Trust, welfare states and income equality: Sorting out the causality

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ABSTRACT

The cross-country correlation between social trust and income equality is well documented, but few studies examine the direction of causality. We show theoretically that by facilitating cooperation, trust may lead to more equal outcomes, while the feedback from inequality to trust is ambiguous. Using a structural equation model estimated on a large country sample, we find that trust has a positive effect on both market and net income equality. Larger welfare states lead to higher net equality but neither net income equality nor welfare state size seems to have a causal effect on trust. We conclude that while trust facilitates welfare state policies that may reduce net inequality, this decrease in inequality does not increase trust.

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1. Introduction

The cross-country correlation between social trust and national income equality is well documented, but few studies examine the direction of causality. It is often assumed that inequality leads to lower trust (Alesina and la Ferrara, 2002; Uslaner, 2002; Delhey and Newton, 2005; Bjørnskov, 2007, 2008), but the theoretical mechanisms involved are still subject to debate (as shown in overviews by Jordahl, 2008 and Nannestad, 2008), as are those between inequality and economic development (e.g. de Dominics et al., 2008).

A mechanism supporting a causal link from trust to equality is suggested by findings in Bergh and Bjørnskov (2011) and Bjørnskov and Svendsen (2013), which show that historical trust levels explain current welfare state size. If larger welfare states lead to an increase in income equality, trust may impact equality through an expansion of the welfare state. Moreover, if the correlation between equality and trust indicates that equality causally increases trust, positive feed-back dynamics may take place, such that equality increases trust, and trust facilitates the implementation of welfare state redistribution, further fostering equality. Such dynamics are even more likely if universal welfare state policies have a positive effect on trust, as suggested by Barr (2004) and Kumlin and Rothstein (2005). On the other hand, if the cross-country correlation between income equality and social trust is driven only by the fact that deeply rooted trust levels explain both trust today and the degree of welfare state redistribution, there is no feed-back dynamic from redistributive welfare state policies to trust.

The possible causal relations are illustrated in Fig. 1, where full arrows show causal relations argued for in previous literature. This paper investigates the causality between trust and equality, and the potential role of welfare state policies as mediators of the causal associations. We do so by exploring two central questions, not dealt with before. First, do welfare states have an independent effect

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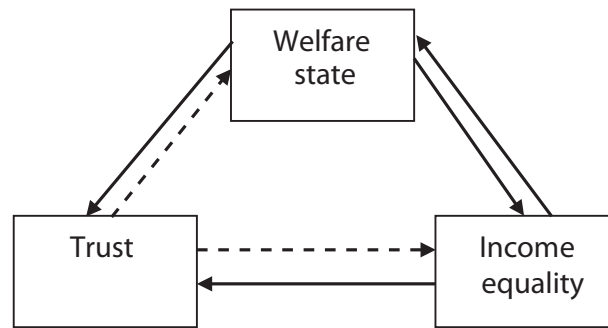
Fig. 1. The correlations between welfare state size, social trust and income equality.

on income equality, or is the correlation between welfare state size and income equality spurious, in the sense that trust explains both welfare state size and income equality? Second, if welfare states do increase equality of income, does this further increase trust, suggesting positive feedback dynamics?

Departing from a standard cooperation game, we show that the overall type of cooperation facilitated by trust and trustworthiness will under plausible circumstances increase equality. We then estimate structural equation models that account for potential feedback effects between income equality and social trust. The results document a two-way causal relation between market (pre-redistribution) income inequality and social trust, but no feedback from net inequality to trust. Furthermore, the effect from trust to inequality is substantially stronger than the feedback. Our findings thus suggest that welfare state policies do increase equality in disposable income but do not increase trust.

We start the paper by discussing potential theoretical links between social trust and inequality. In Section 3, we describe our empirical strategy to sort out the causal directions. Section 4 describes the data used in Section 5 to estimate the relation. Section 6 discusses our findings and concludes.

2. Links between social trust, cooperation and inequality

From a game-theoretic perspective, human interaction can be modeled as a number of repeated games of various types, as suggested by Binmore and Samuelson (1994). Some situations are best represented by zero-sum games, others by positive-sum games while problems such as rent-seeking are best represented by negative-sum games. In some cases, interactions take place among people who know each other and are likely to meet again, in other situations people interact with strangers that they are unlikely to meet again. As noted by many authors, trust and trustworthiness are beneficial for society precisely because they help groups reach cooperative outcomes in positive-sum games.[1] This holds for interactions in pairs, such as two people trading with each other, but also for large-N social dilemmas. In psychological research, the attitude of trust has long been viewed as beneficial for cooperation by helping to solve the conflict between one's own interest and the interest of the others (Dawes, 1980). Pruitt and Kimmel (1977: 375) noted that trust can be viewed as "the expectation of cooperation". More recently, experimental evidence has shown that high-trusting individuals are more cooperative in social dilemmas (De Cremer and Stouten, 2003; Sønderskov, 2011).

As argued by Rothstein (2001), the welfare state can be seen as a large scale social dilemma, explaining why trust and trustworthiness are central for understanding the sustainability of the welfare state. For example, there are potential efficiency gains from cooperation deriving from social insurance arrangements in the welfare state, as emphasized by for example Barr (2004). Trust and trustworthiness help sustain and protect these social insurance arrangements against free riding.[2] From this perspective, it is not surprising that Bergh and Bjørnskov (2011) have demonstrated that more trusting populations are able to sustain larger welfare states. The welfare state may thus be seen as a mediator in the link from trust to equality.

At a broader level, Arrow (1972) noted that the vast majority of commercial transactions require an element of trust. Yet, when delivering homogenous goods in personal business transactions, social trust may not be relevant. Knack and Keefer (1997) define 'trust-sensitive transactions' as a class of transactions in which there is limited immediate monitorability. For example, when trading heterogeneous goods, sellers will need to trust that the quality of the goods delivered by a number of often anonymous agents is up to the contracted standard.

Likewise, in the public sphere, Dahl (1971) stressed that people need to trust one another if they are to associate together in the achievement of those objectives, which they cannot gain by their own individual action. For example, most bureaucratic transactions are anonymous and thus likely to be sensitive to trust differences, as are assessments of political actions and politicians (Bjørnskov, 2010).

Summing up, there is consensus that cooperation resulting from trust and trustworthiness helps societies make efficient use of their resources. Yet, although previous research focused on explaining cooperation, there has been little analytical work on the distributional consequences of trust-aided cooperation. A simple analytical framework for investigating such issues is provided below.

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[1] See, among many others, Knack and Keefer (1997), La Porta et al. (1997), Putnam (1993), Schelling (1960), and Svendsen and Svendsen (2008).

[2] Cf. Fong et al. (2006). Trust and trustworthiness are important not only for the formal social insurance systems of modern welfare states, but also for more informal sharing arrangements. For example, Zhang et al. (2006) demonstrate how trust aids the implementation of community based health insurance in rural China.

Table 1
Outcomes in a standard prisoner's dilemma game.

	Cooperate	Defect
Cooperate	α,α	$0,\beta$
Defect	$\beta,0$	γ,γ

2.1. Cooperation and distribution

Theoretical analyses of trust and cooperation typically use the prisoner's dilemma, described in Table 1. The classic example is Axelrod (1984). The outcome α is the reward for cooperation, β is the temptation pay-off and γ is the payoff when agents fail to cooperate. The pay-offs are normalized so that the outcome for cooperating when the other agent does not (the 'sucker payoff') is 0. The game has proven extremely useful for analyzing the evolution of cooperation, but it says little about whether societies where agents cooperate more often will be more or less equal compared to less cooperating societies. In the standard prisoner's dilemma it is typically implicitly assumed that the gains from cooperation are shared equally, and the same holds when agents fail to cooperate. As a result, inequality among two agents in a prisoner's dilemma game arises only when one cooperates and the other defects.

