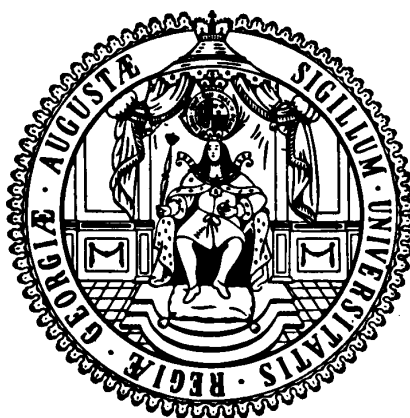# Courant Research Centre

'Poverty, Equity and Growth in Developing and Transition Countries: Statistical Methods and Empirical Analysis'

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Discussion Papers

On the relation between income inequality and happiness:
Do fairness perceptions matter?

Christian Bjørnskov [a], Axel Dreher [b], Justina A.V. Fischer [c], Jan Schnellenbach [d]

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Abstract

In this paper, we revisit the association between happiness and inequality. We argue that the perceived fairness of the income generation process affects this association. Building on a two-period model of individual life-time utility maximization, we predict that persons with higher perceived fairness will experience higher levels of life-time utility and are less in favor of income redistribution. In societies with a high level of actual social mobility, income inequality is perceived more positively with increased expected fairness. The opposite is expected for countries with low actual social mobility, due to an increasing relevance of a disappointment effect resulting from unsuccessful individual investments. Using the World Values Survey data and a broad set of fairness measures, we find strong support for the negative (positive) association between fairness perceptions and the demand for more equal incomes (subjective well-being). We also find strong empirical support for the disappointment effect in low social mobility countries. In contrast, the results for high-mobility countries turn out to be ambiguous.

[a] Department of Economics, Aarhus School of Business, Aarhus University, Hermodsvej 22, DK-8230 Åbyhøj, Denmark; phone: +45 89 48 61 81; e-mail: ChBj@asb.dk.
[b] University of Goettingen, Center for European, Governance and Economic Development Research (*cege*), Platz der Goettinger Sieben 3, DE-37073 Goettingen, Germany, CESifo, Germany, IZA, Germany, and KOF Swiss Economic Institute, Switzerland, e-mail: mail@axel-dreher.de.
[c] (at time of writing) Department of Economics, Stockholm School of Economics, Stockholm, Sweden; University of Hohenheim, Stuttgart, Germany, and University of Hamburg, Institute for Public Finance, Von-Melle-Park 5, DE-20146 Hamburg, Germany; e-mail: JAVFischer@gmx.de.
[d] Ruprecht-Karls-Universität Heidelberg, Alfred Weber Institute for Economics, Bergheimer Strasse 58, DE-69115 Heidelberg, Germany, e-mail: jan.schnellenbach@awi.uni-heidelberg.de.

Inequality is undoubtedly more readily borne, and affects the dignity of the person much less, if it is determined by impersonal forces than when it is due to design.

Friedrich Hayek

(1944, 117)

1. Introduction

Since Abba Lerner's classic contributions from the 1930s, welfare economics has argued that income redistribution can increase overall welfare in a society with an unequal distribution of incomes, due to the decreasing returns to income caused by an assumed strict concavity of individual utility functions (Lerner, 1944). This view implies that most people in societies characterized by a highly skewed income distribution should, all other things being equal, be observed to experience lower levels of utility. With the advent of the economics of happiness, it has become possible – and fashionable – to test this implication on individuals' self-reported life satisfaction, arguably being a reliable proxy for the economic concept of 'utility'.[1] If Lerner's implication – and indeed standard economic theory – is correct, we would expect to see a clear negative association between income inequality and life satisfaction of the average person. Such empirical results would be in line with the more recent theoretical model by Fehr and Schmidt (1999), taking account of social (other-regarding) preferences in individuals' utility functions, equally predicting a negative relation between inequality and happiness.

Even though this traditional, simple microeconomic approach predicts that overall and average welfare in an economy decrease with income inequality, the empirical literature on the association between income inequality and happiness[2] has yielded ambiguous findings.[3]

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[1] For an overview of the economic, sociological and psychological concepts of subjective well-being and validity studies on its alternative measures, see Diener et al. (2008), and Veenhoven (2000).

[2] In this paper, we use the terms 'happiness', 'subjective well-being', and 'well-being' interchangeably.

[3] In a related field of research Clark, Frijters and Shields (2008) and Layard, Mayraz and Nickell (2009), among others, use micro data to analyze income inequality effects through social comparisons where persons compare

One of the first empirical contributions, Alesina et al. (2004), identify a negative association between income inequality and happiness for 12 European countries, but an association that is not statistically significant for most US states. Explaining their results, the authors hypothesize that differences in perceived and actual social mobility exist between these two continents. Extending the sample to 30 OECD countries, Fischer (2009) reports a negative association between individual life satisfaction and inequality in final income, but not for market-generated income inequality – potentially indicating that it is actual consumption on which social comparisons are based.[4] In a world sample, however, the large-scale robustness analysis in Bjørnskov, Dreher and Fischer (2008) suggests that the skewness of the income distribution does not, in general, affect individual happiness.

In this paper, we enrich the association between inequality and happiness with a new feature indicated by the quote from Hayek above: we allow individuals' subjective perceptions of the 'fairness' of the present income generating process to affect the association between life satisfaction and income inequality. In the words of Hopkins (2008), we aim at differentiating between reward inequality (possibly caused by an unfair income generating process even when endowments (skills) have been equal) and endowment inequality (which exists prior to any market transaction, and is shown to persist even when the income generating process is fair). Indeed, Grosfeld and Senik (2009) show that in the transition country Poland, at first, income inequality contributed positively to people's happiness from 1992 to 1996, when it was associated with economic opportunities and social mobility was perceived to be high, while in the later period from 1997 onwards, when social mobility was considered to be low, it affected people's happiness negatively. Alesina et al. (2004) already conjectured that inequality may affect people with specific values and specific views on social mobility in their societies differently, even if inequality *in general* is not associated with happiness.

their income with a reference level. In our study, inequality rather refers to differences in absolute income across persons and the presence of redistributive government activities.

[4] This is in line with Hopkins' (2008) 'rivalry model in conspicuous consumption' according to which income inequality increases individual utility under certain conditions (high income and consumption levels, and a quite dense income distribution), as greater incentives to compete in consumption are generated.

We present a small stylized theoretical model, which serves to illustrate our main arguments and derive some testable hypotheses. This model analyzes individual life-time utility maximization (in expectational terms) with a two-period time horizon, a human capital investment phase and a phase in which the returns on investments are consumed. Here, investment decisions depend on social mobility perceptions, while the return on investment depends on actual social mobility – our model allows both to differ. The model predicts that persons with higher *perceived fairness* will – on average, but not in every single case – experience higher levels of utility and be less in favor of income redistribution. Societies with higher levels of *actual social mobility* are characterized by an institutional framework which rewards individual investments to a larger extent.

According to the model, in a country with high actual and perceived social mobility, individuals will invest more in human capital and thus, on average, realize more favorable economic outcomes – in terms of own income, but also concerning general economic growth. For this group of countries, most of the population will perceive fairness to be relatively high and only a small portion will underestimate actual mobility – we therefore expect a positive effect of an interaction between perceived fairness and income inequality on happiness: As more equal incomes reflect higher taxes and more expansive income redistribution, having less inequality would lower the utility of most of the population who, after actually having successfully invested, do not benefit from compensating income transfers to low-investing individuals.

In contrast, a low-mobility country, characterized by institutions impeding social mobility, may suffer from the following problem: With actual social mobility being low, the group of individuals who overestimate mobility tends to be the largest in the population, in contrast to high mobility countries. Individuals in this group are, however, with an (from their viewpoint unexpectedly) high probability not rewarded for their investments, given an institutional framework that is actually less fair than perceived *ex ante*. Thus, *ex post*, higher *perceived* fairness in countries with low actual upward mobility will induce a disappointment effect for most of the population, as the actual return does not meet the expected return, and there is (*subjectively*) not even an unfair societal framework to put the blame on. For most of

the population, this utility-lowering effect of fairness perceptions is enlarged as income inequality rises, reflecting smaller compensating government transfers to failed investors.

To explore the link between perceptions of fairness, inequality, and happiness empirically we use data from the World Values Survey 1997-2001 and estimate a happiness function. We employ Gini coefficients to measure income inequality, four different proxies for individuals' perceived fairness of the income generating process, and the interaction of inequality with these proxies. The empirical analysis aims to explore whether and to what extent perceived fairness mediates the potential effects of inequality, differentiating between countries with low and high actual social mobility. We also investigate the relation between fairness perceptions and the demand for redistribution, mediating the impact of fairness on life satisfaction.

We find that persons who believe the income generating process in their society to be fair appear to be happier and demand less income equalization (and redistribution) by the government. We also find strong empirical support for the disappointment effect in countries with unfavorable institutions hampering social mobility, while for countries where institutions facilitate equal investment opportunities and access to markets – thus triggering a close relationship between individual effort and market outcomes – a positive interaction between income inequality and fairness perceptions is only weakly supported. The interaction results are corroborated in smaller samples based on actual mobility through the education system.

Section 2 presents a literature review, and our stylized theoretical model motivating the empirical analysis. From the model we then derive testable hypotheses. Data and methods are described in Section 3, while Section 4 presents the results. The final section concludes and discusses the implications of our findings.

2. Happiness, inequality and fairness: theory

2.1 Preliminary considerations and the literature

In 1944, Austrian economist and social philosopher Friedrich Hayek (1944, 88) argued that "To produce the same results for different people, it is necessary to treat them differently. To give different people the same objective opportunities is not to give them the same subjective

chances." From this it follows, as Hayek suggested, that forcing individuals' outcomes to be identical and 'fair' implies treating people unequally, and, thus, 'unfairly'. The relation between what could be termed 'fairness' or other moral judgments of processes and outcomes and social inequality is therefore far from simple and straightforward.

The treatment of 'utility' in the economics literature, both by the empirical research on happiness as well as standard economic theory, has usually focused on pure outcomes and neglected social comparisons. Yet, individuals do not only derive satisfaction from outcomes, but probably compare themselves to others, and also enjoy 'procedural utility' (Veblen 1899, Fehr and Schmidt, 1999; Frey and Stutzer, 2005). If people gain the impression that processes affecting their own situation are 'fair', they are not only likely to directly derive procedural utility from that fact, but also tend to evaluate the outcomes of these processes differently than if their subjective perception of the process is that it is 'unfair'. For example, most people strongly dislike losing games or sports matches, but the impact of a loss is much stronger if they have the – reasonable or unreasonable – impression that their opponent has not played by the rules. Similarly, Stutzer and Frey (2003) show that two-thirds of the beneficial effects of people's influence in the political decision-making process is not through their impact on resulting policy outcomes, but through the procedural utility gained from participating and civic engagement. Experimental evidence tends to support Hayek's broad argument: Recent economic experiments reveal that inequality in profits is the more tolerated (by otherwise generally inequity-averse individuals) the more the process leading to its generation was perceived as 'fair'. Experimental research has even identified the corresponding neurological process in the reward center of the human brain (see Hopkins, 2008, for a summary).

To sum up, economic experiments show that if the *process* of reaching an outcome has been fair, then subjects in general bear an adverse outcome more easily. In contrast to our study, the set-up of these experiments is fairly simple, allowing actual fairness of the process and perceived fairness of the distribution process to coincide. However, one decisive contribution of our paper is to draw conclusions differentiating between actual and perceived

fairness, which may or may not overlap, reflecting the more complex real-world situations not allowing individuals to objectively observe actual social mobility in their societies.[5]

These theoretical and experimental arguments can be applied to how individuals may evaluate the *distribution of income* in society. Their subjective evaluation of the outcome – the inequality of incomes – is likely to depend on their perceptions of the processes creating the distribution and their evaluations of the fairness of those processes. Such a conjecture has already been made by Alesina et al. (2004) to explain the differential effect of income inequality on happiness of survey respondents in the U.S. compared to those in Western Europe. For a sample of 30 OECD countries in the WVS, Fischer (2009) finds that in a socially mobile society (from the interviewees' points of view) the negative effect of income inequality on well-being is mitigated, if not overcompensated. Likewise, in economic laboratory experiments Mitchell et al. (1993: 636) find that "inequality becomes more acceptable as people are better rewarded for their efforts," which can be interpreted as an indication for a mediating effect of the fairness of the distribution process of 'rewards', i.e., wage incomes, on the relationship between inequality and happiness.

