6	38,307.0	38,308.2	38,306.6	38,306.6

Note: These models include additional control variables for cross-country differences based on Model (4) in Table 3. Control variables at the individual level are omitted. Bayesian estimation with a burn-in of 2,500 and 10,000 iterations. Source: ISSP (2017). \* p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

Table A.5: Pairwise correlation between proxies of educational immobility

	EDUC_PRIV	PISA_INDIVIDUAL	PISA_SCHOOL	IOp	EDUC_COR
EDUC_PRIV	1				
PISA_INDIVIDUAL	.594***	1			
PISA_SCHOOL	.0449***	.545***	1		
IOp	-.124***	-.17***	-.538***	1	
EDUC_COR	-.257***	-.239***	-.01	.0151 <sup>+</sup>	1

Note: The variable *PISA\_SCHOOL* is multiplied by (-1) to facilitate interpretation. <sup>+</sup> p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001.

Table A.6: Interaction with share of private education expenditure

	income	wealth	education	occupational prestige	family background	unemployed
EDUC_PRIV	.0509 (.089)	.0069 (.085)	.2054 <sup>+</sup> (.1055)	.1032 (.0955)	-.1476 (.0963)	.0163 (.0882)
interaction	-.0015 (.0014)	9.8e-05 <sup>+</sup> (5.7e-05)	-.0146** (.0049)	-.002 <sup>+</sup> (.0011)	.0345*** (.0087)	.0901 (.1064)
N	11820	11820	11820	11820	11820	11820
<i>ICC<sub>jk</sub></i>	0.0526	0.0520	0.0526	0.0522	0.0532	0.0531
<i>ICC<sub>k</sub></i>	0.0353	0.0346	0.0351	0.0348	0.0359	0.0360
DIC	38307.7	38306.2	38299.7	38305.6	38293.2	38307.8

Note: The dependent variable is subjective social status. Each column represents an estimation model including the ratio between private and public expenditures, whereas the column titles indicate the respective interaction with this proxy. The estimates indicate the predicted effect of a change by one standard deviation from the sample average because the proxy variable is z-standardized using survey and population weights. Substantial and control variables at the individual and country level are included in line with Model (2) in Table 4 but omitted from the table. All proxy variables for meritocratic institutions are z-standardized. Source: ISSP (2017). <sup>+</sup> p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

Table A.7: Interaction with impact of individual background on the PISA reading score

	income	wealth	education	occupational prestige	family background	unemployed
PISA_INDIVIDUAL	.1063 (.0872)	.0499 (.0824)	-.0742 (.0962)	.034 (.0928)	-.0493 (.0913)	.0483 (.0829)
interaction	-.0034* (.0015)	4.7e-05 (5.9e-05)	.0107** (.0041)	5.4e-04 (.001)	.0214** (.0079)	.0771 (.0991)
N	11820	11820	11820	11820	11820	11820
<i>ICC<sub>jk</sub></i>	0.0524	0.0505	0.0501	0.0505	0.0509	0.0511
<i>ICC<sub>k</sub></i>	0.0351	0.0330	0.0325	0.0330	0.0333	0.0339
DIC	38303.3	38308.3	38302.1	38308.6	38301.0	38308.7

Note: The dependent variable is subjective social status. Each column represents an estimation model including the ratio between private and public expenditures, whereas the column titles indicate the respective interaction with this proxy. The estimates indicate the predicted effect of a change by one standard deviation from the sample average because the proxy variable is z-standardized using survey and population weights. Substantial and control variables at the individual and country level are included in line with Model (2) in Table 4 but omitted from the table. All proxy variables for meritocratic institutions are z-standardized. Source: ISSP (2017). <sup>+</sup> p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

