



ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

Trust and attitudes toward income inequality: Does individualism matter?☆

Nabamita Dutta^{a,*}, Russell S. Sobel^b^a Department of Economics, College of Business Administration, University of Wisconsin-La Crosse, USA^b Baker School of Business, The Citadel, Charleston, SC, 29409, USA

ARTICLE INFO

JEL classification:

F55

I31

O15

O17

Keywords:

Trust

Income inequality

Individualism

ABSTRACT

In the last decade authors have increasingly examined the role of two cultural traits – trust and individualism – on a variety of economic outcomes ranging from gendered attitudes to entrepreneurship, human capital accumulation, and economic development. While both have positive effects, recent literature suggests that the effects of trust are often conditional on other variables, and this aspect has been neglected in the literature. Indeed, a recent paper found that with respect to gendered attitudes, there are important interactions between the traits of trust and individualism. Building on this foundation we explore how views of trust and individualism interact to affect attitudes about income inequality. Our results show that while views regarding social trust generally positively affect the desire for income equality, this effect is strengthened in the presence of high individualism. Alternatively stated, distrust in highly individualistic environments leads to a greater desire for income differences (inequality). Our result highlights the important role played by market-based price and profit incentives in fostering economic activity and exchange in larger, impersonal extended orders where interpersonal trust and reputational effects are generally absent (in contrast to personal, small group exchange). Our results are robust to a variety of techniques to establish identification and account for sample selection and omitted variable bias.

1. Introduction

Authors since the time of [Adam Smith \(1763/1978\)](#) have recognized the important role played by interpersonal trust in economic exchange and development. As [Bjørnskov \(2018\)](#) outlines, there are both direct and indirect channels through which trust directly contributes to economic development. Historically, as humans began to form larger and more complex societies, with specialization and exchange occurring in larger impersonal marketplaces, it was no longer possible to rely upon tribal or personal relationships as the basis for ensuring and enforcing the agreed upon terms of exchange. Following [Knack and Keefer \(1997\)](#) transactions involving a time dimension or those in which monitoring is difficult, for example, are the most susceptible to trust issues and opportunistic behavior. This led to the evolution of formal and informal institutions that could help to alleviate trust problems in exchange in this ‘extended order’ ([Bjørnskov, 2018](#); [Williamson, 2000](#); [Fukuyama 1995](#); [North, 1990](#); [Hayek, 1989](#)). By reducing transactions costs, trust itself, or

☆ We thank the editor and the referees for their invaluable comments and suggestions. N. Dutta gratefully acknowledges the financial support from Menard Family Initiative (MFI), University of Wisconsin-La Crosse

* Corresponding author.

E-mail addresses: ndutta@uwlax.edu (N. Dutta), russell.sobel@citadel.edu (R.S. Sobel).

<https://doi.org/10.1016/j.ejpoleco.2022.102351>

Received 1 May 2022; Received in revised form 25 November 2022; Accepted 27 November 2022

Available online 29 November 2022

0176-2680/Published by Elsevier B.V.

these substitute institutions, facilitate economic development and human progress (Bjørnskov, 2018; Cline and Williamson, 2016).

One of the institutions that can help to alleviate these trust issues in impersonal exchange, stressed by Adam Smith himself regarding the ‘invisible hand principle’, is the differing personal rewards (i.e., income) individuals earn in markets based on the degree to which they satisfy their trading partners. When the personal reward is higher from satisfying your trading partner, it helps to align the personal self-interest of individuals in exchange. Thus, income differences based on market performance can be a substitute for trust in ensuring performance in interpersonal exchange.

While socialism and collectivist production/consumption arrangements may work sufficiently well in small tribal groups, they are unable to work as well in larger societies because these systems do not contain the incentive-based rewards that help overcome trust problems that exist in impersonal exchange. Thus, income inequality based on performance in trade relationships is a key factor that ensures (or at least strongly incentivizes) the performance of market participants in exchange, and the role it plays is strongest in impersonal marketplaces in which there are lower levels of interpersonal trust. More simply put, in the absence of trust one needs to be able to provide higher compensation for better performance to incentivize it.¹

There are large differences in the degree of social trust across countries, and these differences are rooted in many social, cultural, economic, historical, and demographic factors. We hypothesize that the desire for greater market-based income differences (i.e., greater income inequality) should be stronger in societies with lower levels of trust. In contrast, in high-trust societies the importance of differing market-based performance rewards should not be as strong, leading to a higher preference for income equality. Previous literature has found that differing levels of trust, for example, are a determinant of preferences for redistribution and the size of the welfare state (Bjørnskov and Svendsen, 2013).