In this paper, we define an income generating process as 'fair' if there is a direct link between own investment in human capital, on-the-job effort and individual economic outcome. The looser this link becomes, i.e., the more the individual outcome depends on chance, the less fair the income generating process is. This would also be the case if income differences were caused mainly by individual differences in innate talent or ability that cannot be compensated by effort. Such initial endowments could also include inherited wealth. On the other hand, if individuals' perceptions of society indicate that 'someone' – either individually or collectively (e.g., through political decision-making) – is responsible for the shape of the income distribution, moral judgments on fairness will arguably come to rest on a different foundation.

Actual (objective) and perceived (subjective) fairness in the income generation process is often not clearly distinguished by the early theoretical and empirical literature on happiness or preferences for redistribution. Most studies implicitly – Alesina et al. (2004)

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[5] Indeed, our model suggests that if perceived fairness is high and actual fairness has a corresponding level, the positive effect of inequality on subjective well-being rises with perceived fairness.

even explicitly – assume that subjectively perceived and objectively existing fairness in society correspond perfectly. However, the empirical happiness analysis for 30 OECD countries by Fischer (2009) suggests that perceived and actual social mobility in society are not necessarily strongly correlated. For this reason, we explicitly differentiate between actual and perceived fairness and put them in a systematic relation. In particular, we hypothesize that whether the happiness effects of income inequality is aggravated or reduced by fairness perceptions for most of the population hinges on whether their perceived and the actual fairness coincide or diverge.

Fairness perceptions can also be argued to diverge according to political convictions: Leftwing parties place more weight on equity of outcomes (so-called 'social justice'), while rightwing governments place more weight on efficiency and equality in opportunities as voters' definitions of fairness differ systematically across parties (Scott et al. 2001). Fundamental differences in fairness perceptions would thus suggest that leftwing voters are sensitive mainly to income inequality, but less to procedural fairness as a determinant of market income (see also the empirical test in Fischer 2009). In contrast, rightwing voters have offsetting efficiency concerns, which lead them to focus more on equality of opportunities, and to accept the resulting income inequality more easily. In a conservative perspective, relatively large income differences might be seen as an indication that individuals who work hard receive their just deserts. Indeed, Alesina et al. (2004) find that left-wing voters are more concerned about income inequality than right-wing or centrist voters, both in Europe and the U.S. We therefore employ the respondent's political ideology as one proxy of her fairness perception.

In the course of this analysis, we predict a negative relation between fairness perceptions and the demand for income redistribution, which we also test against our data. The relation between social mobility (perceptions) and the preference for equal incomes has been analyzed in a couple of previous studies. Ravallion and Lokshin (2000), using Russian micro data, were the first to show that self-assessed *expected own social mobility*, or the belief of being on a rising income trajectory, leads to lower demand for redistribution. Corneo and Gruener (2002) present a 'public values effect' model, concluding that "an individual who

believes in the importance of personal hard work [for income] is expected to oppose redistribution" (ibidem, p.86), preceding the similar arguments in Alesina et al. (2004). In Corneo and Gruener's (2002) logit regressions, run with about 30 countries in various International Social Survey Programme (ISSP) waves on the question 'Government should reduce inequality', both generalized fairness perceptions and perceived *past social mobility* reduce the demand for equalizing incomes.[6] In contrast, persons reporting that 'they would gain [from redistribution]' are in favor of such government policy. Population preferences for and against redistribution are captured by country fixed effects, an approach that we will follow below. A negative relation between personal income and preferences for redistribution is not only shown in Corneo and Gruener (2002), but also by Alesina and La Ferrara (2005). Using US General Social Survey (GSS) data, the latter corroborate the negative relation between perceived equal opportunities, subjective income prospects, income, and a history of past social mobility, with a preference for income redistribution.[7] Exploiting the longitudinal nature of their panel data, Alesina and La Ferrara (2005) construct two objective measures of actual income prospects, at the individual and state level. They find both to be strongly negatively related with individual demand for more equal incomes. Contrasting results are reported in Clark and D'Angelo (2008) for the British Household Panel Survey (BHPS) who identify a positive association between own experienced social mobility ('having higher socio-economic status than parents') and being in favor of having capped incomes, or state-ownership, and being left-wing.[8]

In the following, we develop a simple workhorse model, illustrating the potential impact of income inequality and fairness perceptions on individual well-being.

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[6] Fairness perceptions are measured by the question 'hard work is the key [to success]', while social mobility experience is captured by the variable 'better off than father'.

[7] Preference for redistribution is measured by the question 'Should government reduce income difference between rich and poor?'. Past history of social mobility is measured by 'having a job prestige higher than father's', and subjective income prospects are proxied by 'expect a better life'. Equal opportunities as source of economic success are approximated by the question 'Get ahead: hard work', while unequal opportunities are approximated with the statement 'Get ahead: luck/help'.

[8] This study employs the measure 'The government should place an upper limit on the amount of money that any one person can make', which is not fully comparable to that used in previous empirical analyses.

2.2 The basic set-up of the model

Following, among others, Blanchflower and Oswald (2004), we assume that reported subjective well-being or 'happiness' of an individual i is an increasing function of her actual, directly unobservable utility where ε_i is an error-term:

$$W_i = w(u_i) + \varepsilon_i \tag{1}$$

The error term reflects unobservable differences across individuals, such as different subjective interpretations of the ordinal scale on which individual well-being is reported. This assumption allows us to focus on standard economic utility considerations in the theoretical analysis, i.e., on the underlying economic forces that influence individual welfare.

Our simple workhorse model rests, in a first step, on a standard labor supply decision. Let individuals maximize a standard utility function (henceforth the index i is dropped for notational simplification) where x is private consumption and e is effort invested into gaining the household income, and where $u_x > 0$, $u_{xx} < 0$, $u_e < 0$, $u_{ee} < 0$:

$$u = u(x, e) \tag{2}$$

Individuals face a household budget constraint

$$x = l(1-t)\omega(e, \sigma) + (1-l)T \tag{3}$$

where $l \in \{0,1\}$ reflects labor supply on the extensive margin, and t is a uniform tax rate on labor income $\omega(e, \sigma)$ which in turn depends positively on both effort and an individual ability parameter σ. We assume $\omega_e > 0$, $\omega_\sigma > 0$, $\omega_{e\sigma} > 0$ and $\omega(0, \sigma)=0$. T is a lump-sum transfer that is granted by the welfare state to individuals who do not enter the labor market. It is financed through the revenue from the income tax on labor incomes.

2.3 Individual labor supply decisions

On the intensive margin, individuals need to determine an optimal level of effort that they are willing to invest if they enter the labor market. Assuming for now that their skill parameter σ is exogenously fixed (reflecting, e.g., upbringing, genetically determined intelligence), maximizing the utility function straightforwardly yields (4) as the f.o.c. given *l=1*.

$$\frac{\partial u}{\partial \omega}\frac{\partial \omega}{\partial e}(1-t) = -\frac{\partial u}{\partial e} \tag{4}$$

Given the assumption of standard properties of the utility function, this unambiguously determines an optimal level of effort *e** and it is immediately clear that individuals will increase effort with increasing ability and a decreasing tax rate, since both changes shift their marginal utility from increasing effort upward:

$$e^* = e^*(\sigma, t) \tag{5}$$

Moreover, a second decision has to be made on the extensive margin. Individuals will choose *l=1* iff

$$u((1-t)\omega(e^*,\sigma), e^*) > u(T,0). \tag{6}$$

Given that the left-hand side of the inequality (6) is strictly increasing with σ and strictly decreasing with *t*, we can state that for any strictly positive tax rate generating a positive *T* to be redistributed, there must exist some $\hat{\sigma} > 0$ where $l=0 \forall \sigma \leq \hat{\sigma}$ and $l=1 \forall \sigma > \hat{\sigma}$.

The degree of income inequality does therefore crucially depend on the distribution of the skill parameter σ in the population. Furthermore, it also depends on the tax rate *t* chosen. Increasing the tax rate, and simultaneously increasing the transfer *T*, reduces labor supply both on the extensive and on the intensive margin, which reduces income inequality as long as individuals with sufficiently high ability levels are still working and generating the tax base necessary for redistribution.

Strict economic considerations thus imply that individuals characterized by relatively high skill levels achieve higher utility levels, and are less in favor of redistribution. Our workhorse model in its simplest form thus suggests that we should find a negative relationship between a taste for redistribution and individual well-being in the data. The underlying

economic mechanism is a simple positive income effect. The model also suggests that – on average – better educated people should achieve higher utility levels if their type of education positively influences their income-earning opportunities, because for them the impact of effort on income is more pronounced than for less educated individuals.

2.4 Endogenizing skills

In a second step, the model can be made somewhat more realistic if we account for the fact that individual skills are normally only in part a result of exogenous characteristics (such as genetically determined ability and talent), but are to a large degree determined by the choice of own investment in human capital. Suppose now for simplification that individuals who do not invest in their human capital remain at an unimproved, default skill level $\underline{\sigma} < \hat{\sigma}$. The impact of an investment in skills is, on the other hand, not deterministic – the investment can fail, e.g., because the individual mistakenly invests in skills that eventually do not relate to the skills demanded on the labor market. A different explanation for the uncertainty related to the investment could be that employers eventually look for a combination of personal traits, abilities, and job-related skills, and that individuals with unfavorable, but unalterable personal traits are confronted with the problem that high job-related skills may not overcompensate their adverse personal characteristics.

Suppose that investing an amount $H > 0$ increases the skill parameter with an *objective* probability $\bar{p}$, and with $\sigma_H > 0$ and $\sigma_{HH} < 0$. With a probability *(1-$\bar{p}$)* the investment fails and the individual remains low-skilled. We do, however, allow individuals to have a *subjective* perception p of the probability of success, $\bar{p}$. Expected utility for individuals investing a positive amount H in human capital is then

$$pu(\omega(e^*,\sigma)(1-t)-H,e^*)+(1-p)u(T-H,0) \tag{7}$$

where e^* is now the optimal effort level, given a choice of H and a resulting level of σ. Both are strictly increasing in H if the investment was successful. From the individual perspective, the optimal level H^* that maximizes (7) is strictly increasing in the subjective probability p.

The alternative would be to not invest at all. Setting $H=0$ yields the default utility from transfer incomes with certainty. Comparing both states of the world, we see that the individual will invest into human capital iff

$$pu(\omega(e^*,\sigma)(1-t)-H^*,e^*)+(1-p)u(T-H^*,0) > u(T,0) \qquad (8)$$

An individual is deterred from investing a large amount of resources into human capital by a high tax rate t, but in particular by a low subjective probability p of successfully reaching the higher skill level. Furthermore, we can infer from condition (8) that there must exist some strictly positive threshold level $\hat{p}$ where for every $p < \hat{p}$ individuals do not enter the labor market and find it individually optimal to remain uneducated.

It may still appear as somewhat unconventional from a strict rational expectations point of view to assume a subjective probability p that can differ from its objective counterpart $\bar{p}$. Thus, a short explanation is probably in order. With a sufficiently heterogeneous population, individuals are likely to differ with regard to their personal traits and abilities, only some of which being directly unobservable by third parties. It is then unlikely that observing the success or failure of other individuals' investments in human capital will supply them with sufficient information about their own objective probabilities of being successful themselves. It therefore appears to be reasonable to interpret p as a *subjective, a priori* assessment made by a single individual, and individuals will differ with regard to their expected values of $\bar{p}$.