In most real-life applications of positive-sum games, the gains from cooperation can, however, be distributed in many ways. Consider, for example, Arrow's (1972) example: a trade transaction. This is a positive-sum game because both the seller and the buyer are potentially better off if the transaction takes place, and the transaction is clearly facilitated by trust. But whenever the buyer's maximum willingness to pay exceeds the sellers' minimum acceptance price, there are several prices that would make them both better off. Thus, a successful transaction requires not only that the buyer and seller are sufficiently trusting and trustworthy, but also that they succeed in coordinating on the distribution of the surplus.

As a consequence, when the purpose is to analyze distributional aspects, positive-sum games are better illustrated graphically. An example is provided in Fig. 2, where point 1 is the initial (unequal) allocation, which will remain the outcome should both agents defect. Point 2 may be the outcome when the game is sequential, agent B initially trusts A completely, only to find that A defects and leaves B worse off compared to the initial allocation.[3] Point 3 is the outcome when agents share the gains from cooperation equally, as indicated by the dotted line passing through points 1 and 3. However, all distributions illustrated by the shaded area are equalizing, such that the majority of possible distributions of the gains to (non-constrained) cooperation are equalizing, given that the transaction takes place.

In real-life situations where agents are not constrained to choosing among fixed outcomes, but must actually agree on the distribution of the surplus, the norm of equal division is salient. It can easily be shown that whenever there is some initial inequality between agents A and B, sharing the gains from cooperation equally is a sufficient (but not necessary) condition for equality to increase as a result of the successful cooperation.

To see this, denote the initial allocation by (γ_A, γ_B) and the outcome when agents cooperate by (α_A, α_B). With some imagination, the initial allocation (γ_A, γ_B) can be interpreted as the Hobbesian state of nature, where agents will end up should they fail to cooperate. Unless agents are identical, $\gamma_A = \gamma_B$ is unlikely.[4] Inequality can be analyzed by comparing the ratio $\frac{\alpha_A}{\alpha_B}$ to $\frac{\gamma_A}{\gamma_B}$, and cooperation is equalizing precisely when $\frac{\max(\alpha_A,\alpha_B)}{\min(\alpha_A,\alpha_B)} < \frac{\max(\gamma_A,\gamma_B)}{\min(\gamma_A,\gamma_B)}$.

Equalizing cooperation entails that the players share the gains from cooperation such that the final allocation is more equal than the initial allocation. In Fig. 2, the shaded area marks all allocations that are Pareto improvements over the initial allocation (point 1) that are also more equal than point 1. Clearly, equal sharing of the gains from cooperation is not a necessary condition for cooperation to be equalizing.[5]

In political philosophy there are numerous normative accounts of how the gains from cooperation should be shared, including the maxi–min solution attributed to Rawls (1971), the utilitarian solution (Harsanyi, 1955), the Nash bargaining solution (Nash, 1950) and the Kalai and Smorodinsky (1975) bargaining solution advocated by Gauthier (1987). When the utility possibility set is symmetric and convex, these different approaches lead to the same outcome: sharing the gains from cooperation equally between agents (Roemer, 1996). Sharing the gains from cooperation equally can thus be understood as a focal point of distributive justice.[6] Discussing the evidence of a positive relationship between market exchange and fair-minded, cooperative behavior, Ensminger (2004) noted that a simple fairness norm (such as equal division) may help people coordinate with other anonymous individuals on the market (cf. Young, 1993). Experimental research suggests that cooperation is indeed often equalizing, and that the gains are often shared equality. For example, Hennig-Schmidt (2002) documents bargaining discussions in experimental settings similar to the one shown in Fig. 2, and finds that two points are repeatedly used and described by the subjects as fair: the allocation that equalizes

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[3] In experimental research this possibility is often analyzed using the trust-game introduced by Berg, et al. (1995) where the agents are thought of as an investor and a trustee.

[4] At least two simple assumptions seem more appropriate. One is that in the absence of cooperation resources are distributed in proportion to some individual ability that differs between agent 1 and agent 2. In a primitive society, this ability may be physical strength, as in the "jungle equilibrium" analyzed by Piccione and Rubinstein (2007). A second possibility is that, in the absence of cooperation, a conflict arises where the stronger agent takes all resources, leaving the other one with nothing.

[5] A general characterization of the conditions under which cooperation is equalizing may well prove to be a fruitful theoretical exercise.

[6] The focal property of equal division is widely known, as discussed for example by Binmore (1994) and Skyrms (1996).
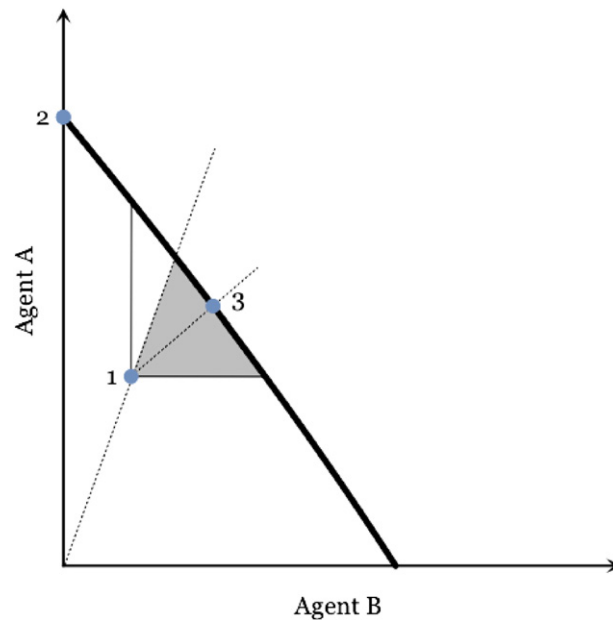
Fig. 2. A positive-sum game illustrated.

outcomes and the allocation that shares the gains from cooperation equally.[7] Similarly, Ciriolo (2007) re-analyzes results from experimental trust games that have been interpreted as trust and reciprocity to show that agents often simply share the gains from participating in the experiment equally. Henrich et al. (2001) also show that people from very different cultures, with few exceptions, tend to choose equal distributions in trust and public goods experiments.

So far, we have considered a game between two agents and examined the distribution by comparing the distribution between the interacting agents in the case of mutual defection to the cooperative outcome. A number of extensions must be made before we can infer anything about how trust and cooperation affect the income distribution in society from the model.

First of all, the model described has only two agents, while many real-life strategic interactions involve more than two agents. The logic of equalizing cooperation described above still applies, even if the inherent information problems multiply. If there are N agents, and the gains from cooperation g are distributed equally, initial inequality will decrease as g/N is added to all payoffs (unless initial inequality is 0 and nothing will change).

Second, the effect of cooperation on distribution cannot be analyzed only by looking at those agents who successfully cooperate. Equalizing cooperation between two or more agents may still increase the income difference between those who successfully cooperate with each other and those who do not. Furthermore, even if mutual cooperation entails higher equality than mutual defection, the effect of cooperation in society on equality will depend on the matching procedure: when cooperation is present but not universal, cooperators risk being paired with defectors, typically assumed to result in a very unequal payoff distribution.[8]

In all, the arguments above point to an inverse-U relationship between the degree of cooperation and inequality in society similar to the original Kuznets curve (Kuznets, 1955). From a state of universal defection, equalizing cooperation among a few will lead to smaller relative differences among those who cooperate, but to higher inequality in society as a whole. In addition, inequality will increase as some cooperators end up being defected upon. As the degree of cooperation increases, inequality will start falling and eventually fall below the level in a society with no cooperation, as shown in Fig. 3.