While many prior studies have attempted to examine how the actual degree of income inequality affects levels of social trust, the literature has yet to examine how actual individual preferences for their desired level of income inequality in society are related to measures of social trust.² Thus, a critical dimension on which our research differs from prior work is that we examine individual’s self-reported desires and preferences for their ideal levels of income inequality rather the degree of actual inequality that exists. In doing so we turn the causal direction of the question around, and rather than asking how the current levels of existing inequality in a society affect attitudes toward trust, we ask how individual perceptions of social trust affect their preferences for the ideal (not actual) level of income inequality.

While the effects of social trust on many measures of economic development have been examined empirically, Bjørnskov (2019, 2021) argues that the effects of trust are often conditional on other factors. Bjørnskov (2019, 2021) further argues that this conditionality in trust’s effect on other variables has been mostly neglected in prior literature and needs further examination. One recent study that does examine this conditionality is Dutta et al. (2022), who examine the impact of trust on gendered attitudes. Dutta et al. (2022) find that the relationship between trust and gendered attitudes is heavily influenced by the degree of a second cultural trait—individualism. Building upon that paper, our current analysis also considers how individualism affects the relationship between trust and the desired level of income inequality.

In the literature, measures of the cultural prevalence of individualism (versus collectivism) have also been linked to improved economic development outcomes and governance, and specifically to transactional trust related issues (Davis and Williamson, 2019; Nikolaev and Salahodjaev, 2017; Nikolaev and Salahodjaev, 2016, 2017; Gorodnichenko and Roland, 2017; Kyriacou, 2016; Davis and Williamson, 2016; Licht et al., 2007; Inglehart and Oyserman, 2004). Cline and Williamson (2016), for example, specifically examine how individualism affects measures of contract enforcement, which directly relates to our hypothesis involving trust in exchange. Similarly, Lu et al. (2021) find individualism alleviates mistrust in financial institutions and reduces reliance on informal networks, as individualistic societies lead to greater outgroup interactions with strangers that help to develop trust. Thus, we think it highly likely that individualism plays an interactive role in the relationship between trust and desired income inequality.

The concept of individualism relates to self-determination, personal freedom and the awarding of social status and higher incomes to individuals with greater accomplishments such as entrepreneurial discovery and innovation (Cline and Williamson, 2016). In contrast, the opposite trait on the continuum—collectivism—focuses on social conformity rather than individual achievement. We hypothesize that the relationship between trust and desired equality/inequality should be stronger in individualistic societies than in societies that are more collectivistic.³

We thus provide a contribution to the literature that tries to explain the factors that affect individual preferences for the equality/inequality of income within society (Alesina et al., 2012; Alesina and Giuliano, 2010; Alesina 2004; Alesina and Glaeser, 2004; Persson and Tabellini, 2002). While that prior literature examines the role of views and opinions about how wealth is accumulated and whether individuals are deserving of such wealth, we are the first to examine how trust and individualism shape these views.⁴

Our results suggest that indeed, less trusting individuals (and societies) generally desire higher degrees of income inequality. This

¹ There is a large literature on incentive compatibility in contractual relationships that addresses this in more detail.

² For examples see Bjørnskov (2008, 2007), Delhey and Newton (2005), Alesina and La Ferrara (2002), Uslaner (2002), Bergh and Bjørnskov (2011), Jordahl (2008), Nannestad (2008), and Bjørnskov and Svendsen (2013).

³ As with measures of trust, prior literature has examined the relationship with individualism and actual income inequality (see Nikolaev and Salahodjaev, 2017), but has yet to examine how it relates to measures of the preference or desire for equality/inequality.