Having a low p for oneself reflects that one expects the labor market to be relatively rigid for oneself, in the sense that one does not expect it to be likely that one's own and others' investments into human capital will be rewarded by high wage incomes. Even more importantly, such an individual expects that if her investment failed, and if she nevertheless entered the labor market with the default low $\sigma = \underline{\sigma}$, then the elasticity of wages with respect to her own effort would be very low. In this sense, a low p reflects a sense of being excluded from high income earning opportunities. The opposite is true for very high values of p: they reflect an optimistic perspective on upward mobility in the labor market, and an individual's expectation that, ultimately, investing H^* in her stock of human capital and subsequently supplying the effort level e^* is a reasonably safe way to earning high market incomes.

In this sense, in our model the subjective probability p captures subjectively perceived fairness, indicating how close individuals perceive the relationship between human capital investment, effort and market income to be. Given the discussion above, there clearly is a potential for self-fulfilling prophecies. Individuals perceiving the economic framework as unfair, yielding low upwards mobility, invest low amounts of resources, or none at all, in improving their skill level. Accordingly, *ex post* successful, but *ex ante* relatively more pessimistic investors suffer from being relatively less affluent than *ex post* successful individuals who were *ex ante* more optimistic in perceiving their environment as fair.

2.5 Subjective well-being and fairness: testable hypotheses

The theoretical model sketched above allows us to derive some empirically testable hypotheses regarding the interaction of income inequality, fairness perceptions and subjective well-being.

Hypothesis 1. *Individuals who expect $\bar{p}$ to be high (individuals with a high value of p) are more likely to report high levels of subjective well-being than individuals who expect that $\bar{p}$ is low (whose value of p is low).*

Remember that in our model p reflects subjectively perceived fairness of the labor market, i.e., how tightly income, human capital investments and effort are correlated from an individual's point of view. Thus, the individual propensity to actually invest H^* in order to increase the individual skill level also increases with p. Expected life-time utility is therefore, *ceteris paribus*, larger for individuals who believe to be participating in a fairer environment, characterized by a more immediate, and stronger positive relationship between individual effort and individual economic success.

With regard to the individual attitude towards income redistribution and its association with levels of well-being, we can subsequently state

Hypothesis 2. *Individual demand for income redistribution decreases with perceived fairness p, while vice versa the belief that disposable incomes should be distributed more equally is expected to be negatively associated with reported well-being.*

Again, the positive effect of the subjectively assessed *p* on expected individual life-time income (and utility) is mainly responsible. According to our model, if an individual believes $\bar{p}$ to be sufficiently low (i.e., if her *p* is low), she chooses *H*=0* and eventually consumes only a relatively low transfer income. Any increase in transfers (reflected in a resulting decrease in income inequality) would make her relatively more affluent and thereby increase her utility, while the belief in a low $\bar{p}$ by itself is associated with relatively low individual welfare.

Hypothesis 2 hints at a close connection between fairness perceptions and policy preferences: In our model, those who believe the world to be very unfair and who do not participate in the labor market at all unambiguously prefer higher levels of income redistribution, and they do so out of immediate self-interest: Their belief in unfairness has made them less affluent. For the remaining individuals, note that even if they participate, a declining value of *p* reflects an increased perceived risk of failure, in which case, if it realized, they would eventually be forced to live off transfers. Thus, the proposed relationship between fairness perceptions and preferences for redistribution is also found for these individuals.

The effect of *actual* reductions of inequality on utility is a slightly different issue. To see this, remember that $\bar{p}$ is the true value of the probability that human capital investments are successful, which is unknown to individuals at the time of their investment decision *H**. Also, remember from Eq. (8) that $\hat{p}$ denotes the level of perceived fairness where for any $p \geq \hat{p}$ the individual decides to invest, and then enter the labor market and not to live off transfers. Then we can distinguish three types of individuals, depending on the relation between subjective success probability *p*, participation threshold $\hat{p}$, and actual mobility $\bar{p}$:

(i) Individuals with $p < \hat{p} \leq \bar{p}$ choose not to enter the labor market and immediately benefit from higher transfers and a reduction of inequality;

(ii) Individuals with $\hat{p} \leq p < \bar{p}$ enter the labor market and choose *H*>0*, but since the true success probability is underestimated, any increase in perceived fairness would both lead to increased inequality *and* more favorable expected economic outcomes. Thus, we expect a positive interaction between perceived fairness and inequality for these individuals;

(iii) finally, individuals with $p \geq \bar{p} \geq \hat{p}$ invest relatively large amounts *H*>0*, but are also characterized by overoptimism, expressed by an *ex ante* unexpectedly high rate of eventual *ex post* failure, resulting in 'disappointment'. When this third group becomes larger, overall income inequality increases: Both the lucky and the unlucky over-investors fatten the respective tails of the income distribution. Since failure is more pervasive, however, a negative interaction of fairness and income inequality can be expected for this group.

It is difficult to directly observe individual-specific *objective* probabilities of success and failure. We can, however, distinguish between types of countries, namely countries with low or, alternatively, with high social mobility, or institutions granting equal opportunities and facilitating market access, respectively, resulting in a low and a high impact of individual effort on market income, or in the context of our model: $\bar{p}_{LOW} < \bar{p}_{HIGH}$. In countries with sufficiently low actual social mobility, the first two groups become small enough to be dominated by the third group, whose members have a p greater than $\bar{p}$. This is in contrast to the population composition in countries with sufficiently high actual social mobility, where the first two groups dominate the third. Thus, individual over-optimism and strong disappointment is more likely to be a problem of low mobility countries than of countries where the income generating process is indeed very fair. Due to these considerations, we can state

Hypothesis 3. *In countries with low actual social mobility, a negative interaction between fairness perceptions and actual inequality on well-being is expected, while*

for countries with high actual social mobility a positive impact of increasing fairness interacting with increasing inequality on well-being is predicted.

In low-mobility countries, government measures which redistribute incomes – and thereby also reduce inequality – increase the subjective well-being of a relatively large group of individuals who have overinvested due to an unrealistically high fairness perception, and who eventually failed in their effort. The situation is different for high mobility countries. Here, marginally increasing fairness perceptions, and accordingly individual investment levels, allows more favorable equilibria to be realized, where the actual institutional scope for upward mobility ($\bar{p}$) is more fully utilized. Due to *Hypothesis 1*, this should go hand in hand with an increased acceptance of income inequality. With the third group – people over-investing in human capital – dominated by the first two groups in high-mobility countries, we expect income inequality and fairness perceptions to interact positively with respect to their impact on well-being in this group of countries.

As an additional point concerning the disappointment effect experienced *ex post* by the third group of overinvesting individuals, note also that individuals who suffer from failed investments themselves do not need to revise their fairness perception: For any *p<1*, being unsuccessful oneself can still be consistent with a coincidence of overall, societal fairness with personal shortcoming. But in this case, fairness is obviously not a source of welfare; rather personal failure in a fair labor market and the forgone investment of *H** will be a particularly severe source of unhappiness.

3. Data and Method

3.1. Data

In order to empirically test *Hypotheses* 1 to 3, we employ data from the pooled third and fourth waves of the World Values Survey, covering the years 1994-2001 (Inglehart et al., 2004). The availability of reliable and internationally comparable Gini data restricts our choice of WVS data to around the year 1995. We follow the standard approach in the literature by using individuals' responses to the question "All things considered, how satisfied are you with your life as a whole these days?" as proxy for (remembered) utility and the dependent variable for hypotheses 1 and 3. The responses are distributed on a ten-point scale ranging from 1 (completely dissatisfied) to 10 (completely satisfied), with a sample mean of about 6.3.[9] In order to estimate a set of relevant personal characteristics forming the core of individuals' happiness functions, we rely on the robust baseline model in Bjørnskov, Dreher and Fischer (2008). The country-level control variables include only country fixed effects, to avoid biasing the impact of the inequality measure through the choice of macro-controls. At the individual level, we include measures of age, gender, family type, religion, religiosity and spirituality. The baseline model is complemented with a wave dummy and age cohort effects. The empirical models exclude measures of education, income and occupational status that, according to the theoretical model, should fully mediate an individual's subjective success probability *p* (fairness perception). They are, however, included in additional tests further below.

Measures of vertical and horizontal trust (such as confidence in political institutions and trust in other people) do not form part of the baseline model as they may be strongly correlated with perceived fairness and could thus be transmission channels for our variable of main interest.[10] Due to data availability, the baseline sample is reduced to approximately 146,000 respondents from 68 countries; depending on the employed fairness measure, it may

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[9] The WVS includes questions on both life satisfaction and happiness, but the correlation between happiness and satisfaction is surprisingly low (rho = 0.44). We opt for using the life satisfaction question since 1) translation problems seem to yield cross-country comparisons of answers to the other question less comparable and 2) the happiness question is more likely to capture the affective component of subjective well-being rather than its cognitive component.

[10] Note that the inclusion of a measure of horizontal trust does not alter the main results of our analysis (e.g., in Tables 6 and 7), but does reduce the size of the regression samples by between 3000 and 6000 observations.

even be reduced further. The baseline results for the micro-level determinants of subjective well-being (SWB) in the present sample are similar to those in Bjørnskov, Dreher and Fischer (2008) – they are reported in Column 1 of Table A1 in Appendix A, while Appendix B presents descriptive statistics.[11]

Measures of self-report procedural fairness and demand for income redistribution
Individuals' fairness evaluations of income inequality are approximated using definitions of fairness in the income generation process in the labor market. They include measures of social mobility in the labor market, such as, e.g., whether hard work determines economic success. All fairness perception proxies are constructed as dichotomous variables, taking on the value '1' if the respondent believes that procedural fairness is present in society, and '0' if otherwise. These definitions of fairness perceptions have also been employed in previous studies such as Corneo and Gruener (2002) and Alesina and LaFerrara (2005). In addition, we approximate fairness perceptions by employing information on individual political self-positioning on a leftist-conservative scale, arguing that conservative persons favor fairness in the income generation process, while leftist oriented persons are more outcome-oriented. Table 1 provides an overview of the fairness perception measures included in this study.

The demand for income redistribution is measured using three proxies derived from the World Values Survey. These variables, originally recorded on a 10-point or, respectively, a 5-point scale, were aggregated into dichotomous indicators ('1' = pro redistribution) in order to facilitate the empirical analysis in the probit models and, particularly, the interpretation of the results. They resemble the measures of income redistribution through governments employed in Corneo and Gruener (2002) and Alesina and LaFerrara (2005). Table 1 provides on overview of the variables employed and their exact codings.

Insert Table 1 about here

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[11] For a detailed discussion of these results see Bjørnskov, Dreher and Fischer (2008).

Measures of actual social mobility

To test *Hypothesis 3*, perceived social mobility (perceived fairness/equal opportunities) needs to be distinguished from actual social mobility. Unfortunately, cross-nationally comparable social mobility measures are hardly available on a large scale. To exploit the large sample size of up to 68 countries, we suggest using several proxies of actual social mobility. First, we employ the Gastil index of civil liberties (Freedom House 2007) and the Fraser Index of Economic Freedom (Gwartney and Lawson 2008). Second, following Fischer (2009), we employ measures of intergenerational mobility in terms of educational attainment, in particular whether student performance depends on parental background. These direct measures of social mobility are, however, only available for a small subsample of OECD countries.

The rationale for using indices of economic freedom is that social mobility is only possible in an institutional framework that allows for free choice of occupation in a liberalized labor market, easy access to the national credit market (all measured by *area 5* of the Fraser index, ranging from 1 (lowest) to 10 (highest)), a government size not too large, triggering modest taxation of capital and income (captured by *area 1*), a sound monetary policy that does not hamper investment (*area 3*). In addition, legal quality and the protection of property rights (*area 2*) as well as openness to the international goods markets and access to foreign capital (*area 4*) may equally be prerequisites for a socially mobile society and actual procedural fairness in the income generation process. Similarly, the Gastil index of civil liberties (range: 1 (highest) to 7 (lowest)) captures not only freedoms of expression and religion, but also the economically important dimensions of freedom of assembly, association (such as unions and firm cartels), and equal opportunities in education.