2.2. Feedbacks from equality to trust?

Given the relationship between cooperation and inequality shown in Fig. 3, it is hard for agents to infer much about the trustworthiness of others from the degree of inequality. An agent who sees inequality increase because a trusting individual is being defected upon is likely to become less trusting. Seeing inequality increase because several trustworthy individuals successfully cooperate with each other more likely has the opposite effect.[9]

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[7] It should be noted that in the experimental literature, there is typically no reference to the level of effort subjects make. While there are several suggestions that gains should be shared in proportion to effort among philosophers, the situation becomes difficult to control when effort is not observable. In the present context, it should however be noted that the utility possibility frontier is drawn given optimal effort responses: if A takes everything, B will probably not exert any effort, and A is left with what she can produce on her own.

[8] If some mechanism (such as reputation or signaling) implies that cooperators are able to identify each other and avoid interacting with defectors, the impact of defections on inequality will be smaller.

[9] To fully explore these mechanisms, the matching mechanism must be modeled. The more likely a cooperator is to meet another cooperator, the more likely it is that increasing incomes are the result of mutual cooperation.
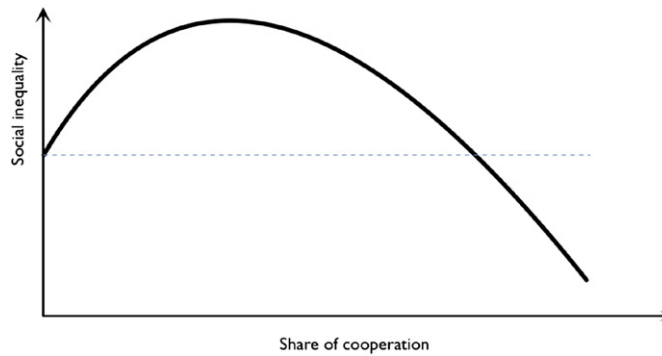
Fig. 3. Social inequality and the share of cooperation.

Recent experimental evidence supports the complexity of the inequality–trust relationship. Greiner et al. (2012) find that trust is initially higher but decreases faster when trust games start with equal endowments. In a treatment with unequal endowments, trust is initially lower but more robust over time. Brülhart and Usunier (2012) find no effect on trust when making the trustee poorer than the first mover. Anderson et al. (2006) find only small and non-systematic effects of inequality in initial endowments on trusting behavior, while Sadrieh and Verbon (2006) find no systematic effect of inequality on cooperation in a public good game. To sum up, Greiner et al. (2012: 355) seem right in concluding that "both the level and the (exogenous or endogenous) source of inequality matters for the dynamics of trust".

A key question is if the equality created by the welfare state is likely to feed back into trust. Despite the seeming consensus in the literature, a theoretically informed answer to this question must remain ambiguous. Kumlin and Rothstein (2005) propose an impartiality argument according to which the impartiality of universal welfare states will lead people to infer that most people can be trusted. On the other hand, larger and more universal welfare states provide more opportunities for free-riding on publicly financed goods and benefits, and people may believe that such temptations make us less trustworthy (see Buchanan, 1975; Coate, 1995; Lindbeck, 1995). For both these mechanisms, the key factor is the size and structure of the welfare state.

Another possible mechanism is that low income earners may have more to gain from defection when inequality is high, as noted by Gustavsson and Jordahl (2008). As a result, high income earners may worry more about crime and social unrest when inequality is high.[10]

Finally, we have already noted that in highly trusting societies, inequality will increase as a result of non-trustworthiness in private interactions, when people take advantage of others' trust.[11] In a welfare state, such opportunistic behavior will primarily affect the market income distribution, as welfare state policies mitigate the effect on inequality of net income. Thus, at least for the net income distribution, welfare state redistribution may distort the signal value on trustworthiness contained in the income distribution, making it harder to distinguish defectors from the trusting and trustworthy.

2.3. Hypotheses regarding trust, inequality and welfare state size

Based on the reasoning above, we now formulate the following hypotheses for empirical testing:

H1. Countries with higher trust levels will have larger welfare states and lower net income inequality.

H2. Countries with higher trust levels will have lower market inequality as well as net inequality also when controlling for welfare state size.

Importantly, these two hypotheses do not exclude the possibility of a feedback from inequality to trust. On the contrary, the links reviewed suggest that

H3. Market inequality decreases trust, given a sufficient signal, while for net inequality theoretical expectations are ambiguous.

While the first half of H1 has been tested in several recent studies (Bergh and Bjørnskov, 2011; Bjørnskov and Svendsen, 2013; Pitlik and Kouba, 2014), we next turn to the remaining hypotheses.

3. Identifying causality using a structural equation model

To test general hypotheses as formulated above, one could in principle consider a number of approaches. An immediately intuitive choice would be to employ the temporal dynamics of the two main series and explore their cointegration characteristics. However, as

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[10] This theory predicts that social trust would correlate negatively with wealth within a country. It is worth noting, however, that in the vast majority of countries, high income earners tend to be relatively more trusting.

[11] For example, by billing large companies small amounts of money for services they have never used and hoping that these bills will be paid automatically by trusting accountants.
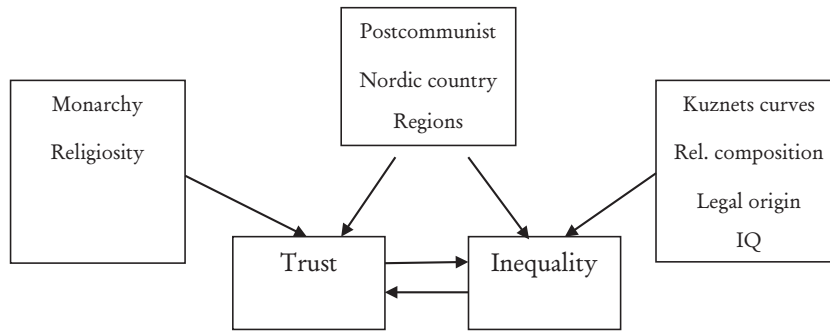
Fig. 4. The empirical system.

demonstrated in several studies, trust scores are remarkably stable over time (Uslaner, 2002, 2008; Bjørnskov, 2007).[12] As income inequality is also known to be persistent over time, we are thus faced with a situation in which what is identifiable must be a set of long-run equilibrium relations of variables that are not changed overnight.

A natural alternative choice therefore is to employ a structural equation model, where the long-run equilibrium determinants of trust and inequality are estimated simultaneously, allowing for a varying degree of endogeneity. Fig. 4 outlines the overall model that we estimate by Eqs. (1) and (2).

$$TR = \alpha_1 + \beta_1 X + \gamma_1 Y + \lambda_1 I + \varepsilon_1 \tag{1}$$

$$I = \alpha_2 + \beta_2 X + \gamma_2 Z + \lambda_2 TR + \varepsilon_2. \tag{2}$$

The validity of our approach rests on the assumption that there are vectors of variables (Y and Z) specific to either part of the system that are properly exogenous, i.e. factors that affect trust (TR), but not inequality (I), and vice versa. Our approach also necessarily rests on sufficiently strong identification of both parts. As such, the structural approach is in principle similar to two linked instrumental variable estimates with the specific variables in Y and Z as instruments. It is nevertheless more flexible than standard instrumental estimators by allowing explicitly for two-way causality and covariance of the error terms.