⁴ There is a related literature examining attitudes regarding individual preferences for income redistribution (see Nikolaev et al., 2017; Blekesaune, 2007; Linos and West, 2003; Bobo, 1991; Hasenfeld and Rafferty, 1989; Kluegel and Smith, 1986); as well as a literature that examines the repercussions of attitudes toward income inequality on other economic, social, and policy variables (see Bénabou and Tirole, 2006; Aalberg, 2003; Hochschild, 2001).

relationship is also influenced by cultural beliefs regarding individualism (versus collectivism). Specifically, the strength of the relationship is heightened in individualistic cultures. Thus, in highly individualistic cultures, with the lowest levels of social trust, individuals have the highest preferences for income inequalities to exist among members of society. This clearly supports Adam Smith's conjecture that income differentials in market-based economies are indeed an important institution that substitutes for trust in helping to foster economic exchange and development.

In Section 2 we provide more details on our theoretical motivation and main hypotheses. In Section 3 we describe our data, while in Section 4 we explain our empirical methodology. Benchmark results are presented in Section 5, and in Section 6 we demonstrate the robustness of our results. Finally, Section 7 concludes.

2. Theoretical motivation

We begin by stating our empirical hypotheses based on the theory underling these variables and their possible interrelationship. First, we know that trust is a key element in ensuring performance in economic exchange (Leeson, 2008; Williamson, 2009). Reputational trust (which is sometimes earned over repeated dealings) helps to lower transactions and enforcement costs. In contrast, low-trust environments may suffer from opportunism, and high enforcement and transactions costs that stand in the way of exchange.

When it is easy to monitor the other party to an exchange, opportunism and shirking are less likely to occur. When monitoring of effort or input is not possible, however, it becomes important to ensure that contracts and payments are structured in ways to ensure that each party has the proper incentives (i.e., 'compatible' incentives) based on measurable outcomes—and that the rewards are different enough to matter. Because effort is costly, a small difference in reward for high versus low effort (or performance) is often not enough. The difference in the reward for effort must be large enough to offset the cost of proving it. Thus, one needs larger differentials in rewards to incentivize performance, and to create incentive-compatibility, when monitoring is costly or difficult. Commission-based income rewards for salespeople, for example, are a means of ensuring performance without the ability to monitor daily employee effort. But in general, monitoring of inputs or effort is more costly or difficult in impersonal market exchange compared with the tribal and personal exchange among small groups of individuals from which it historically evolved.

The market system itself is a means of providing profit/income-rewards based on satisfaction of the desires of the other party to the exchange, and market prices evolve in ways to ensure that these differential rewards are enough to encourage effort and performance. Collectivistic (socialist/communist) systems that try to provide equal rewards based upon need, while expecting the maximum performance individuals, may be possible when monitoring of effort or enforcement are easy in small groups, but quickly result in inferior outcomes in larger groups or cases where monitoring or information are less visible. Thus, these types of communal arrangements may work well within a household for example but fail miserably when applied to a large society with an extended order of impersonal exchange. In large market-based economies therefore, as Adam Smith noted in his 'invisible hand principle', individual self-interest is aligned by the differential market rewards embodied in market prices and profits (or losses). Thus, income inequality, driven by differential market-performance-based rewards, plays a key role in ensuring performance in the lower-trust nature of impersonal exchange.

The main theoretical point is thus that reliance on a system of substantially different market rewards (i.e., greater income inequality) can be a substitute for trust or monitoring in ensuring performance in economic exchange. Thus, we hypothesize that there should be a negative relationship between the level of trust and the desire for higher income inequality. Specifically, in low trust environments there will be a desire for incomes to differentiate more clearly high versus low performance. In contrast, in high trust environments, there may be a desire for more equality (lower inequality) as performance can be assured by substitute means (e.g., reputation or personal knowledge).

The other cultural trait we examine, individualism, is often discussed in contrast to its opposite, collectivism. While collectivism focuses on how the individual is part of a larger interdependent social system, individualism is the idea that each person is an independent entity with purpose and meaningful ends. Cline and Williamson (2017) argue that people in more individualistic societies are more likely to engage in market production and exchange, and favor a less regulated commercial marketplace.

We believe that individualism may create important interactive effects on the trust-inequality relationship. When one hypothesizes which types of preferences would lead to the greatest desire for the more unequal rewards market incomes provide based on performance, it would be precisely those who are highly individualistic in low trust environments. Thus, we hypothesize a negative coefficient the interaction term of individualism and trust. This would result in the low trust/high individualism outcome to be the most in favor of more inequality while the high trust/low individualism (e.g., high trust/high collectivism) outcome to be the least in favor of greater market-based income inequality.