To test for the robustness of our results, we employ measures of actual social mobility. We use a measure of educational mobility based on the PISA 2003 Mathematics results, obtained from Fischer (2009) and available for 27 countries in our baseline sample. Educational mobility is the average advantage of having a high-education family background, expressed in test score points. More specifically, it is the average difference between the performance of students with such an advantageous family background compared to average

student performance. The closer this difference is to zero, the more independent is student performance from parental background, and the more socially mobile is a country's education system. Appendix C presents the values of these actual social mobility measures for OECD countries.

Measure of income inequality

The Gini coefficients for testing *Hypothesis 3* are obtained from UNU (2006) and relate roughly to the year 1995.[12] We have chosen to obtain the Gini values from this specific database because the authors undertook special care to use reliable, high-quality income information to calculate the Gini coefficients to ensure its cross-country comparability; non-comparability of Gini coefficients across countries constitutes a severe problem with alternative income inequality information (e.g., from the World Development Indicators database). As the Gini measure refers to a cross-section of countries only, its true effect cannot be identified due to its multicollinearity with the country fixed effects. However, Hypothesis 3 can be tested by interacting our fairness measures with the Gini coefficient. Appendix C displays the values for the 68 countries in the baseline sample.

3.2. Method

Hypothesis 1 predicts a positive association of individual fairness perceptions ($p_i = perceived$ *fairness of individual i*) with individual's life satisfaction. For testing *Hypothesis 1*, we simply add the four fairness perception measures to the baseline happiness model and observe their relations with subjective well-being ($SWB_i = f(fairness_i, M_t ...)$). Vector M_t includes the individual-level control variables, country fixed effects, a wave dummy and cohort effects, as described above. According to the theoretical model, in equilibrium, the effects of fairness perceptions should entirely run through own income, education and occupational status,

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[12] Gini coefficients all are calculated on the basis of gross income or earnings and are thus prior to any redistribution. However, Bergh (2005) shows for 11 OECD countries high quality national statistics systems that the difference between pre-transfer and post-transfer Ginis is not a reliable measure of actual government redistribution.

which we therefore exclude from the vector M_t of the baseline specification. We test whether these variables are transmission channels for our main variables of interest and therefore also report specifications including them.

$$SWB_i = \alpha' \, fairness_i + \beta'M_t + u_i \, . \tag{9}$$

Hypothesis 2 predicts that perceiving the income generation process as fair lowers the demand for income redistribution, while demanding more redistribution itself is predicted to be negatively associated with subjective well-being. In other words, *Hypothesis 2* views equation (9) as reduced function of the chained function ($SWB_i = f\,(RED_i\,(fairness_i\,...)\,...$). We test this hypothesis by, first, estimating a model of demand for income redistribution, with the identical variable of interest and the same set of control variables as in equation (9). The estimated coefficient γ' indicates the effect of fairness perceptions on the probability to be in favor of redistribution:

$$Pr(RED)_i = \gamma' fairness_i \; + \beta'M_t + u_i \, . \tag{10}$$

In a second step, we relate subjective well-being to the demand for redistribution, expecting a negative relation:

$$SWB_i = RED_i \; + \beta'M_t + u_i. \tag{11}$$

To test *Hypothesis 3*, we add the interactions of the responses to one of those fairness perception questions with income inequality in their home country as measured by the Gini coefficient to equation (9).[13]

$$SWB_i = fairness_i + fairness_i * GINI \; + \beta'M_t + u \, . \tag{12}$$

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[13] A potential worry with these data would arise if they simply proxied for individuals' income positions. However, the responses are only weakly associated with individual incomes.

In estimating the model of subjective well-being we follow the previous literature (see, e.g., Bjørnskov, Dreher and Fischer 2008), but employ OLS in which coefficient estimates also represent marginal effects, facilitating the interpretation of the interaction terms. This approach follows Ferrer-i-Carbonell and Frijters (2004), who show that OLS is a feasible estimation procedure for a 10-point categorical happiness variable by employing the 10-category life satisfaction question in the German Socio-Economic Panel, the analogue of which we have obtained from the WVS.

Given the dichotomous nature of the measures of preference for income redistribution, the model of redistributive preferences is estimated as probit model, which greatly facilitates the calculation of the marginal effects (for the probability of reporting a pro-redistributive political statement). Even though the analysis focuses on the direction of (significant) influences of the fairness perceptions estimates, we also discuss their relative quantitative effects.

The next section reports the results.

4. Results

4.1. Some basic correlations

Prior to turning to the multivariate analysis it may be worthwhile to investigate a couple of simple correlations between individual life satisfaction and perceived and objective fairness, or, respectively, social mobility.

Simple correlations between measures of fairness perceptions and individual life satisfaction are rather low or moderate, with coefficient values ranging between roughly 0.05 (hard work) and 0.2 (chance to escape poverty). Correlations with measures of actual social mobility are somewhat larger, for civil liberties (Gastil) and economic freedom (full Fraser index), between 0.23 and 0.26 (in absolute terms). For the subsample of OECD countries, measures of social mobility in terms of educational attainment show correlations similar in size to that of economic freedom, with coefficients for maternal and paternal educational

dependence of 0.20 and 0.22, respectively. Finally, the correlation between income inequality and life satisfaction is positive, but fairly small (0.06).

In general, correlations of roughly 0.4 to 0.6 are achieved when an aggregate measure of happiness in place of individual subjective well-being is employed. Using the mean of life satisfaction in a country, economic freedom shows a correlation of about 0.5 to 0.6, and social mobility in education of about 0.6 – 0.7. Only the Gini coefficients still show a small correlation of 0.14 with country means in life satisfaction, possibly indicating their subsample-specific heterogeneous effect. Employing aggregated individual data on the four fairness perceptions measures, correlations with country means in life satisfaction range from 0.06 to 0.4 and are, for at least two measures (poverty due to laziness and chance to escape poverty), considerably large.

4.2. Testing Hypothesis 1: Fairness perceptions and subjective well-being

Table 2 tests *Hypothesis 1* by including the proxies for perceived fairness to the baseline specification of the well-being model, one-by-one. Overall, Table 2 tests four fairness measures, yielding four model variants. The table displays only the estimation results for the fairness measure and the number of individual observations in the corresponding regression samples; the full model estimations are displayed in the Appendix of this paper (Table A1, columns 2 – 5). The constant in the regressions is in most cases around 8 SWB points (not reported), and the adjusted R^2 ranges between 0.2 and 0.25, depending on the model specification.[14]

First, note the positive signs of the perceived-fairness estimates, indicating that persons with strong fairness perceptions, a high *p*, are indeed happier compared to those who have a different view. As all four fairness estimates are significant at the 1 percent level, the results are clearly in line with *Hypothesis 1*. The quantitative impact of these variables is considerable, with coefficients ranging between 0.22 (hard work) and 0.57 (laziness). Comparing these effects with those of other determinants of subjective well-being as reported

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[14] The constant can be interpreted as the baseline SWB level of the reference group, which, in this specification, has low fairness perceptions, is male, has no children, is religious but not affiliated to a major religion, is divorced or separated from her partner, does not believe in a superior being, and never attends religious service.

in the Appendix (Tables A1 and A2) shows that these effects are comparable with, e.g., taking part in religious service once a month as compared to never (0.22) or being married as compared to being divorced or separated (0.53). According to Table A2 in the Appendix, the largest associations of about half a life satisfaction category are observable for labor market mobility perceptions ('people are poor due to laziness' and 'people have a chance to escape poverty') and 'conservative ideology'. Further investigation shows that these relative differences across fairness perception coefficients are not caused by changes in sample sizes across regressions (not reported). In summary, our empirical results are in line with *Hypothesis* 1, suggesting that persons who perceive the income generation process as fair experience higher levels of subjective well-being.

Insert Table 2 about here

According to the theoretical model above, perceived social mobility should have a positive impact on individual human capital investments, expected life-time earnings and occupational status in equilibrium, with perceived social mobility affecting subjective well-being through these transmission channels. As our next step, we therefore test the same empirical model specification including measures of education, income, and occupational status. Table 3 reports the results and shows analogously to Table 2 that persons who perceive themselves as living in a fair society experience higher levels of subjective well-being. In line with our model, persons with higher income or better education are happier (for full estimation results, again see Appendix Table A2). Comparing the fairness perception estimates across models (Tables 2 and 3), we observe for all four fairness perception measures smaller coefficient sizes in Table 3 – all differences are statistically significant at the 1 percent level. For example, the coefficient on 'people have the chance to escape poverty' is 0.483 in Table 2, but only 0.433 in Table 3. Thus, the SWB effects of fairness and social mobility

perceptions are partly mediated through own human capital investment. This finding is again in line with the theoretical model.

Insert Table 3 about here

4.3. Testing Hypothesis 2: Fairness perception, demand for redistribution, and subjective well-being

Table 4 tests the prediction of *Hypothesis 2* that persons who perceive the income generating process as fair are less favorable towards equalizing the income distribution, most probably through redistribution from the rich to the poor. We estimate probit models for the four fairness perception variables employed in the happiness models (*Hypothesis 1*) with three dichotomous proxies of preference for income redistribution as dependent variables (preference for 'a more equal income distribution', for 'eliminating income inequality', and for 'guaranteeing basic needs', respectively). Due to missing observations in regressors and regressands, not all 12 possible models could be estimated. For the larger samples, we observe values of Pseudo R^2 between 0.05 and 0.08, a reasonable size for comparable probit estimations. Table 4 reports the coefficient estimates, its level of significance and the number of observations in the regression sample.

Almost all regressions in Table 4 suggest that people who perceive the income generating process as fair are less in favor of redistribution through the government. This is observable for the measures 'poverty due to laziness', 'chance to escape poverty' and 'conservative ideology'. Notably, these individual ideology and perceived fairness effects are, given that we employ country fixed effects, independent of 'national' beliefs and political cultures. The marginal effects suggest that the effect of fairness perceptions decreases the probability of demanding government activities by between 3 and 13 percent. Thus, the results are in line with *Hypothesis 2*, suggesting that persons who believe in procedural fairness oppose government redistribution.

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Somewhat astonishing is the increase in the probability of favoring a more equal income distribution expressed by persons who believe that 'hard work brings success in the long run', possibly reflecting a modern version of Weber's hypothesis of a Protestant work ethic.[15] Arguably, 'having success' is multidimensional, whereas 'escaping poverty' is one-dimensionally related to gaining income only. However, as this variable can only be included in model 1, we cannot draw a clear conclusion whether the positive sign is a statistical artefact or indicates a generic relation.

Overall, the results in Table 4 support the prediction of *Hypothesis 2* that perceived social mobility reduces the demand for income redistribution from the rich to the poor.

Insert Table 4 about here

Table 5 tests the second part of *Hypothesis 2*, which predicts a negative relation between a preference for redistribution and individual welfare. This prediction translates into our empirical model based on the WVS that persons with a preference for 'a more equal income distribution', for 'eliminating income inequality', or for 'guaranteeing basic needs' (see Table 4) should report lower levels of subjective well-being. All three columns show that, indeed, persons who demand a more equal income distribution (potentially through government intervention) and guaranteed basic needs for everybody, are less satisfied with their lives compared to those with no such preferences. With coefficient estimates between -0.2 and -0.38, the quantitative effect on subjective well-being is of medium size, comparable to that of 'cohabiting' as opposed to being 'divorced or separated'.

Overall, Tables 4 and 5 present evidence in line with *Hypothesis 2*: We find that those persons who perceive the society they live in as fair are less likely to demand a more equal

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[15] In the traditional Calvinist view and according to their predestination theory, only the efforts of the 'blessed' would yield economic success, in contrast to that by the 'lost souls'. Thus, economic success in 'this world' is perceived by Calvinists as a signal for being chosen to have a good afterlife.

(post-tax and -transfer) income distribution. Furthermore, we also find that those who do demand more equal incomes report lower levels of life satisfaction.