To infer exogenous variation in inequality (Z-variables), we use a standard Kuznets curve (GDP per capita and its squared term), a political Kuznets curve (the degree of democracy and its squared term), a set of dummy variables capturing variations in religious affiliation, and a control for common law countries (i.e., countries with some form of British heritage). Finally, we include IQ scores as proxies for educational quality to control for inequality arising from skills-based technological progress.[13]

Similarly, exogenous variation in trust is inferred using a dummy variable for monarchies and a measure of religiosity (Y-variables). We include religiosity following Berggren and Bjørnskov (2011) while monarchy is included based on previous research in Bjørnskov (2007, 2010) and Robbins (2012). Variables common to both inequality and trust, i.e. our X-vector, are two dummies for postcommunist countries that are both less trusting and more equal, and for Nordic countries, that have large welfare states, and are substantially more trusting, all other things being equal. We include a Nordic dummy as most recent studies find that trust levels in these countries are substantially higher than in the rest of the world, regardless of whether one controls for inequality and the size of the welfare state. Since the Nordic countries also have particularly low levels of net income inequality, not taking these differences into account would by construction reinforce what might merely be the appearance of a link between inequality and trust.

The system of Eqs. (1) and (2) is estimated simultaneously with the predicted values for trust as an independent variable when explaining inequality, and predicted inequality values to explain trust. This allows us to identify either a two-way causality, or a one-way causality in either direction. The causal relation from trust to welfare state size has been demonstrated in previous studies (Bergh and Bjørnskov, 2011; Bjørnskov and Svendsen, 2013) and we therefore do not model welfare state size explicitly, but only treat it as a potentially moderating variable in the following.

However, while this type of modeling may be more flexible than standard two-stage least squares, it obviously rests to an equal extent on having variables specific to one equation that are exogenous to the residual of the other equation. We have therefore used separate two-stage least squares regressions to test the exclusion restrictions of the structural system. We find no evidence of overidentification problems with the excluded variables in either part of the system. As we note that the goodness-of-fit statistics also reveal that both parts are properly predicted and that specific variables hold sufficient predictive power, we are unlikely to suffer from underidentification problems. Sargan–Hansen tests also are likely to pick up significant collinearity between specific variables

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[12] As the event studies from German reunification in, e.g., Boenisch and Schneider (2013) and the September 11 attacks on the World Trade Center in New York in Shaleva (2013) show, even major events seem not to affect social trust significantly.

[13] See Johnson (1997) and Lemieux (2006) for discussions of skills-biased progress. Jones and Potrafke (2014) show that average IQ and other intelligence-based measures correlate substantially more with institutional measures than more traditional indicators of educational attainment or enrollment. In an earlier version of the paper, we showed that IQ provides significantly better identification than, e.g., secondary school completion rates.

and inequality, which implies that our specification does not prevent us from identifying particular causal effects. These statistics are consistently insignificant with p-values above .5.[14]

A potential problem might be that a substantial part of the identification occurs as a difference between rich, middle-income and very poor countries, for which redistributive policies are not a real option. This problem would make measures of net and market inequality almost identical in part of our sample, which would prevent proper identification of the likely effects of redistributive policy that is captured through the difference between net and market measures. We therefore report all main results in a reduced sample covering 89 countries in which we only keep countries with a GDP per capita above 2000 USD while results in the full 104-country sample are reported in an Appendix A.

4. Data

Measuring income inequality and social trust both represent potential problems. Inequality in particular is measured in a variety of ways, and estimated from surveys and other information of varying quality and coverage, as collected for example in the Deininger and Squire (1996) database. To be properly comparable, the large variety of measures therefore needs to be standardized.

We use data from the standardized world income inequality database by Solt (2009), who categorizes income inequality calculated from different types of income measures into 21 categories. He thereafter estimates all differences between these inequality measures, thereby obtaining a large set of ratios. These ratios are then used to yield predictions in other categories of inequality, generated through multilevel modeling. The final measures of market and net income inequality therefore take advantage not only of all available information, but also of the quality of that information. The result is a large database of Ginis that are as comparable as practically possible, given the available information from each country and each year.

This provides us with a large dataset from which we take the average of all available measures of net and market income inequality, respectively, between 2002 and 2006.[15] Our dataset with full information on all main variables includes 104 countries, spanning the globe and all levels of economic and political development.

In order to test the associations between inequality and social trust, we use data from a number of sources. First, we follow the literature by employing what has become the standard measure of social trust over the last decade: the percent of a population that answers yes to the question "In general, do you think most people can be trusted?" In our full sample of 104 countries, this measure varies between a low of 3.4% in Cape Verde and a high of 68.1% in Denmark; the other Scandinavian welfare states, Norway and Sweden, have only marginally lower trust scores. The full sample average is 25.3%, putting into perspective how high the Nordic trust scores are. We draw these data from the five waves of the World Values Survey (2010), combined with data from the AfroBarometer, Asian Barometer, East Asian Barometer, LatinoBarometro, and the Arab Barometer.[16]

Despite criticism, the trust measure in general does well in various validity tests and is remarkably stable over time.[17] Although the question may seem unclear and imprecise, it correlates strongly with return rates in wallet-drop experiments, which capture the honesty of people in a situation that is unobservable to formal institutions (see Knack and Keefer, 1997). In-depth interviews and extended surveys show that this simple question measures respondents' trust in strangers, while their trust in individuals they know or have specific information on is a quite different and approximately orthogonal concept, as discussed by Bjørnskov (2007), Naef and Schupp (2009) and Uslaner (2002). Nannestad (2008: 419) also emphasizes that "respondents do not in general seem to find the generalized trust question difficult," as only roughly five percent of respondents in developed countries do not or cannot respond to the question. Recent evidence furthermore indicates that trust questions do well in explaining observed behavior in experiments. Actual trusting behavior in ultimatum games, trust games and public goods games correlates with respondents' answers to the trust question, although perhaps primarily in situations in which the stakes are of economic significance (Cox et al., 2009; Sapienza et al., 2013). Yet, one exception is Holm and Danielson's (2005) study of trust in Sweden and Tanzania, which suggests that the trust question may be a rather noisy measure in the least developed countries.

As for control variables, we keep the trust specification rather minimalistic in line with Nannestad (2008) who stresses that only a few variables have proved to be robustly associated with trust. We predict social trust by dummies for post-communist countries, constitutional monarchies and the Nordic countries, and the Gallup (2009) measure of the salience and intensity of religiosity, following recent work in Berggren and Bjørnskov (2011). To this simple specification, we add one of the two measures of inequality.

As determinants of inequality, we first of all include variables controlling for two types of Kuznets curves. We include the logarithm to GDP per capita, measured in PPP adjusted US dollars, as well as its squared term; data are from Heston et al. (2009). This effectively controls for the traditional Kuznets curve, which states that inequality is increasing in economic development at low levels of development, due to sectorally unbalanced growth, while it will be decreasing in development from some level, as other sectors and political redistribution outweigh the initial effects (Kuznets, 1955). Second, we also add the more recent explanation of a political Kuznets curve (cf., Chong, 2004). The rationale is that with increasing democratic influence, larger groups in society will become politically influential and thus be able to tweak redistributive policies in their favor. At some point, the electorate becomes sufficiently representative of the entire population that further democratic development will cause a more even distribution of incomes, as the electorate

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[14] The full 2SLS estimates are available from the authors upon request.

[15] Net inequality is here used for inequality post-taxes and transfers, and market inequality refers to gross inequality (pre-taxes and transfers).

[16] The trust dataset is thus identical to that used in Berggren and Bjørnskov (2011).