3. Data

In this section we describe and explain our data, sources, and summary statistics for our benchmark sample.

3.1. Data sources

Our two main data sources are the World Value Survey (WVS) and World Development Indicators (WDI) databases. Starting in 1981, the WVS data has been collected in six waves of individual-level surveys. Although initial waves started with fewer countries, recent waves have covered almost 100 countries where respondents are asked questions about their beliefs, values, and opinions about social, economic, and political issues. Because each wave does not have the same number of countries, the sample is unbalanced. The

WVS also includes information about the demographic characteristics of the survey respondent (sex, age, education, etc.) and their self-reported economic characteristics (income, social class, etc.). For our study, we employ data from all six waves comprising the years 1981–1984, 1989–1993, 1994–1998, 1999–2004, 2005–2009, and 2010–2014.

3.2. Dependent variable

Our main dependent variable comes from the specific question on the survey (WVS) asking respondents their view regarding their personally desired level of income inequality. The individual answers the question on a scale of 1–10, with 10 corresponding to the view that “We need larger income differences” to 1 corresponding to the view that “Incomes should be more equal”, with explicit instructions that if their view falls somewhere in between they can choose any number between. The mean value in the sample is 5.7 and the median is 6. There is substantial variance across countries with Bangladesh, Algeria, El Salvador, Peru, Poland, Jordan, and Zimbabwe having median values of 8 suggesting that most people in these countries want greater income differences. Countries like Germany, Israel, Switzerland, Estonia, and Hungary have median scores of 4 or less implying attitudes favoring a more equal income distribution.

3.3. Main independent variables

Our two main independent variables of interest are measures of trust and individualism. Following an extensive set of studies (Dutta et al., 2022; Mikucka et al., 2017; Bjørnskov and Méon, 2015; Johnson and Mislin, 2012; Tabellini 2008, 2010; Uslaner, 2003), our trust measure is constructed based on the WVS question ‘generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?’ The dummy takes the value 1 if individuals respond *most people can be trusted*; and 0 otherwise. Our sample average is about 26%. The median for our sample is zero indicating that at least 50% of individuals do not in general trust others. Examples of countries with very high mean trust levels (above 50%) are Sweden, Netherlands, China, Saudi Arabia, Norway, and Finland. Countries like Brazil, Lebanon, Peru, Malaysia, Philippines, Zimbabwe, and Uganda have very low mean trust levels of less than 10%.

The other main independent variable is a measure of individualism. We employ Hofstede’s (1980, 2001) commonly used measure of individualism as applied to WVS individual level data (Gorodnichenko and Roland, 2017; Cline and Williamson, 2016; Davis and Williamson, 2016; Davis and Williamson, 2019; Dutta et al., 2022; and Beugelsdijk et al., 2015). Principle component analysis using four questions from the WVS are used to construct the individualism index.⁵ The index is standardized, and higher values denote greater individualism. For our sample, the index varies from -1.86 to 2.29 with a mean of 0 and standard deviation of 1. Albania, Australia, Belarus, Bosnia, Canada, Finland, Germany, Moldova, Slovenia, Spain, United States and Uruguay are examples of some countries with above average levels of individualism. Some countries with low levels of individualism are Brazil, Argentina, China, Colombia, Jordan, Pakistan, Mexico, and Zimbabwe.

3.4. Other control variables

We control for a vast array of individual level variables following existing literature. First, because a survey respondent’s answer to whether they desire more or less inequality in their country may depend on the actual level of inequality, we include the GINI index from WDI as an independent variable.⁶ Our other benchmark controls include measures of age, employment status, self-reported income level, and educational attainment.