Insert Table 5 about here

4.4. Hypothesis 3: Inequality and fairness perceptions

Hypothesis 3 relates fairness perceptions, actual fairness in society and income inequality to well-being. We test *Hypothesis 3* by interacting the individual fairness perception variables with the Gini coefficient, which measures income inequality at the country level. In order to ease interpretation, the regression samples have been split by actual social mobility at the country level, as reflected by a country's institutions that allow for taking advantage of economic opportunities and a country's actual social mobility. In order to ease the interpretation of the regression results in view of *Hypothesis 3*, we start with a short discussion of the underlying contextual assumptions and the testable predictions.

Empirical evidence suggests that a majority of people do not act upon a precise estimate of how strong actual social mobility in a society is (Fischer 2009). Rather, there appears to be an optimism bias, and a large fraction of individuals believes that they have a relatively good chance of being successful as a result of effort and ambition, even though they may observe institutional rigidities.[16] In principle, we can assume that *ex ante* perceived fairness levels are, on average, quite high, resulting in substantial investments.

In countries with low social mobility, or with labor and capital market rigidities and frictions, even a high individual effort yields high levels of individual economic prosperity only with a low probability. In this type of countries, it is likely that most individuals are of the third type distinguished above (section 2.4). They suffer from an optimism bias manifested in an *ex ante* $p > \bar{p}$, which, in turn, results in systematic overinvestment and large-

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[16] This is an analogy to the observed optimism bias of criminals who believe, despite of well-known considerable objective detection rates, they will not be caught. For more empirical evidence on biases in probability judgments in the population regarding economic outcomes, see, for example, Dohmen et al. (2009).

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scale *ex post* disappointment.[17] The higher people's perceived social mobility (and actual investment levels), the larger their disappointment, and the unhappier they become. This negative relation between SWB and *p* is aggravated by a rise in income inequality: According to the theoretical model, actual increases in inequality and reductions in income equalizing government transfers and taxes have an unambiguously negative effect on utility in countries with sufficiently low social mobility. Furthermore, in such countries we also expect individuals with higher personal fairness beliefs to benefit from increasing equality *ex post*, because the disappointment effect will affect larger portions of the population than in actually fairer countries. Thus, in the low social mobility sample, we should observe a negative interaction between perceived fairness and income inequality, resulting from 'disappointment' due to overinvestment.

For countries with high upward mobility, we theoretically predicted a positive interaction between perceived fairness and inequality on reported individual well-being, due to the fact that individuals from the second group dominate in the population: individuals who have fairness perceptions *p* high enough to invest but still below the optimal level that is determined by actual social mobility, that is $\hat{p} \leq p < \bar{p}$. An increase in fairness perceptions in these countries leads to an increase of *ex post* successful investments in equilibrium. Essentially, in countries with high actual upward mobility, institutional opportunities to earn higher incomes are used to a greater degree if perceived fairness increases. Redistributive taxation, on the other hand, decreases the individually optimal investment and therefore has a counteracting effect. A lower scale of redistributive taxation, and thus a higher degree of actual inequality, should therefore also have a positive impact on well-being in these countries.

Tables 6 and 7 present the estimates for perceived fairness and its interaction with income inequality, the two main variables of interest, in subsamples split by measures of civil liberties and economic opportunities.[18] These measures, that arguably proxy for actual social

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[17] As the explanation to *Hypothesis 3* suggests, even past experiences of failed own investments do not necessarily lead to an updating of fairness perceptions.
[18] The complete model also includes the other micro control variables, country fixed effects, and wave and cohort effects, with results similar to those reported in Table A1 in the Appendix.

mobility, as the Gastil index of civil liberties and the Fraser index of economic freedom. Subindices of the full Fraser index cover aspects of government size, legal quality and protection of property rights, inflation and the domestic financial market, trade openness and access to foreign capital, and labor market regulation and other market rigidities that might hamper entrepreneurial activities. In particular, column 1 employs the Gastil index of civil liberties, while column 2 reports the results for the Full Fraser index. The remaining columns employ subindices of the Fraser index that relate to the five specific areas described above.[19] Supporting the findings of Table 2, in both Tables 6 and 7 there is a positive association between perceived fairness and subjective well-being in most of the models. In the focus of our analysis are the interaction terms between income inequality and perceived fairness. In line with *Hypothesis 3*, we observe the expected disappointment effect in the low economic opportunity sample (Table 6), indicated by the negative (in most cases significant at the ten percent level at least) interaction between GINI and the four fairness perception measures. Given that the GINI coefficient varies between 20 and 60 in the sample, the overall effect of fairness perception remains positive, but is reduced in size as income inequality increases. In contrast to our prediction, in high social mobility countries (Table 7) the interaction effects with income inequality are heterogeneous rather than unequivocally positive. This finding suggests that for some fairness perception measures and measures of economic opportunities, the expected positive interaction may be dominated by a different, negative effect, resulting either in overall insignificance or even a negative sign on the coefficient. We also note that if negative interactions occur, they are smaller in size compared to the corresponding interactions in the low-mobility country sample.

Insert Tables 6 and 7 about here

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[19] For countries with high social mobility (Table 7), there is an insufficient number of observations for the subindices areas 1 and 2, so we cannot estimate these models.

Even though *Hypothesis 3* lets us expect a positive interaction between fairness perceptions and income inequality in high mobility countries, the heterogeneous coefficient estimates in Table 7 are not necessarily contradicting our theoretical model. In countries with high mobility the model also allows for some ambiguity regarding the overall effect of inequality and perceived fairness on well-being. Even in countries with a considerably high mobility we can expect to have some share of overinvestors in the population, who overestimate $\bar{p}$. This group is joined by those individuals who have *ex ante* underestimated, or estimated the correct value of $\bar{p}$, but who have nevertheless realized *ex post* that they have failed. This group of individuals may turn out to be particularly disgruntled and disappointed due to their failed efforts. For them, we do therefore also expect that actual reductions of inequality, which compensate them *ex post* for their *ex ante* unexpected loss, have a positive impact on their reported well-being. We can, however, be certain that the group of individuals who are disappointed *ex post* is smaller in high-mobility countries, relative to the size of the same group of individuals in low-mobility countries. Thus, even if the case occurs that *ex ante* over-optimism is strong enough even in a high-mobility country to produce a negative interaction between increased fairness and increased actual inequality, the size of the effect should be smaller than in a low-mobility country.

4.5 Robustness tests using actual social mobility measures

The model in Tables 6 – 7 and the empirical corroboration of *Hypothesis 3* hinges on the assumption that social mobility, economic opportunities and economic freedom are sufficiently correlated. As additional robustness test, we replicate the analyses using direct measures of educational mobility. These direct measures are available for some OECD countries only, implying the disadvantage that they substantially reduce the sample size.

Table 8 estimates the same model as in Tables 6 and 7 for two country samples split by the degree of intergenerational educational mobility. We employ our measure of actual educational mobility, defined as the educational advantage enjoyed by a person from a high-education family (maternal or paternal education), which is available for a maximum of 27

OECD countries in our baseline sample. The sample is split at -22 and -27 test score points, respectively. Again, we report only those regression results for which at least 10 countries remain in each of the subsamples, resulting in two fairness perception measures ('laziness' and 'conservative'). Columns 1 and 2 present the low educational mobility findings, differentiated by either paternal or maternal family background (correlation coefficient: rho = 0.94); columns 3 and 4 display analogous regressions for countries with a high degree of social mobility.

For all fairness perception measures, the disappointment effect is observable in low mobility countries. Equally in line with *Hypothesis 3*, in the high mobility country sample we observe positive interactions of inequality for mother's educational background, but an insignificant interplay for paternal education level. The latter result corresponds with the finding obtained for measures of economic freedom and is equally in line with our theoretical model. Again, we achieve corroborating results for those fairness perception measures that are similar to those employed in previous empirical studies discussed above (e.g., Corneo and Gruener, 2002, Alesina and LaFerrara, 2005).

Overall, the robustness test using educational mobility measures in Table 8 is well in line with *Hypothesis 3*, with a negative interaction in low mobility countries, and heterogeneous effects in the high mobility country sample.[20]

Insert Table 8 about here

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[20] In our view, it is not a coincidence that the process of industrialization and period of high growth in Europe and the USA (from 1790 on) was preceded by political reforms which abolished the competition-hindering and incentive-incompatible medieval guild system, which fixed production technology, prices for goods and wages for employees, and choice of profession. It is for this reason that we view GDP growth as a potential alternative measure of actual social mobility (correlation (GDP growth, social mobility): 0.4), in line with Hirschman and Rothschild (1973) who argue that in times of rapid economic growth income inequality is interpreted as higher opportunities. Regressions for country sample split by economic growth yield qualitatively identical findings compared to when more direct measures of social mobility are employed (see Appendix Table A3).

To summarize, the empirical analysis clearly is in line with our theoretical hypotheses. Individuals who perceive their society as unfair are less likely to be satisfied with their lives (*Hypothesis 1*), and are more likely to oppose redistributive government activities (*Hypothesis 2*). In low mobility countries, people fare the better, the more redistribution takes place, reflected in reduced income inequality. This effect is enlarged by lower mobility perceptions: the positive effect of living in a fair society on well-being decreases as income inequality rises. In contrast, in high mobility countries, we observe that – given that the disappointment through failed investments is not too large – people are more ready to bear existing income inequalities and disfavor redistribution. Perceiving the income generation process as fair creates an increase in well-being that is rising with income inequality (*Hypothesis 3*). As these findings provide an important qualification to standard assumptions in welfare economics, we proceed to discuss them in the concluding section.

5. Conclusions

The empirical literature on the relation between income inequality and happiness has yielded ambiguous results. The starting point of this paper was that one of the potential reasons for this confusion might be that people evaluate the fairness of the income distribution (distribution process) differently and that such subjective evaluations eventually affect their subjective well-being. Extending the previous literature, we also make the case that inequality assessments hinge on whether social mobility expectations meet actual societal mobility or not.

We illustrate the relationship between inequality and subjective well-being in a small formal model. We assume that individual investments in human capital depend on subjectively perceived probabilities of success that, in turn, reflect fairness perceptions: The higher the probability of success, the closer is the individually perceived connection between individual investment and economic outcomes. We therefore in general expect a positive relationship between perceived fairness and overall well-being, and a negative effect on preference for government redistribution. If *ex ante* fairness perceptions are sufficiently low,

the individual will choose an investment level of zero, and benefit from a reduction of income inequality through taxes and transfers. We also distinguish between systematic over- and underestimation of the actual fairness of the income generating process. Actual fairness is associated with low and high upwards mobility, respectively. We argue that in low mobility countries, actual returns on investment are lower than expected ones, so that increased perceived *ex ante* fairness will lead to reduced well-being due to a disappointment effect, that increases as less income redistribution takes place. In contrast, in high mobility countries, the model predicts a positive interaction of fairness with inequality, because here, a perception of the income generating process as more fair will lead to both higher inequality, but also more favorable economic outcomes on average.

We test this model using combined individual-level data of the pooled third and fourth waves of the World Values Survey (1994-2001), containing about 150'000 interviewed individuals in 69 countries. According to the results, the respondents' believe that income inequality in society is the result of a comparably fair market process makes them considerably more satisfied with their lives, while a demand for more government redistribution to correct the achieved income distribution is negatively associated with happiness. However, differentiating by level of actual social mobility in a country, in countries with fewer economic opportunities we find indirect evidence for a disappointment effect through failed investments, reflected in a negative interplay between income inequality and fairness perceptions, which rises in both fairness perceptions and income inequality, reflecting lesser income-corrective government activities. In contrast, in countries with plenty of economic opportunities and equal chances to success, strong beliefs in fairness interact positively with actual income inequality. Indeed, this finding confirms our theoretical model which predicts that in these countries with high social mobility higher perceived fairness makes individuals invest more and come closer to the point of optimal investment, thus yielding a higher return on investment that would be lowered if government would redistribute market incomes. This positive interaction appears stronger when a measure of actual social and intergenerational mobility in terms of educational attainment is applied rather than when cruder measures of economic freedom are used.