[17] The examples of obviously non-stationary trust scores since the early 1980s include the much-discussed declines in the USA and the UK (though this drop only occurs in the World Values Survey but not in the contemporaneous British Social Attitudes Survey), and also positive trends in Denmark and Uruguay. Trust is trendless in most other countries (Bjørnskov, 2007; Uslaner, 2008). We therefore use the average of all available observations.

will demand redistributive policies benefitting the median household. As such, the subsequent inclusion of poorer groups of voters in politics gives rise to a non-linear version of Director's Law (Stigler, 1970).

A number of other potential explanations need inclusion. We add further variables capturing common law systems (i.e., Anglo-Saxon cultural backgrounds), religious affiliations, and intelligence quotients that proxy for the quality of education and hence skill-bias explanations of income inequality, and dummies for postcommunist and Nordic countries that for obvious reasons may be different. We also include a set of regional dummies capturing differences between Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa; the comparison group is thus countries belonging to the Western political Hemisphere.

Finally, we consider welfare state characteristics as potential moderators of the trust–inequality association. To capture the relevant factors, we employ three variables in subsequent analysis. Government final consumption expenditures (percent of GDP) measure the provision of publicly provided goods and services (Heston et al., 2009); government full expenditures capture the full activities of the government sector including both public consumption and transfers (CIA, 2010), i.e. all redistributive effort; and transfers and subsidies (percent of GDP) from Gwartney et al. (2010) more directly capture redistributive policy such as social transfers.

In a set of robustness tests, we include further control variables informed by the literature: ethnic diversity, measured as one minus the Herfindahl–Hirschman index of ethnicity (Alesina et al., 2003), the absence of corruption from Transparency International (2010), urban population (percent of total) and population density from the World Bank (2010), coup intensity (coups per decade, from Marshall and Marshall, 2009), and trade volumes as percent of GDP from Heston et al. (2009).

5. Results

As a first impression, Figs. 5 and 6 provide scatter plots of the inequality–trust association, measured by market and net inequality, respectively. Both figures depict the clear negative association identified in the literature, although they also exhibit one particular feature: while the Nordic welfare states have some of the lowest levels of net inequality, market inequality, i.e. pre-transfer and pre-tax inequality, is not particularly low in these countries. It is this regularity that has caused some of the special attention to these countries and, more generally, to the universal welfare state. Yet, the record Nordic trust levels could be caused by the obvious redistribution or they might reflect that trust allows a Nordic level of income redistribution (cf. Nannestad, 2008).

5.1. Main results

Table 2 presents the formal results of estimating our simple, two-way system between income inequality and social trust. Throughout the tables, we use net income inequality in columns 1–2 and market inequality in columns 3–4. Odd-numbered columns report the results of the trust specification (Eq. (1)) while even-numbered columns report the inequality results (Eq. (2)). We chose for two reasons to report the results for the restricted sample of 89 countries. First, for the group of countries with a GDP per capita
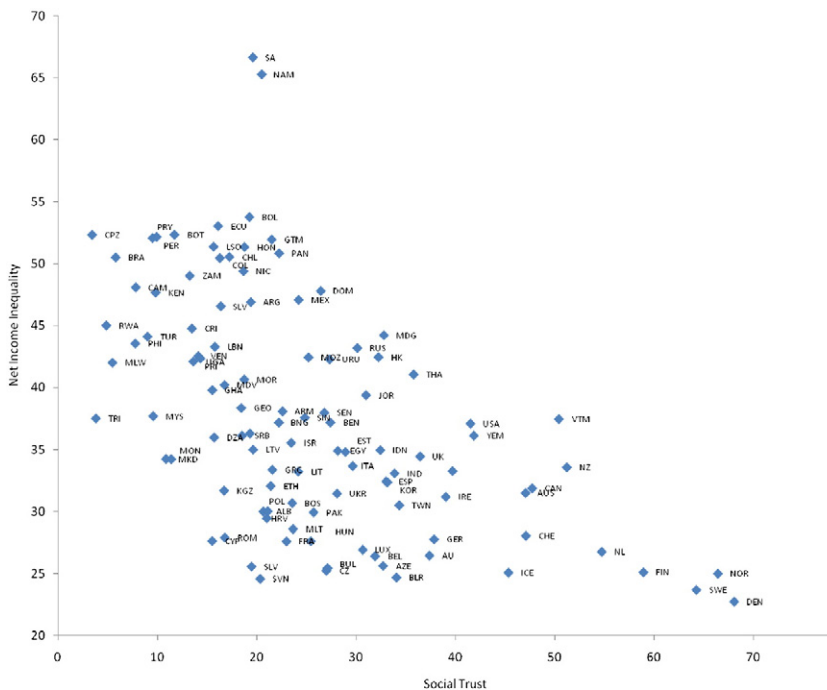

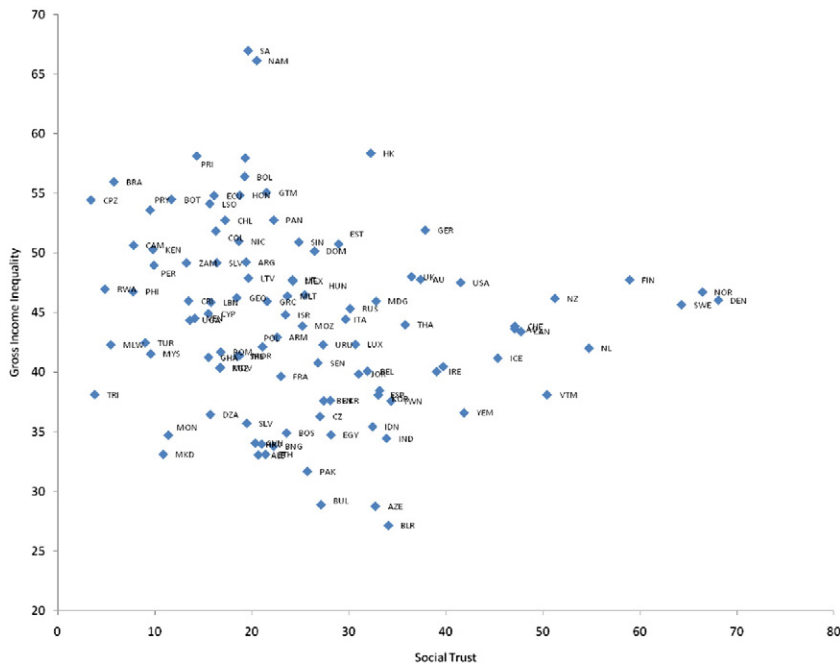**Fig. 5.** Trust and net income inequality.

Fig. 6. Trust and market income inequality.

below 2000 USD, there is very little political redistribution and the difference between net and market measures is thus likely to be due primarily to noise. Second, although the trust measure works very well in most cases, there are reasons to believe that the measure itself as well as the surveys it derives from is questionable for the absolutely poorest countries (cf. Holm and Danielson, 2005).

The estimates of trust in general provide support for the simple specification. In columns 1 and 3, the specification explains about 73% of the variation in net inequality, and all control variables are highly significant. Monarchies and Nordic countries are more trusting while post-communist and more religious countries are less so. The results thus confirm the main findings in the most recent studies in the field (Berggren and Bjørnskov, 2011; Robbins, 2012). Although the full sample covers an additional 15 least developed countries, results in Appendix A show that the results in columns 1 and 3 are remarkably similar.

With respect to the main variable, we find that both net and market income inequality are negatively related to trust, yet only the point estimate of market inequality is significant and substantially larger than the insignificant estimate of net inequality. At first sight, market inequality therefore seems to be the relevant aspect of inequality.