Our justification for our age variable stems from Langsæther and Evans (2020) and Steele (2015) who identify it as a factor affecting attitudes about redistribution and income inequality. Based upon their results we expect age to have a negative effect on preferences for greater income inequality. Employment status (a dummy variable for whether an individual is employed and zero otherwise) and educational attainment follow Kaltenthaler et al. (2008) and Gabel (1998). Generally, individuals who are employed and those with a higher education tend to be more supportive of market-based institutions that allow them to maximize their earning potential, and thus favor greater income inequality. Following Seguino (2011), our educational variable is constructed as an ordered dummy ranging from 0 to 8; with the endpoints of 0 indicating to no formal education and 8 representing a completed university education.⁷ We also include

⁵ We follow the papers cited in the text and employ the questions of whether private ownership of business and industry should be increased (versus government), one of my main goals in life has been to make my parents proud, abortion is never justifiable, and homosexuality is never justifiable.

⁶ Because the GINI variable is the same for all individuals within each given country, our benchmark specifications cannot also include country fixed effects. Our benchmark specifications, however, do include time (i.e., WVS ‘wave’) fixed effects. We demonstrate the robustness of our key results to alternative specifications later in the paper.

⁷ Where 0 indicates no formal education, 1 indicates an incomplete primary education, 2 indicates a completed primary education, 3 indicates an incomplete secondary education (vocational/technical), 4 indicates a completed secondary education (vocational/technical), 5 indicates an incomplete secondary (university/college preparatory) education, 6 indicates a completed secondary (university/college preparatory) education, 7 indicates an incomplete university education, and 8 represents a completed university education.

dummy variables for self-reported income status in the upper or middle class, and as an alternative we consider self-reported income decile.⁸ Following [Guillaud \(2013\)](#) we control for employment status and whether or not an individual is an unskilled worker ('unskilled manual' in the WVS database) as part of our benchmark controls.

To ensure robustness, we also run our benchmark specifications without controlling for these other independent variables, and also using only subsets of these variables. This is especially important given some of these variables (such as an individual's place in the income distribution) are self-reported, and subject to error ('self-reporting bias'). [Cruces et al. \(2013\)](#) and [Karadja et al. \(2017\)](#), for example, find that people often have systematic misperceptions about their place in the income distribution. While this may not be a large problem for our purpose of using these measures as control variables, we do want to make sure that our results are robust to alternate specifications that exclude potentially problematic self-reported income variables.

4. Empirical methodology and specifications

The first part of our empirical analysis aims at testing whether higher levels of trust affect attitudes about income inequality. To answer this question, we estimate the following specification:

$$\text{Inc Inq. Att.}_{jit} = \beta_1 + \beta_2 \text{Trust}_{jit} + \text{Controls}_{jit} + \theta_t + \varepsilon_{jit} \quad (1)$$

where $\text{Inc Inq. Att.}_{jit}$ is the dependent variable assessing attitudes towards income inequality for individual j in country i at time (wave) t , Trust_{jit} is the dummy for trust, as described above, for individual j in country i at time (wave) t . The matrix of control variables is indicated by Controls_{jit} (each of which has its own β coefficient), and θ_t represents the time (wave) fixed effects.

β_2 is our variable of interest for specification (1). We remind readers that higher values of the dependent variable imply a desire for greater income *inequality*, while lower values of the dependent variable imply a desire for greater income *equality* (or, equivalently, less inequality). Thus, our hypothesis predicts a negative value of β_2 which means that lower trust is associated with a desire for more income inequality, while higher trust for an individual is associated with a desire for more income equality (i.e., less income inequality). Again, this is based on the idea that market income differentials based on prices and profits create incentives that substitute for trust to ensure performance in exchange.

The second part of our empirical analysis investigates whether this relationship between trust and preferences for income inequality are dependent on the level of individualism. We include both a direct effect of individualism as well as an indirect, interaction effect through trust. We test the following empirical specification:

$$\text{Inc Inq. Att.}_{jit} = \beta_1 + \beta_2 \text{Trust}_{jit} + \beta_3 \text{Ind}_{jit} + \beta_4 (\text{Trust} * \text{Ind})_{jit} + \text{Controls}_{jit} + \theta_t + \varepsilon_{jit} \quad (2)$$

Ind_{jit} is the measure of individualism previously discussed taken from the prior literature. Our coefficients of interest are now β_2 and β_4 . We expect the direct effect of trust, β_2 , to remain negative as described above. Our hypothesis would suggest that the coefficient on the interaction term, β_4 , should be negative. Note that with the presence of an interaction term, the general interpretation of the impact of the underlying variables, and their statistical significance, are no longer straightforward as they depend both on the underlying values of the variables and the coefficients on both the main and interaction terms. This combined effect could have a different sign and level of significance than either of the variables individually, and both may also depend on the level of the underlying conditioning variable ([Hainmueller et al., 2019](#); [Berry et al., 2012](#); [Brambor et al., 2006](#); [Braumoeller, 2004](#)). The proper interpretation requires computing a partial derivative at different values of the underlying conditioning variable.