Table A.8: Interaction with the school-specific effect on the PISA reading score

	income	wealth	education	occupational prestige	family background	unemployed
PISA_SCHOOL	.0772 (.0843)	.0557 (.0816)	.0014 (.092)	-.0288 (.0908)	-.0367 (.089)	.0496 (.0776)
interaction	-.0021 (.0017)	-6.2e-05 (7.4e-05)	.0041 (.0036)	.0019 <sup>+</sup> (9.9e-04)	.0177* (.0073)	.0923 (.0898)
N	11820	11820	11820	11820	11820	11820
<i>ICC<sub>jk</sub></i>	0.0513	0.0512	0.0514	0.0509	0.0514	0.0512
<i>ICC<sub>k</sub></i>	0.0339	0.0339	0.0339	0.0334	0.0336	0.0340
DIC	38307.4	38308.3	38307.3	38305.0	38302.1	38308.1

Note: The dependent variable is subjective social status. Each column represents an estimation model including the ratio between private and public expenditures, whereas the column titles indicate the respective interaction with this proxy. The estimates indicate the predicted effect of a change by one standard deviation from the sample average because the proxy variable is z-standardized using survey and population weights. Substantial and control variables at the individual and country level are included in line with Model (2) in Table 4 but omitted from the table. All proxy variables for meritocratic institutions are z-standardized. Source: ISSP (2017). <sup>+</sup> p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

Table A.9: Interaction with the inequality in educational opportunity

	income	wealth	education	occupational prestige	family background	unemployed
IOp	-0.1682*	-0.1554*	-0.2444**	-0.1182	-0.0254	-0.1576*
	(.08)	(.0777)	(.0878)	(.0905)	(.089)	(.0754)
interaction	8.9e-04	-2.6e-05	.0074*	-9.7e-04	-.027**	-.1765+
	(.0019)	(6.2e-05)	(.0035)	(.0011)	(.0084)	(.0924)
N	11820	11820	11820	11820	11820	11820
$ICC_{jk}$	0.0403	0.0406	0.0401	0.0406	0.0419	0.0407
$ICC_k$	0.0226	0.0228	0.0225	0.0227	0.0236	0.0231
DIC	38307.8	38307.7	38303.9	38306.9	38295.9	38308.1

Note: The dependent variable is subjective social status. Each column represents an estimation model including the ratio between private and public expenditures, whereas the column titles indicate the respective interaction with this proxy. The estimates indicate the predicted effect of a change by one standard deviation from the sample average because the proxy variable is z-standardized using survey and population weights. Substantial and control variables at the individual and country level are included in line with Model (2) in Table 4 but omitted from the table. All proxy variables for meritocratic institutions are z-standardized. Source: ISSP (2017). + p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

Table A.10: Interaction with the correlation between individuals' and parents' education

	income	wealth	education	occupational prestige	family background	unemployed
EDU_COR	.0251	.0194	.1163**	.1189**	-.006	.0165
	(.0237)	(.0176)	(.0397)	(.0391)	(.0349)	(.0167)
interaction	-5.6e-04	-1.6e-05	-.008**	-.0024**	.0049	.0344
	(.0013)	(5.7e-05)	(.0029)	(8.5e-04)	(.0063)	(.047)
N	11820	11820	11820	11820	11820	11820
$ICC_{jk}$	0.0518	0.0514	0.0515	0.0522	0.0511	0.0514
$ICC_k$	0.0347	0.0344	0.0341	0.0348	0.0340	0.0343
DIC	38309.0	38309.3	38301.2	38300.2	38308.9	38309.2

Note: The dependent variable is subjective social status. Each column represents an estimation model including the ratio between private and public expenditures, whereas the column titles indicate the respective interaction with this proxy. The estimates indicate the predicted effect of a change by one standard deviation from the sample average because the proxy variable is z-standardized using survey and population weights. Substantial and control variables at the individual and country level are included in line with Model (2) in Table 4 but omitted from the table. All proxy variables for meritocratic institutions are z-standardized. Source: ISSP (2017). + p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. S.E.s in parentheses.

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