The results across the even-numbered columns provide support for a Kuznets curve in the full sample (in Appendix A).[18] Excluding the poorest countries as in Table 1, the traditional Kuznets curve nonetheless has a consistently negative slope, reflecting that the bulk of the sample is middle-income and rich countries. The political Kuznets curve, conversely, receives substantial support in both samples. Furthermore, the results show consistently lower net and market inequality in post-communist countries. We also find expected evidence of lower net inequality in the Nordic welfare states and less redistribution in common law countries as well as substantial religious differences. Finally, the evidence points to a skills premium (captured by IQ) as suggested in recent studies, which is nevertheless only weakly significant for net inequality and insignificant for market inequality.

In the 89-country sample for which we are likely to observe systematic differences between market and net inequality, we find evidence of two-way causality between trust and inequality only for market inequality.[19] Examining the size of the feedback from trust to equality with the size of the feedback in the opposite direction provides a sense of the relative importance of mechanisms. If we test the long-run effects of some shock that provokes a one-standard deviation increase in social trust (13.5 percentage points), it eventually turns into a 14.5 point increase in trust due to the feedback from market income inequality.[20] In the long run, market inequality drops by 3.7 points (50% of a standard deviation). Conversely, a one standard deviation shock to market income inequality (7.6 points) in turn becomes an increase of 8.2 points through feedback effects from trust and induces a drop in trust of 2.3 percentage points (17% of a standard deviation). Hence, it seems rather clear that the mechanism from trust to inequality is substantially stronger than the feedback in the opposite direction.

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[18] In the full sample with net inequality, the top point of the Kuznets curve occurs at a GDP level of 4587 USD per capita; with market income, the top point is at 8443 USD. We also find ample evidence of a political Kuznets curve as in Chong (2004) with a top point at a Polity score of approximately 2.5–3 across columns 2 and 4 in both tables.

[19] The results in the full sample in the appendix however point to a two-way causality between income inequality and social trust.

[20] The long-run effect in a bidirectional relation, e.g., the long-run effect of a trust change on inequality, can be calculated as $\lambda_1 / (1 - \lambda_1 \lambda_2)$, following the notation in Eqs. (1) and (2).

Table 2
Main results.

	Trust	Net inequality	Trust	Market inequality
	1	2	3	4
Monarchy	6.627***		6.321***	
	(2.422)		(2.388)	
Religiosity	−20.422***		−21.308***	
	(4.427)		(4.265)	
Postcommunist	−9.162***	−7.556***	−11.019***	−8.658***
	(2.281)	(1.811)	(2.414)	(2.513)
Nordic country	18.447***	−5.344*	19.186***	.583
	(3.746)	(2.826)	(3.625)	(3.926)
Log GDP per capita		−7.126		−28.898
		(13.384)		(18.503)
Log GDP squared		.160		1.588
		(.752)		(1.039)
Democracy		.426***		.409**
		(.138)		(.191)
Democracy squared		−.098***		−.077**
		(.022)		(.030)
Common law		.284		−2.657
		(1.289)		(1.783)
Orthodox		−.048**		−.090***
		(.021)		(.029)
Catholic		−.059***		−.080***
		(.019)		(.026)
Protestant		−.009		.002
		(.032)		(.044)
Muslim		−.119***		−.155***
		(.024)		(.033)
Eastern religion		−.026		−.076*
		(.028)		(.039)
Intelligence quotient		.201*		.073
		(.108)		(.149)
Net inequality (λ_1)	−.113			
	(.174)			
Market inequality (λ_1)			−.285**	
			(.132)	
Social trust (λ_2)		−.136***		−.252***
		(.052)		(.072)
Regional dummies	Yes	Yes	Yes	Yes
Observations	89	89	89	89
R squared	.736	.889	.733	.658
Chi squared	250.08	721.61	258.32	185.02
RMSE	6.944	3.206	6.980	4.532

Note: *** (**) [*] denote significance at p < .01 (p < .05) [p < .10]; regional dummies control for Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa. The results only include countries with a GDP per capita above 2000 USD in American 2005 dollars.

As such, the evidence mainly speaks against the standard interpretation of the trust–inequality association. In particular, we find no evidence that welfare state redistribution increases trust, as net inequality does not affect trust.[21] We therefore devote the next section to testing the robustness of these findings and probing into whether we can identify likely transmission channels suggested in the existing literature.

5.2. Robustness tests and potential transmission mechanisms

In the following, we explore the robustness of the findings to a number of potential other variables and factors, some of which are likely to proxy for specific, potential transmission mechanisms. In Table 3, we first test the findings when including three measures of government size: government full expenditures, including all transfers and subsidies, government final consumption expenditures, which exclude transfers and subsidies, and transfers and subsidies as percent of GDP. These variables subsume the most obvious transmission mechanisms as they provide direct measures of the extent of redistributive policy across countries.

The table therefore shows a set of tests for direct effects of welfare states and redistributive efforts that all other things being equal will be associated with larger government sectors. We find an expected negative effect of full expenditures on net inequality, as these expenditures include all redistributive transfers, but no effect on market inequality, and hence no likely effect on social trust. Government final consumption expenditures that include all publicly provided goods and services are never significant while we find that

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[21] We have verified that our results are not due to the special status of the Nordic countries. All findings remain unchanged if we remove these five countries from the sample.

Table 3
Results with welfare state channels.

	Trust	Net inequality	Trust	Market inequality
	1	2	3	4
Net inequality (λ_1)	−.045 (.183)			
Market inequality (λ_1)			−.264* (.137)	
Social trust (λ_2)		−.113** (.052)		−.239*** (.072)
Government full expenditures	.059 (.086)	−.074* (.039)	.059 (.083)	.026 (.056)
Regional dummies	Yes	Yes	Yes	Yes
Observations	87	87	87	87
R squared	.729	.893	.726	.663
Chi squared	235.02	729.44	242.17	182.63
RMSE	6.991	3.162	7.033	4.507
	1	2	3	4
Net inequality (λ_1)	−.101 (.176)			
Market inequality (λ_1)			−.275** (.134)	
Social trust (λ_2)		−.129** (.050)		−.243*** (.070)
Government consumption exp.	.037 (.123)	−.056 (.063)	.016 (.123)	.001 (.089)
Regional dummies	Yes	Yes	Yes	Yes
Observations	90	90	89	89
R squared	.731	.892	.728	.662
Chi squared	246.06	750.13	253.78	188.43
RMSE	6.991	3.169	7.030	4.501
	1	2	3	4
Net inequality (λ_1)	−.197 (.194)			
Market inequality (λ_1)			−.185 (.139)	
Social trust (λ_2)		−.103** (.047)		−.196*** (.068)
Transfers and subsidies	−.186 (.166)	−.351*** (.078)	−.152 (.153)	−.250** (.114)
Regional dummies	Yes	Yes	Yes	Yes
Observations	86	86	86	86
R squared	.742	.910	.739	.673
Chi squared	249.63	874.21	251.43	183.62
RMSE	6.806	2.926	6.836	4.294

Note: *** (**) [*] denote significance at p < .01 (p < .05) [p < .10]; regional dummies control for Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa. The results only include countries with a GDP per capita above 2000 USD in American 2005 dollars.

transfers and subsidies reduce both measures of inequality. Yet, the effect is substantially larger for net inequality and the inclusion does not change the point estimates of inequality in the trust specification. We thus find no evidence for direct effects of welfare state spending on trust, nor do our results indicate an indirect effect through redistribution.