The partial derivative showing the marginal impact of trust on the attitude toward income inequality is given by $\frac{\partial \text{Inc.Inq.Att.}_{jit}}{\partial \text{Trust}_{jit}} = \beta_2 + \beta_4 * \text{Ind}_{jit}$. This partial derivative, $\frac{\partial \text{Inc.Inq.Att.}_{jit}}{\partial \text{Trust}_{jit}}$, will be $>$, $=$, or $<$ 0 depending on the sign and magnitude of β_2 , β_4 as well as the underlying value of the constructed individualism variable. We provide estimates of $\frac{\partial \text{Inc.Inq.Att.}_{jit}}{\partial \text{Trust}_{jit}}$ at the minimum and the maximum values of individualism in our regression results tables to illustrate the range of this partial derivative, and we also show it graphically for the entire range of underlying values in a separate figure. The idea is to see how $\frac{\partial \text{Inc.Inq.Att.}_{jit}}{\partial \text{Trust}_{jit}}$ changes in sign and significance as individualism changes from its lowest to highest value. Recall that our hypothesis is that more individualistic societies strengthen the negative effect of the trust variable. Thus, the partial derivative should be a larger negative value at the maximum than the minimum value of individualism.

4.1. Benchmark results

In [Table 1](#), we present our first set of benchmark results based on individual level data. To test specification (1), we start with including *Trust* as our only variable of interest testing the bivariate relationship in column (1) and add controls in the subsequent columns. In column (2), we add GINI. Since GINI is an important control which shapes perceptions about income inequality, we check our results only including that variable. In column (3), we add the other controls – belonging to middle or upper class, if an individual is

⁸ The upper-class dummy is coded one for individuals self-reporting they are in the upper class, the middle-class dummy is coded one for individuals self-reporting they are in the upper-middle or lower-middle class, and the lower class is the omitted group dummy. The alternative self-reported income decile variable ranges from the lowest to top decile, thus 1 to 10.

in an unskilled profession or not, age, and employment status. We use an alternate measure of status and profession in column (5) by incorporating self-reported income decile measure. While self-reported measures can be problematic since they affect how people perceive about income inequality, we try to establish robustness by checking our results with alternate measures of income, class, and profession. We also check our results by excluding these variables in column (4).

We find that the coefficient on trust is negative and significant in all specifications as expected suggesting that lower trust strengthens attitudes in favor of greater income inequality (and thus greater trust strengthens attitudes towards income equality). In terms of controls, the coefficient of GINI is positive and significant suggesting that higher actual income inequality strengthens preferences for income inequality. We also find, as expected based on prior literature, that individuals with higher education, higher income, those who are employed, and those who are younger tend to favor greater income inequality.

In Table 2, we present the results of specification (2) which adds the interaction term with the individualism measure. The format of Table 2 follows that of Table 1 otherwise. In column (1) of Table 2, we include only our variables of interest – trust, individualism, and the interaction term. We find the coefficient of trust remains negative and significant. The interaction term between the two is negative and significant as expected implying that individualism does indeed strengthen the negative impact of trust. Again, this implies that in more individualistic societies, the degree to which higher trust leads to a stronger preference for income equality (or conversely, the degree to which lower trust leads to a stronger preference for income inequality) is strengthened. However, as stated above, in the presence of interaction terms, we need to estimate marginal effects for the entire range of the conditioning variable, individualism in our case, to make any meaningful conclusions. We present the marginal effects in the lower rows of the table as well.

The marginal effects estimates shown in Table 2, $\frac{\partial \text{Inc. Inq. Att.}_{it}}{\partial \text{Trust}_{it}}$, are estimated at two extreme values of individualism – the minimum, and the maximum value of individualism. We also present these marginal effects graphically for a wider range of values in Fig. 1A and B based upon the specifications shown in columns (1) and (3) of Table (2), respectively, along with the associated confidence intervals.