The findings rather clearly reject the standard Lerner argument that more redistribution and less income inequality leads to an increase in welfare of the average person, and thus, in *average* welfare. Instead, the model and the empirical analysis suggest that for broad groups of countries the potential effects of inequality are either neutralized or enlarged through individual fairness perceptions and evaluations, thus making the effect of inequality ambiguous at the aggregate level of society, although, in reality not necessarily for the core constituency of specific governments that actually implement redistribution. As such, our findings may hold implications for both policy and future theorizing on the subject. Obviously, in terms of happiness there may be a substitutive effect between developing institutions permitting fair market competition and social mobility, on the one hand, and redistributive government activities, on the other: the latter are only essential if actual social mobility is low but fairness perceptions are high. As human beings tend to be overly optimistic in general, it would seem to be beneficial to overall welfare to implement policies and institutions that foster competition and allow for equal opportunities and economic freedom. This finding is quite in line with the definition of a just society often brought forward by politically conservative persons, but also be congruent with Hayek's view of a just world. Overall, our results suggest that creating a society with such equal opportunities would be preferred over a paternalistic and overly redistributive state.

References

Alesina, A., R. DiTella and R. MacCulloch, 2004, Inequality and Happiness: Are Europeans and Americans Different? *Journal of Public Economics* 88: 2009-2042.

Alesina, A. and E. La Ferrara, 2005, Preferences for redistribution in the land of opportunities, *Journal of Public Economics* 89: 897-931.

Bergh, A., 2005, On the Counterfactual Problem of Welfare State Research: How Can We Measure Redistribution? *European Sociological Review* 21, 4: 345-357.

Bjørnskov, C., A. Dreher and J.A.V. Fischer, 2008, Cross-country determinants of life satisfaction: Exploring different determinants across groups in society, *Social Choice and Welfare* 30: 119-173.

Blanchflower, D.G. and A.J. Oswald, 2004, Well-Being Over Time in Britain and the USA, *Journal of Public Economics* 88: 1359-1386.

Clark, A.E., P. Frijters and M. Shields, 2008, Relative Income, Happiness, and Utility: An Explanation for the Easterlin and Other Puzzles, *Journal of Economic Literature* 46: 95-144.

Clark, A. and E. D'Angelo, 2008, Upward Social Mobility, Wellbeing and Political Preferences: Evidence from the BHPS, working paper, Paris School of Economics, 17 October 2008.

Corneo, G. and H.P. Gruener, 2002, Individual preferences for political redistribution, *Journal of Public Economics* 83: 83-107.

Diener, E., R.E. Lucas, U. Schimmack and J. Helliwell, 2008, *Well-Being for Public Policy*, Oxford, UK: Oxford University Press.

Dohmen, Th., A. Falk, D. Huffman, F. Marklein and U. Sunde, 2009, Biased Probability Judgment: Evidence of Incidence and Relationship to Economic Outcomes from a Representative Sample, *Journal of Behavioral Organization*, forthcoming.

Fehr, E. and K.M. Schmidt, 1999, A theory of fairness, competition, and cooperation, *Quarterly Journal of Economics* 114: 817-868.

Ferrer-i-Carbonell, A. and P. Frijters, 2004, How Important is Methodology for the Estimates of the Determinants of Happiness? *The Economic Journal* 114: 641–659.

Fischer, J.A.V., 2009, The Welfare Effects of Social Mobility, OECD Social, Employment and Migration Working Papers 93, OECD, Directorate for Employment, Labour and Social Affairs.

Freedom House, 2007, *Freedom in the World Country Ratings*.

Frey, B. and A. Stutzer, 2005, Beyond outcomes: measuring procedural utility, *Oxford Economic Papers* 57: 90-111.

Grosfeld I. and C. Senik, 2009, The emerging aversion to inequality - Evidence from long subjective data, PSE Working Papers 2008-19, PSE (Ecole normale supérieure).

Gwartney, J. and R. Lawson, 2008, *Economic Freedom of the World: 2008 Annual Report.*

Hayek, F.A., 1944, *The Road to Serfdom*, Chicago: University of Chicago Press.

Hopkins, E., 2008, Inequality, Happiness and Relative Concerns: What Actually is their Relationship? *Journal of Economic Inequality* 6: 351-372.

Hirschman, A. and M. Rothschild, 1973, The changing tolerance for income inequality in the course of economic development, *Quarterly Journal of Economics* 87: 544-566.

Inglehart, R., M. Basañez, J. Díez-Medrano, L. Halman and R. Luijkx, 2004, *Human Beliefs and Values*, Ann Arbor: University of Michigan Press.

Layard, R., G. Mayraz and S. Nickell, 2009, Does Relative Income Matter ? Are the Critics Right? CEP Discussion Paper No 918, March 2009.

Lerner, A., 1944, *The economics of control: principles of welfare economics*, New York: MacMillan.

Mitchell, G., P.E. Tetlock, B.A. Mellers and L.D. Ordóñez, 1993, Judgments of social justice: compromises between equality and efficiency, *Journal of Personality and Social Psychology* 65: 629-639.

Ravillion, M. and M. Lokshin, 2000, Who wants to redistribute? The tunnel effect in 1990s Russia, *Journal of Public Economics* 76: 87-104.

Roemer, J.E., 1998, *Theories of distributive justice*, Harvard University Press: 1998.

Scott, J.T., R.E. Matland, P.A. Michelbach and B.H. Bornstein, 2001, Just deserts: an experimental study of distributive justice norms, *American Journal of Political Science* 45: 74-767.

Stutzer, A., and B.S. Frey, 2003, Institutions Matter for Procedural Utility: An Economic Study of the Impact of Political Participation Possibilities, in: R. Mudambi et al. (eds.), *Economic Welfare, International Business and Global Institutional Change*, Edward Elgar, Cheltenham, 81-99.

UNU, 2006, World income inequality database v2.0. Helsinki: United Nations University-World Institute for Development Economics Research.

Veblen, T., 1899, *The Theory of the Leisure Class*, New York: MacMillan.

Veenhoven, R., 2000, The four qualities of life: Ordering concepts and measures of the good life, *Journal of Happiness Studies* 1: 1-39.

Table 1: Measures of fairness perceptions and income redistribution

Variable name	Definition
Fairness in the education system and the labor market	
Hard work	Dummy that is 'one' for values below 5 on the question 'In the long run, hard work usually brings success' (which has a 10-point scale)
Laziness	Dummy that is 'one' for individuals claiming 'People are living in need because of laziness or lack of willpower' and 'zero' when answering 'People are living in need because of injustice in society'
Chance	Dummy that is 'one' for individuals claiming that 'people have a chance to escape poverty'. (alternative: 'they have little chance')
General meritocratic worldview	
Conservative	Dummy that is 'one' for values above or equal to 7 on a 10-point scale measuring conservative political ideology
Demand for income redistribution	
More equal incomes	Dummy that is 'one' for values below 5 on the question "Incomes should be more equal" (which has a 10-point scale)
Elimination	Dummy that is 'one' for values 1 and 2 on a 5-point scale measuring the 'importance of eliminating big income inequalities' (ranging from 'very important' to 'not at all important').
Basic needs	Dummy that is 'one' for values 1 and 2 on a 5-point scale measuring the 'importance to guaranteeing basic needs' (ranging from 'very important' to 'not at all important').

Table 2: Relations between happiness and fairness perceptions

	(1)	(2)	(3)	(4)
Hard work brings success in the long run	0.224***			
number of observations	60730			
People are poor due to laziness		0.570***		
number of observations		62920		
People have chance to escape poverty			0.483***	
number of observations			59383	
Conservative ideology				0.411***
number of observations				146752
Income, education, occupational status	no	no	no	no
Other micro controls included	yes	yes	yes	yes
Country fixed effects included	yes	yes	yes	yes

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. All models include the baseline micro-variables, wave, cohort and country effects (not reported). Income, education and occupational status are excluded from the model. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Table 3: Relations between happiness and fairness perceptions – testing the transmission channels

	(1)	(2)	(3)	(4)
hard work brings success in the long run	0.212***			
number of observations	60730			
people are poor due to laziness		0.501***		
number of observations		62920		
people have chance to escape poverty			0.433***	
number of observations			59383	
conservative ideology				0.363***
number of observations				146752
Income, education, occupational status	yes	yes	yes	yes
Baseline micro controls included	yes	yes	yes	yes
Country fixed effects included	yes	yes	yes	yes

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. All models include the baseline micro-variables, wave, cohort and country effects (not reported). Income, education and occupational status are included. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Table 4: Fairness perceptions and the demand for income redistribution

	(1) Incomes should be more equal	(2) importance to eliminate income inequality	(3) importance of guaranteeing basic needs
hard work brings success in the long run	0.097***		
	[8.44]		
marginal effect	0.035		
number of observations	59325		
Pseudo R2	0.0521		
people are poor due to laziness, not injustice	-0.230***	-0.311***	-0.249***
	[20.79]	[18.83]	[10.92]
marginal effect	-0.082	-0.110	-0.034
number of observations	74588	28814	29114
Pseudo R2	0.0574	0.0792	0.063
people have chance to escape poverty	-0.147***		
	[11.95]		
marginal effect	-0.052		
number of observations	57822		
Pseudo R2	0.0505		
conservative ideology	-0.217***	-0.360***	-0.224***
	[23.68]	[19.69]	[9.43]
marginal effect	-0.075	-0.134	-0.034
number of observations	128917	34193	34610
Pseudo R2	0.07	0.0847	0.0633
Country fixed effects included	yes	yes	yes
Income, education, occupational status	no	no	no
Baseline micro controls included	yes	yes	yes

Notes: Probit estimations. Dependent variable is a dichotomous measure of preference for income redistribution. All models include other micro controls such as gender, age, family type, marital status, religion, religiosity, spirituality, cohort effects, country fixed effects and a wave dummy. Excluded from the model are measures of education, income, and occupational status. Missing regressions are due to insufficient sample sizes. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Table 5: Subjective well-being and the demand for redistribution

	(1)	(2)	(3)
Importance to eliminate income inequality	-0.338***		
	[6.40]		
Incomes should be more equal		-0.380***	
		[26.86]	
Importance to guaranteeing basic needs			-0.177***
			[4.19]
baseline micro controls included	yes	yes	yes
income, education, occupational status	no	no	no
country fixed effects included	yes	yes	yes
number of observations	34193	128917	34610
Adjusted R-squared	0.24	0.22	0.24

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. All models include the baseline micro-variables, wave, cohort and country effects (not reported). Excluded from the model are measures of education, income, and occupational status. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Table 6: Analysis by low social mobility through little economic opportunities

	(1) Civil liberties low	(2) Fraser full index < 6.3	(3) government size large area 1	(4) legal quality low area 2	(5) inflation high area 3	(6) openness low area 4	(7) new business difficult area 5
Hard work * GINI	-0.001	-0.005**	-0.007	-0.002	-0.004*	-0.004	-0.003
	[0.33]	[2.03]	[0.88]	[0.70]	[1.73]	[1.46]	[0.79]
Hardwork	0.221*	0.424***	0.493**	0.290***	0.403***	0.361***	0.348***
	[1.72]	[4.26]	[2.18]	[2.61]	[4.26]	[3.49]	[2.98]
Observations	28613	28037	20722	29630	33111	27768	22566
Chance * GINI	-0.004	-0.016***	0.015*	-0.017***	-0.015***	-0.015***	-0.014***
	[1.44]	[7.13]	[1.77]	[6.66]	[6.83]	[6.23]	[4.71]
Chance	0.718***	1.114***	0.142	1.144***	1.090***	1.025***	1.013***
	[5.73]	[11.61]	[0.56]	[10.27]	[11.58]	[9.97]	[9.14]
Observations	30488	29914	20127	30373	34941	28540	23551
Laziness * GINI	-0.009***	-0.008***	-0.007	-0.013***	-0.009***	-0.008***	-0.015***
	[2.91]	[3.36]	[1.08]	[5.29]	[4.01]	[3.26]	[5.46]
Laziness	0.938***	0.900***	0.683***	1.085***	0.968***	0.839***	1.075***
	[7.57]	[9.66]	[3.51]	[10.80]	[10.37]	[8.78]	[10.94]
Observations	35191	35810	36686	38145	37779	35407	36027
Conservative * GINI	-0.008***	-0.010***	-0.012***	-0.010***	-0.011***	-0.010***	-0.016***
	[2.99]	[4.77]	[2.87]	[4.75]	[4.98]	[5.04]	[7.45]
Conservative	0.732***	0.871***	0.792***	0.867***	0.911***	0.840***	1.033***
	[6.83]	[10.15]	[6.12]	[9.55]	[10.01]	[9.94]	[12.09]
Observations	67018	62055	47160	73857	57237	70405	65921