A set of further results that primarily test the robustness of our main findings are reported in Appendix A. Table A3 first tests for the robustness to two characteristics often associated with both trust and inequality: ethnic diversity, which is likely to weaken the support for redistribution, and corruption (measured as absence of corruption) that may arguably reduce the effectiveness of redistribution and could also benefit elite rent-grabbing, which would tend to increase market inequality (Glaeser, 2006; Rothstein and Uslaner, 2005). While we find only insignificant support for the effects of ethnic diversity and some indication of effects on corruption – although insignificant, the difference between the point estimates is significant – we note that their inclusion does not change the main results.

Table A4 instead provides evidence for the robustness to including measures of political instability and openness. We find that politically less stable countries tend to have significantly larger net inequality, yet the main difference is that the estimate is insignificant for market inequality. On the other hand, trade openness significantly increases market inequality, but does not affect net inequality.[22] Again, our main results remain unchanged.

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[22] The lack of effect from trade openness on net inequality is consistent with Dreher and Gaston (2008).

Table A5 tests for two other factors potentially associated with inequality and trust: the relative size of the urban population and population density. We find that countries with larger urban populations have relatively less equal income distributions although the association is only weakly significant for market inequality. However, consistent with cost explanations of redistributive efforts, we also find that more densely populated countries have more market inequality but not more net inequality.

Finally, Table A6 provides a particularly strong test of the relevance of our results by excluding all poor and lower middle-income countries. In the table, we only retain countries with a PPP-adjusted level of GDP per capita above 7000 USD. In other words, all 55 countries included are clearly economically able to pursue substantive redistributive policies. We note that while the association between trust and net inequality becomes insignificant in *both* directions – in larger samples, the causal direction from trust to net inequality remains significant – and the effect of market inequality on trust likewise losses significance, the association from trust to market inequality continues to be significant at conventional levels.

Although a sample of only 55 relatively similar countries may not offer enough variation to identify effects with relatively imprecise data, one result remains significant throughout all robustness tests: that social trust lowers market inequality. As such, we must conclude that a set of careful estimates in general provides support for a non-standard interpretation of the trust–inequality association. We therefore proceed to discuss these results at some length.

6. Discussion and conclusions

In a survey of the trust literature, Nannestad (2008: 430) hypothesized that high levels of trust in some countries enable these countries to "solve the collective action dilemma created by their welfare systems" and that as a consequence, "generalized trust is what makes the universal welfare system sustainable and allows equality to coexist with wealth." In other words, trust is a necessary condition for the long run sustainability of a universal welfare state, but it is not a sufficient condition. The trust factor should be viewed as a complement to other well-researched public choice explanations of welfare state size. These include the influence on redistributive policy and political rents of special interest groups, the particular shape of political institutions including the important choice between proportional representation and first-past-the-post-systems, and ideological differences that may affect the extent of redistribution and also what particular groups in society that gain from political redistribution (cf. Browning, 1975; Meltzer and Richard, 1981; Congleton and Shughart, 1990; Breyer and Craig, 1997; Potrafke, 2010; Congleton and Bose, 2010; Leon, 2014). Finally, economic development itself likely affects redistribution and the size of the public sector through Wagner effects and Baumol's cost disease (Wagner, 1893; Baumol and Bowen, 1966; Henrekson, 1993; Congleton et al., 2013). Social trust alone cannot explain why and when some countries adopt welfare state policies, but it contributes to our understanding of their long-run economic and political sustainability.

Our findings support the ideas of Nannestad as well as Rothstein's idea of the universal welfare state as a social dilemma: social trust aids countries in creating and maintaining welfare states, and larger welfare states do lead to lower net inequality. But this lower net inequality does not feed back into higher levels of trust. Another way of phrasing our results is that it is possible to decrease inequality by expanding the welfare state, but expanding the welfare state is not likely to increase trust.

We also find that social trust has a direct impact on inequality, regardless of whether or not one controls for the size of the welfare state or direct measures of rent-seeking such as the incidence of corruption. This impact occurs for pre-tax, pre-transfer (market) inequality as well as for post-redistribution (net) inequality. Exploring the opposite causal direction, we find evidence that market inequality affects social trust while we see no support for the claim that net inequality has any causal effect on trust.

The finding that social trust seems to have a direct impact on inequality – even when controlling for the size of the welfare state – while there is no evidence for feedback effects from net inequality, has important implications. For example, it implies that income equality may be correlated with a number of desirable outcomes, but that the correlation is not necessarily causal but can rather be caused by the omitted variable trust. Among the documented positive effects of trust, we find better governance, more education, higher economic growth and higher levels of subjective wellbeing.[23] In addition, Rostila (2007) shows that contexts with low trust, such as the post-socialist context, are more detrimental for the health of distrustful individuals. Our results suggest that cross-sectional research on the consequences of inequality risks spurious results if trust is not accounted for.

Our findings also have implications for the likelihood that policy can affect trust levels. One of the most robust results in the trust literature is the negative association between social trust and measures of inequality (Bjørnskov, 2007, 2008; Delhey and Newton, 2005; Knack and Keefer, 1997; Nannestad, 2008; Uslaner, 2002). Most studies have – explicitly or implicitly – interpreted this association as evidence that large income differences decrease social trust. Under this interpretation, the policy implication is that redistributive welfare state policies can increase social trust.[24] If redistributive welfare policies affect trust, we should observe mainly that *net* inequality is associated with lower trust, and that causality would run from inequality to trust.

Our evidence suggests the opposite, which means that redistribution is unlikely to affect social trust. Moreover, our results show that while the causality between market inequality and social trust is likely to be bi-directional, the effect from trust to inequality is substantially stronger than that from inequality to trust. Our results thus do not support the policy advice that trust can be increased

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[23] See for example Bjørnskov (2010), Boix and Posner (1998), Helliwell and Wang (2011), Knack and Keefer (1997), Papagapitos and Riley (2009), Putnam (1993) and Zak and Knack (2001).

[24] An example here is Rothstein and Uslaner (2005) who argue for a circular relation connecting trust to less corruption, less corruption to more redistribution, and more redistribution to higher trust levels.

through redistributive welfare state policies, but rather point to trust as a deeper determinant of formal–institutional and societal characteristics. Put differently, trust appears as an institutional feature belonging to Williamson's (2000) first level of social analysis, the social embeddedness level, where a culturally stable set of norms, traditions and basic beliefs are located. Finally, the theoretical work in Section 2 provides some ideas regarding the influence of social trust on market inequality, but clearly more work is needed, both theoretically and empirically. Given the evidence that social trust reduces the various forms of rent-seeking (Bjørnskov, 2010; Boix and Posner, 1998; Knack, 2002; Putnam, 1993; Uslaner, 2002), it is probably a good idea to examine the relationship between trust and elite rent-grabbing in the private sector.

Acknowledgments

Appendix A

Table A1
Descriptive statistics.

Variable	Mean	Standard deviation	Minimum	Maximum	Observations
Absence of corruption	4.54	2.18	1.9	9.4	115
Catholic	30.27	36.56	0	98	116
Common law	0.25	0.43	0	1	116
Coup intensity	2.63	3.74	0	16	116
Democracy	5.71	5.14	−10	10	116
Eastern religion	5.78	19.73	0	95.1	116
Ethnic diversity	.39	.24	.00	.93	116
Government consumption exp.	22.11	9.33	5.36	57.63	114
Government full expenditures	31.06	11.09	.05	68.37	110
Market inequality	44.31	7.64	27.18	66.93	105
Intelligence quotient	88.37	10.66	63	107	116
Log GDP per capita	8.76	1.12	6.24	10.78	114
Monarchy	0.16	0.37	0	1	116
Muslim	19.47	31.78	0	100	116
Net inequality	37.66	9.39	22.77	66.63	105
Nordic country	0.04	0.20	0	1	116
Orthodox	11.77	27.05	0	98	116
Population density	235.96	815.19	1.53	6396.35	116
Postcommunist	0.216	0.41	0	1	116
Protestant	15.02	23.78	0	95	116
Religiosity	0.68	0.25	0.16	1.00	114
Social trust	25.48	13.46	3.40	68.08	116
Trade volume	78.83	47.37	18.24	337.85	114
Transfers and subsidies	10.62	7.26	.30	28.76	103
Urban population	59.43	22.47	11.37	100	116

Table A2
Main results, full sample.

	Trust	Net inequality	Trust	Market inequality
	1	2	3	4
Monarchy	7.069***		6.693***	
	(2.498)		(2.467)	
Religiosity	−18.077***		−19.984***	
	(4.558)		(4.467)	
Postcommunist	−10.162***	−7.451***	−12.439***	−8.653***
	(2.384)	(2.100)	(2.486)	(2.546)
Nordic country	17.342***	−6.867**	18.807***	−.266
	(4.038)	(3.139)	(3.944)	(3.810)
Log GDP per capita		53.029***		29.781***
		(9.488)		(11.458)
Log GDP squared		−3.145***		−1.647***
		(.561)		(.677)

Table A2 (continued)

	Trust	Net inequality	Trust	Market inequality
	1	2	3	4
Democracy		.365**		.355*
		(.151)		(.183)
Democracy squared		−.073***		−.061**
		(.025)		(.030)
Common law		1.056		−.912
		(1.273)		(1.538)
Orthodox		−.008		−.047
		(.024)		(.029)
Catholic		−.034		−.049*
		(.022)		(.027)
Protestant		.049		.048
		(.035)		(.042)
Muslim		−.079***		−.113***
		(.026)		(.032)
Eastern religion		−.023		−.062
		(.034)		(.041)
Intelligence quotient		.272**		.178
		(.108)		(.131)
Net inequality (λ_1)	−.257*			
	(.144)			
Market inequality (λ_1)			−.339***	
			(.119)	
Social trust (λ_2)		−.136**		−.218***
		(.053)		(.064)
Regional dummies	Yes	Yes	Yes	Yes
Observations	104	104	104	104
R squared	.676	.805	.674	.559
Chi squared	221.56	438.55	229.84	146.04
RMSE	7.601	4.074	7.622	5.010

Note: *** (**) [*] denote significance at p < .01 (p < .05) [p < .10]; regional dummies control for Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa.

Table A3
Robustness, excluding the poorest countries.

	Trust	Inequality	Trust	Inequality
	1	2	3	4
Net inequality (λ_1)	−.117			
	(.177)			
Market inequality (λ_1)			−.258*	
			(.134)	
Social trust (λ_2)		−.138***		−.240***
		(.051)		(.070)
Ethnic diversity	4.681	2.829	3.712	−1.708
	(4.195)	(2.050)	(4.208)	(2.884)
Regional dummies	Yes	Yes	Yes	Yes
Observations	89	89	89	89
R squared	.733	.893	.729	.663
Chi squared	246.99	749.93	253.66	187.18
RMSE	6.984	3.174	7.026	4.514
	1	2	3	4
Net inequality (λ_1)	−.132			
	(.176)			
Market inequality (λ_1)			−.301**	
			(.133)	
Social trust (λ_2)		−.186***		−.312***
		(.052)		(.067)
Absence of corruption		−.123		.842
		(.420)		(.538)
Regional dummies	Yes	Yes	Yes	Yes
Observations	90	90	90	90
R squared	.729	.865	.726	.638
Chi squared	246.44	583.42	255.36	173.71
RMSE	7.003	3.546	7.053	4.653

Note: *** (**) [*] denote significance at p < .01 (p < .05) [p < .10]; regional dummies control for Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa. The results only include countries with a GDP per capita above 2000 USD in American 2005 dollars.

Table A4
Robustness, excluding the poorest countries.

	Trust	Inequality	Trust	Inequality
	1	2	3	4
Net inequality (λ_1)	−.129			
	(.176)			
Market inequality (λ_1)			−.293**	
			(.133)	
Social trust (λ_2)		−.189***		−.301***
		(.051)		(.067)
Coup intensity		.319**		.299
		(.141)		(.186)
Regional dummies	Yes	Yes	Yes	Yes
Observations	90	90	90	90
R squared	.730	.872	.727	.641
Chi squared	246.42	620.92	254.68	174.18
RMSE	7.001	3.451	7.046	4.639
	1	2	3	4
Net inequality (λ_1)	−.139			
	(.176)			
Market inequality (λ_1)			−.304**	
			(.133)	
Social trust (λ_2)		−.188***		−.298***
		(.052)		(.066)
Trade volume		.009		.029**
		(.009)		(.012)
Regional dummies	Yes	Yes	Yes	Yes
Observations	90	90	90	90
R squared	.729	.866	.726	.649
Chi squared	246.65	588.46	255.86	182.85
RMSE	7.005	3.535	7.055	4.580

Note: *** (**) [*] denote significance at p < .01 (p < .05) [p < .10]; regional dummies control for Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa. The results only include countries with a GDP per capita above 2000 USD in American 2005 dollars.

Table A5
Robustness, excluding the poorest countries.

	Trust	Inequality	Trust	Inequality
	1	2	3	4
Net inequality (λ_1)	−.159			
	(.175)			
Market inequality (λ_1)			−.313**	
			(.133)	
Social trust (λ_2)		−.189***		−.301***
		(.051)		(.067)
Urban population		.069**		.083*
		(.034)		(.044)
Regional dummies	Yes	Yes	Yes	Yes
Observations	90	90	90	90
R squared	.729	.870	.725	.639
Chi squared	247.41	612.13	256.55	176.70
RMSE	7.012	3.481	7.064	4.645
	1	2	3	4
Net inequality (λ_1)	−.111			
	(.176)			
Market inequality (λ_1)			−.275**	
			(.133)	
Social trust (λ_2)		−.128**		−.201***
		(.051)		(.065)
Population density		.001		.003***
		(.001)		(.001)
Regional dummies	Yes	Yes	Yes	Yes
Observations	90	90	90	90
R squared	.730	.892	.728	.713

Table A5 (continued)

	Trust	Inequality	Trust	Inequality
	1	2	3	4
Chi squared	246.06	748.74	254.39	238.89
RMSE	6.997	3.174	7.032	4.145

Note: *** (**) [*] denote significance at p < .01 (p < .05) [p < .10]; regional dummies control for Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa. The results only include countries with a GDP per capita above 2000 USD in American 2005 dollars.

Table A6
Robustness, only rich and newly developed countries.

	Trust	Inequality	Trust	Inequality
	1	2	3	4
Net inequality (λ_1)	.056 (.218)			
Market inequality (λ_1)			−.114 (.158)	
Social trust (λ_2)		−.055 (.071)		−.262** (.108)
Regional dummies	Yes	Yes	Yes	Yes
Observations	55	55	55	55
R squared	.786	.870	.781	.517
Chi squared	203.44	370.95	203.56	5.012
RMSE	6.809	3.256	6.880	63.75

Note: *** (**) [*] denote significance at p < .01 (p < .05) [p < .10]; regional dummies control for Asia, Latin America and the Caribbean, North Africa and the Middle East, and Sub-Saharan Africa. The results only include countries with a GDP per capita above 7000 USD in American 2005 dollars.

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