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. All models include the baseline micro-variables, wave, cohort and country effects (not reported). Excluded from the models are measures of education, income, and occupational status. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Table 7: Analysis by high social mobility through good economic opportunities

	(1)	(2)	(3)	(4)	(5)
	Civil liberties high	Fraser full index > 6.2	inflation low area 3	openness high area 4	new business easy area 5
Hard work * GINI	-0.005**	0.001	0.001	-0.001	-0.005*
	[2.03]	[0.21]	[0.33]	[0.17]	[1.74]
Hardwork	0.438***	0.253**	0.22	0.315***	0.436***
	[4.98]	[1.98]	[1.57]	[2.60]	[3.82]
Observations	31355	21319	16245	21588	26790
Chance * GINI	-0.013***	0.007**	0.005	0	-0.006**
	[5.78]	[2.03]	[1.15]	[0.07]	[2.10]
Chance	0.929***	0.097	0.165	0.486***	0.620***
	[9.77]	[0.64]	[1.00]	[3.60]	[4.90]
Observations	28161	18535	13508	19909	24898
Laziness * GINI	-0.002	-0.002	-0.007**	-0.004	0.011***
	[0.80]	[0.71]	[2.38]	[1.24]	[4.84]
Laziness	0.508***	0.407***	0.573***	0.515***	-0.03
	[7.04]	[4.37]	[5.54]	[5.31]	[0.34]
Observations	49436	38220	36251	38623	38003
Conservative * GINI	-0.004**	-0.004*	-0.004**	-0.002	0.004**
	[2.32]	[1.86]	[2.12]	[0.87]	[2.00]
Conservative	0.527***	0.454***	0.468***	0.440***	0.218***
	[8.20]	[5.84]	[6.13]	[5.21]	[2.82]
Observations	78967	68787	73605	60437	64921

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. All models include the baseline micro-variables, wave, cohort and country effects (not reported). Excluded from the model are measures of education, income, and occupational status. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively. For area 1 and 2, the number of observations was too low.

Table 8: Educational mobility, fairness perceptions and income inequality

	(1) Low mobility father	(2) Low mobility mother	(3) High mobility father	(4) High mobility mother
Laziness	1.084***	1.131***	0.024	0.001
	[7.72]	[7.73]	[0.14]	[0.01]
Laziness * GINI	-0.022***	-0.023***	0.007	0.008*
	[5.15]	[5.21]	[1.49]	[1.75]
Number of observations	22903	19951	13248	16200
Number of countries	14	13	10	11
Conservative	0.734***	0.833***	0.083	0.008
	[5.58]	[6.08]	[0.61]	[0.07]
Conservative * GINI	-0.009**	-0.011***	0.004	0.006*
	[2.37]	[2.89]	[1.12]	[1.73]
Number of observations	34835	30812	20180	24203
Number of countries	14	13	12	13

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. All models include the baseline micro-variables, wave, cohort and country effects (not reported). Excluded from the model are measures of education, income, and occupational status. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Appendix A: Full results

Table A1: baseline model; fairness perceptions and life satisfaction

	(1)	(2)	(3)	(4)	(5)
age	-0.141***	-0.143***	-0.139***	-0.143***	-0.139***
	[9.03]	[5.88]	[6.81]	[5.84]	[8.90]
age^2/100	0.251***	0.246***	0.236***	0.242***	0.246***
	[7.48]	[4.69]	[5.43]	[4.56]	[7.33]
age^3/1000	-0.133***	-0.122***	-0.122***	-0.120***	-0.130***
	[6.20]	[3.59]	[4.42]	[3.52]	[6.08]
male	-0.044***	0.003	0.004	-0.01	-0.063***
	[3.11]	[0.15]	[0.20]	[0.46]	[4.46]
buddhist	0.185**	0.538***	0.375***	0.510***	0.164**
	[2.53]	[4.87]	[3.31]	[4.45]	[2.25]
muslim	-0.126**	0.054	-0.201***	0.063	-0.123**
	[2.43]	[0.67]	[2.72]	[0.76]	[2.37]
catholic	0.011	0.183***	-0.007	0.183***	0.003
	[0.26]	[2.87]	[0.13]	[2.85]	[0.08]
protestant	0.170***	0.312***	0.117**	0.318***	0.159***
	[3.81]	[4.76]	[2.09]	[4.77]	[3.56]
orthodox	-0.335***	-0.212***	-0.381***	-0.205***	-0.315***
	[6.47]	[2.84]	[6.04]	[2.72]	[6.10]
other Christian denomination	-0.049	0.550***	0.234**	0.534***	-0.05
	[0.70]	[4.50]	[2.41]	[4.46]	[0.71]
no denomination	-0.001	0.171***	0.005	0.189***	0.002
	[0.03]	[2.62]	[0.09]	[2.87]	[0.03]
jewish	-0.077	0.146	0.002	0.153	-0.058
	[0.61]	[0.80]	[0.01]	[0.83]	[0.47]
hindu	0.249***	0.481***	0.288***	0.498***	0.248***
	[3.39]	[4.33]	[2.65]	[4.40]	[3.39]
single female	0.194***	0.178***	0.220***	0.162***	0.164***
	[6.45]	[3.68]	[5.62]	[3.34]	[5.48]
single male	0.184***	0.202***	0.167***	0.199***	0.153***
	[5.92]	[3.98]	[4.05]	[3.93]	[4.94]
married	0.706***	0.744***	0.727***	0.725***	0.689***
	[36.39]	[24.56]	[30.40]	[23.72]	[35.56]
cohabiting	0.300***	0.322***	0.325***	0.364***	0.274***
	[8.81]	[6.42]	[7.19]	[7.38]	[8.05]
has had 1 child	-0.147***	-0.127***	-0.081***	-0.131***	-0.163***

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	(1)	(2)	(3)	(4)	(5)
	[6.19]	[3.53]	[2.66]	[3.64]	[6.90]
has had 2 children	-0.120***	-0.129***	-0.032	-0.117***	-0.135***
	[5.19]	[3.70]	[1.09]	[3.32]	[5.85]
has had 3 or more children	-0.174***	-0.131***	-0.085***	-0.123***	-0.188***
	[7.32]	[3.62]	[2.75]	[3.37]	[7.92]
service part: > once a week	0.479***	0.519***	0.507***	0.478***	0.447***
	[18.34]	[12.02]	[13.67]	[10.96]	[17.18]
service part: once a week	0.282***	0.315***	0.300***	0.269***	0.249***
	[12.30]	[8.52]	[9.87]	[7.26]	[10.85]
service part: one a month	0.185***	0.227***	0.247***	0.167***	0.164***
	[7.44]	[5.98]	[7.84]	[4.41]	[6.61]
service part: on common holy days	0.195***	0.170***	0.186***	0.145***	0.178***
	[8.87]	[5.14]	[6.74]	[4.33]	[8.08]
service part: on specific holy days	0.300***	0	0.321***	0	0.291***
	[5.94]	[.]	[5.85]	[.]	[5.77]
service part: once a year	0.104***	0.157***	0.126***	0.126***	0.092***
	[3.96]	[4.13]	[3.92]	[3.29]	[3.51]
service part: less than once a year	-0.01	0.001	0.01	-0.033	-0.015
	[0.39]	[0.03]	[0.32]	[0.91]	[0.64]
believes in superior being	0.044**	0.112***	0.096***	0.148***	0.021
	[2.36]	[3.83]	[4.13]	[4.95]	[1.13]
hard work brings success in the long run		0.224***			
		[11.65]			
people are poor due to laziness, not injustice			0.501***		
			[29.39]		
people have chance to escape poverty				0.483***	
				[23.69]	
Conservative ideology					0.411***
					[27.89]
Constant	8.126***	4.226***	5.030***	4.432***	7.959***
	[33.52]	[11.43]	[15.26]	[11.91]	[32.91]
Country fixed effects, wave fixed effects, age cohorts	Yes	Yes	Yes	Yes	Yes
Number of observations	146752	60730	85343	59383	146752
Adjusted R-squared	0.22	0.23	0.25	0.26	0.23

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Table A2: fairness perceptions, income, education, occupational status and life satisfaction

	(1)	(2)	(3)	(4)
Age	-0.150***	-0.150***	-0.158***	-0.161***
	[6.13]	[6.22]	[6.40]	[10.23]
Age squared/100	0.263***	0.262***	0.274***	0.291***
	[4.98]	[5.05]	[5.14]	[8.62]
Age to the power of three/1000	-0.127***	-0.134***	-0.136***	-0.153***
	[3.75]	[4.03]	[3.96]	[7.14]
male	-0.013	-0.01	-0.016	-0.047***
	[0.57]	[0.44]	[0.69]	[3.09]
buddhist	0.407***	0.274**	0.380***	0.072
	[3.76]	[2.36]	[3.38]	[1.01]
muslim	0.117	-0.035	0.125	-0.081
	[1.47]	[0.43]	[1.55]	[1.59]
catholic	0.061	-0.065	0.076	-0.103**
	[0.98]	[1.02]	[1.20]	[2.40]
protestant	0.188***	0.047	0.205***	0.043
	[2.93]	[0.71]	[3.13]	[0.97]
orthodox	-0.272***	-0.431***	-0.262***	-0.371***
	[3.73]	[5.87]	[3.54]	[7.33]
other Christian denomination	0.400***	0.280**	0.408***	-0.068
	[3.34]	[2.43]	[3.46]	[1.00]
no denomination	0.049	-0.052	0.074	-0.105**
	[0.76]	[0.80]	[1.14]	[2.38]
jewish	-0.093	-0.002	-0.058	-0.266**
	[0.52]	[0.01]	[0.32]	[2.16]
hindu	0.402***	0.282**	0.422***	0.176**
	[3.69]	[2.50]	[3.80]	[2.45]
Income level 1	ref. cat.			
Income level 2	0.176***	0.257***	0.213***	0.176***
	[4.52]	[6.71]	[5.43]	[6.75]
Income level 3	0.371***	0.433***	0.365***	0.355***
	[9.39]	[11.05]	[9.06]	[13.64]
Income level 4	0.563***	0.614***	0.559***	0.597***
	[13.76]	[15.39]	[13.65]	[22.55]
Income level 5	0.708***	0.755***	0.728***	0.758***
	[16.80]	[17.99]	[16.85]	[27.51]
Income level 6	0.831***	0.820***	0.786***	0.872***
	[18.30]	[18.39]	[17.23]	[29.64]
Income level 7	0.971***	0.988***	0.960***	1.028***
	[20.32]	[20.59]	[19.62]	[32.98]
Income level 8	1.114***	1.052***	1.044***	1.105***
	[21.59]	[20.48]	[20.10]	[32.69]

Income level 9	1.206***	1.188***	1.176***	1.173***
	[21.30]	[20.46]	[20.08]	[31.17]
Income level 10 (highest)	1.386***	1.303***	1.292***	1.284***
	[23.54]	[22.05]	[21.97]	[32.60]
no income information	0.692***	0.698***	0.660***	0.762***
	[16.40]	[16.64]	[15.15]	[27.75]
no education /incomplete primary education	ref. cat.			
completed primary education	0.337***	0.320***	0.352***	0.157***
	[8.19]	[8.09]	[8.45]	[6.37]
incomplete sec., techn.	0.369***	0.328***	0.353***	0.240***
	[7.93]	[7.22]	[7.42]	[8.50]
complete sec., techn.	0.538***	0.489***	0.539***	0.280***
	[12.93]	[11.86]	[12.69]	[10.86]
incomplete sec., uni prep.	0.359***	0.390***	0.371***	0.269***
	[7.70]	[8.86]	[8.04]	[9.54]
complete sec., uni prep.	0.584***	0.520***	0.570***	0.360***
	[13.48]	[12.44]	[13.04]	[13.67]
lower-level tertiary edu.	0.533***	0.528***	0.524***	0.386***
	[10.33]	[10.45]	[10.12]	[12.25]
upper-level tertiary edu.	0.764***	0.702***	0.735***	0.503***
	[17.37]	[16.27]	[16.64]	[18.23]
education missing	0.524***	0.383***	0.519***	0.327***
	[4.01]	[3.77]	[3.92]	[5.97]
divorced or separated	ref. cat.			
single female	0.059	0.099**	0.06	0.054*
	[1.23]	[2.13]	[1.25]	[1.81]
single male	0.115**	0.116**	0.126**	0.044
	[2.29]	[2.38]	[2.53]	[1.42]
married	0.535***	0.541***	0.533***	0.465***
	[17.69]	[18.40]	[17.47]	[23.99]
cohabiting	0.252***	0.309***	0.323***	0.192***
	[5.11]	[6.35]	[6.66]	[5.73]
has had no child	ref.cat.			
has had 1 child	-0.093***	-0.091**	-0.095***	-0.139***
	[2.63]	[2.57]	[2.67]	[5.98]
has had 2 children	-0.093***	-0.031	-0.079**	-0.113***
	[2.71]	[0.91]	[2.29]	[4.98]
has had 3 or more children	-0.001	0.012	0.01	-0.080***
	[0.02]	[0.34]	[0.28]	[3.43]
employed	ref.cat.			
self-employed	0.047	0.015	0.038	0.005
	[1.33]	[0.44]	[1.08]	[0.22]
housewife	0.079**	0.089***	0.105***	0.121***
	[2.27]	[2.61]	[3.00]	[5.54]

	(1)	(2)	(3)	(4)
retired	-0.091**	-0.147***	-0.083**	-0.151***
	[2.32]	[3.85]	[2.09]	[5.87]
other	0.009	-0.043	-0.011	-0.119**
	[0.13]	[0.63]	[0.15]	[2.57]
student	0.115**	0.094**	0.081*	-0.043
	[2.52]	[2.09]	[1.76]	[1.51]
unemployed	-0.536***	-0.537***	-0.504***	-0.601***
	[15.42]	[15.85]	[14.60]	[27.36]
service part: > once a week	0.509***	0.480***	0.479***	0.448***
	[12.01]	[11.56]	[11.17]	[17.52]
service part: once a week	0.302***	0.293***	0.263***	0.247***
	[8.32]	[8.29]	[7.24]	[10.97]
service part: one a month	0.221***	0.218***	0.166***	0.160***
	[5.95]	[5.95]	[4.44]	[6.60]
service part: on common holy days	0.157***	0.156***	0.140***	0.164***
	[4.85]	[4.82]	[4.26]	[7.59]
service part: on specific holy days	.	0.388***	.	0.294***
	.	[3.56]	.	[5.93]
service part: once a year	0.135***	0.113***	0.111***	0.074***
	[3.61]	[3.04]	[2.95]	[2.89]
service part: less than once a year	0.018	-0.004	-0.020	-0.008
	[0.51]	[0.12]	[0.57]	[0.33]
service part: never	ref.cat.			
believes in superior being	0.164***	0.191***	0.193***	0.063***
	[5.71]	[6.72]	[6.56]	[3.41]
hard work brings success in the long run	0.212***			
	[11.22]			
people are poor due to laziness		0.501***		
		[23.39]		
people have chance to escape poverty			0.433***	
			[21.59]	
conservative ideology				0.363***
				[25.10]
Constant	3.066***	3.479***	3.389***	7.177***
	[8.13]	[9.15]	[8.92]	[29.01]
Country fixed effects	yes	yes	yes	yes
Wave dummy, cohort effects	yes	yes	yes	yes
Number of observations	60730	62920	59383	146752
Adjusted R-squared	0.26	0.28	0.28	0.26

Notes: The specification of this model is based on Bjørnskov, Dreher and Fischer (2008).

Table A3: Economic Growth, fairness perceptions and income inequality

	(1) 10-year growth high	(2) 30-year growth high	(3) high & stable 10-year growth	(4) 10-year growth low	(5) 30-year growth low	(6) low or unstable 10-year growth
Hard work	0.464***	0.201	0.238	0.359***	0.400***	0.416***
Hard work * GINI	-0.005	0.002	0.001	-0.003	-0.005**	-0.005**
Observations	24178	18886	17392	28500	41844	35286
Laziness	0.156	0.423***	0.386***	0.806***	0.761***	0.784***
Laziness * GINI	0.007**	-0.003	-0.001	-0.008***	-0.004*	-0.006***
Observations	30277	37003	28895	46091	48340	47473
Chance	0.183	0.480***	0.472***	1.147***	1.019***	1.017***
Chance * GINI	0.009**	-0.002	-0.001	-0.017***	-0.012***	-0.013***
Observations	22269	21278	15657	29437	38105	36049
Conservative	0.144	0.478***	0.085	0.787***	0.752***	0.861***
Conservative * GINI	0.008***	-0.004*	0.008**	-0.010***	-0.007***	-0.010***
Observations	49700	68328	46378	73649	78424	76971

Notes: OLS estimation. Dependent variable is life satisfaction measured on a 10-point scale. All models include the baseline micro-variables, wave, cohort and country effects (not reported). Excluded from the model are measures of education, income, and occupational status. *, **, *** denote significances at the 10, 5 and 1 percent level, respectively.

Appendix B: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Life satisfaction	150793	6.36	2.59	1	10
age	150466	41.16	16.19	15	101
age^2/100	150466	19.56	15.01	2.25	102.01
age^3/1000	150466	10.44	11.74	0.34	103.03
male	150793	0.48	0.50	0	1
buddhist	150793	0.01	0.11	0	1
muslim	150793	0.15	0.36	0	1
catholic	150793	0.32	0.47	0	1
protestant	150793	0.13	0.34	0	1
orthodox	150793	0.09	0.28	0	1
other Christian denomination	150793	0.02	0.14	0	1
no religious affiliation	150793	0.22	0.41	0	1
jewish	150793	0.01	0.10	0	1
hindu	150793	0.02	0.16	0	1
age category 25-34	150466	0.24	0.42	0	1
age category 35-44	150466	0.21	0.41	0	1
age category 45-54	150466	0.16	0.36	0	1
age category 55-64	150466	0.12	0.32	0	1
age category > 65 Jahre	150466	0.11	0.31	0	1
income category 2	150793	0.13	0.33	0	1
income category 3	150793	0.13	0.34	0	1
income category 4	150793	0.13	0.34	0	1
income category 5	150793	0.11	0.31	0	1
income category 6	150793	0.09	0.28	0	1
income category 7	150793	0.07	0.26	0	1
income category 8	150793	0.05	0.22	0	1
income category 9	150793	0.04	0.19	0	1
income category 10	150793	0.04	0.18	0	1
income missing	150793	0.13	0.34	0	1
completed primary education	150793	0.15	0.36	0	1
incomplete secondary edu., technical	150793	0.09	0.29	0	1
complete secondary edu., technical	150793	0.17	0.38	0	1
incomplete secondary edu., university prep.	150793	0.10	0.29	0	1
complete secondary edu., university prep.	150793	0.16	0.36	0	1
lower-level tertiary education	150793	0.07	0.26	0	1
upper-level tertiary education	150793	0.13	0.34	0	1
education missing	150793	0.02	0.15	0	1
single female	150793	0.11	0.31	0	1
single male	150793	0.13	0.34	0	1
married	150793	0.57	0.50	0	1
cohabiting	150793	0.05	0.21	0	1
has had 1 child	150793	0.15	0.36	0	1
has had 2 children	150793	0.27	0.44	0	1
has had 3 children	150793	0.27	0.45	0	1

Self-employed	150793	0.09	0.28	0	1
housewife	150793	0.13	0.34	0	1
retired	150793	0.14	0.35	0	1
other occupational status	150793	0.02	0.13	0	1
student	150793	0.07	0.26	0	1
unemployed	150793	0.09	0.29	0	1
service part.: > once a week	147044	0.12	0.33	0	1
service part.: once a week	147044	0.19	0.39	0	1
service part.: one a month	147044	0.12	0.32	0	1
service part.: on common holy days	147044	0.16	0.37	0	1
service part.: on specific holy days	147044	0.02	0.13	0	1
service part.: once a year	147044	0.08	0.27	0	1
service part.: less than once a year	147044	0.10	0.29	0	1
believes in superior being	150793	0.76	0.42	0	1
hard work brings success in the long run	61716	0.54	0.50	0	1
people are poor due to laziness, not injustice	86498	0.33	0.47	0	1
people have chance to escape poverty	60278	0.39	0.49	0	1
conservative ideology	150793	0.23	0.42	0	1
GINI	150793	37.77	10.33	21.5	63.43
civil liberties (Gastil)	150015	3.14	1.42	1	6
Fraser index of economic freedom	134641	6.33	1.21	3.45	8.65
area 1 (Fraser)	134641	5.48	1.68	1.8	8.6
area 2 (Fraser)	134641	6.25	1.91	2.8	9.6
area 3 (Fraser)	134641	6.90	2.71	0	9.8
area 4 (Fraser)	134641	7.08	1.22	3.2	9.3
area 5 (Fraser)	134641	5.91	1.12	3.2	8.8
educational mobility (maternal)	56024	-24.27	19.19	-57.74	20.14
educational mobility (paternal)	56024	-29.79	21.51	-63.91	11.26

Appendix C: Descriptive Statistics, income inequality and educational mobility

Country	GINI	educational mobility (mother)	educational mobility (father)
Albania	28.02		
Algeria	45.33		
Argentina	47.6		
Armenia	48.6		
Australia	41.7	-28.88	-35.44
Austria	30.5	-11.69	-6.6
Azerbaijan	50.1		
Bangladesh	28.3		
Belarus	30.4		
Belgium	28.5	-31.7	-28.29
Bosnia and Herzegovina	32.7		
Brazil	59.6		
Bulgaria	24.5		
Canada	27.6	-21.03	-23.05
Chile	57.9		
Colombia	51.3		
Croatia	33.4		
Czech Republic	26.6	-54.27	-61.98
Denmark	33.2	-24.94	-40.95
Dominican Republic	49		
Egypt	38.6		
El Salvador	50.8		
Estonia	37.6		
Finland	26.1	-16.97	-21.09
France	25.6	-16.5	-19.02
Georgia	38.9		
Germany	30	-21.28	-29.72
Greece	35.2	-20.6	-15.9
Hungary	27.9	-57.74	-63.91
India	32		
Indonesia	38.29		
Ireland	34.6	-19.18	-23.84
Italy	32.2	-1.28	3.26
Japan	35	-28.49	-33.87
Jordan	47.26		
Latvia	27		
Lithuania	33.6		
Macedonia	28.2		
Mexico	50.3	20.14	11.07
Moldova	34.4		
Netherlands	29.4	-32.6	-28.56
New Zealand	40.2	-13.26	-32.25
Nigeria	41.2		

Norway	33.3	-27.37	-23.16
Pakistan	37.8		
Peru	44.9		
Philippines	45		
Poland	33.1	-53.94	-55.1
Portugal	35.6	-1.7	11.26
Russia	30.5		
Singapore	39		
Slovak Republic	21.5	-48.59	-62.22
Slovenia	28.2		
South Africa	62.3		
South Korea	33.6		
Spain	25.9	-25.07	-27.14
Sweden	32.4	-2.59	-2.48
Switzerland	33.1	2.41	-8.71
Taiwan	30.78		
Tanzania	44.7		
Turkey	44.1	-34.85	-50.23
Uganda	47.38		
Ukraine	25.7		
United Kingdom	32.4		
United States	37.9	-28.86	-34.53
Uruguay	44.8		
Venezuela	53.8		
Zimbabwe	63.43		

Notes: Based on the regression sample in Table 3 with the largest sample possible, adding conservative ideology as measure of fairness perceptions.