Based on the marginal estimates, we find exactly what we expected. The negative effect of trust is significantly stronger at the maximum values of individualism than for the minimum values of individualism (i.e., the highest levels of collectivism). This is clear in the table rows and in the figure where the effect becomes increasingly negative as the value of individualism rises.

5. Robustness analysis

Our first set of robustness results consist of checking our benchmark findings with alternate measures of trust and individualism in Section 5.1. In subsequent sub-sections, we explain the alternate ways we try to establish identification. Our key results remain robust to these additional checks of robustness.

5.1. Alternate measures of individualism

As an alternate measure of trust, we consider the variable *respect* constructed based on the question - *Important child qualities: tolerance and respect for other people* from the WVS database. The variable is coded 1 if the responses state respect and tolerance are important child qualities, 0 otherwise. Respect for other individuals is a cultural trait similar to individualism. We run our benchmark specification interacting respect with individualism instead of trust. The results are presented in Table 3, column (1), and the results are consistent with our benchmark models. Trust has a negative effect, and this grows larger at higher levels of respect for other people.

In columns (2) and (3), we consider alternate measures of individualism. Our main results employ the most commonly used measure of individualism as applied to WVS individual level data, which is constructed using principle-components analysis based upon four WVS questions (Gorodnichenko and Roland, 2017; Cline and Williamson, 2016; Davis and Williamson, 2016; Davis and Williamson, 2019; Dutta et al., 2022; and Beugelsdijk et al., 2015). However, we wish to consider whether our results are robust to alternative ways to construct this index. First, as an alternate measure of individualism, we drop the ‘parent proud’ variable and construct the measure with the remaining three components included in the benchmark measure. We call this measure *Individualism 1*.⁹ To further check robustness of our findings towards sensitivity of considered measures, we construct yet another measure of individualism – *Individualism 2* – based on Dutta et al. (2022) and Stelle and Lynch (2013). This alternative measure uses the original four questions plus several additional questions often used to measure of individualism’s opposite—collectivism—on which we reverse the scale to match the individualism measure. Collectivistic cultures are opposite of individualistic cultures emphasizing traditions and norms, and collective decision making. The variables considered from WVS in the prior collectivism measures regard pride about one’s nation, responsibility of government versus individual responsibility, and the benefit of competition or lack of it.¹⁰ The results using these alternative measures of individualism also support our benchmark findings. We are thus confident that our results are robust to alternative measures of individualism.

⁹ We also tried omitting each of the other variables one at a time, and our results are robust to each of these.

¹⁰ Prior papers cited in the text include the variable we employ as our dependent variable (attitudes regarding income inequality) in the principle-components collectivism measure. Because it is our dependent variable, we exclude it and only employ the other three variables in addition to our original four. The specific additional questions we include regard ‘how proud of nationality’ (for collectivism the dummy is ‘agree’ and ‘strongly agree’, so we employ a dummy is for ‘disagree’ and ‘strongly disagree’), ‘competition good versus harmful’ (rescaled so that higher numbers indicating competition is good), ‘people should take more responsibility to provide for themselves’ versus ‘the government should take more responsibility ensure that everyone is provided for’ (rescaled so that higher numbers denote the individual should take more responsibility).

Table 1

Views about Income Inequality and Trust. The dependent variable is a measure of an individual's preference for higher income inequality ranging from 1 to 10 with higher numbers indicating individuals agreeing with the presence of higher levels of income inequality. Trust is a dummy variable with a value of 1 denoting an individual responded 'most people can be trusted', 0 otherwise. The control variables include GINI, educational attainment, income levels, age, and employment status. OLS estimation with fixed effects as indicated in the table. Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

	(1)	(2)	(3)	(4)	(5)
Trust	-0.195*** (0.0120)	-0.174*** (0.0143)	-0.175*** -0.0207	-0.201*** (0.014)	-0.238*** (0.015)
Edu. Attainment	-	-	0.073*** (0.004)	0.0719*** (0.002)	0.039*** (0.003)
Income (Middle)	-	-	0.395*** (0.021)	-	-
Income (High)	-	-	0.732*** (0.030)	-	-
Unskilled	-	-	-0.146*** (0.023)	-	-
Income (decile)	-	-	-	-	0.129*** (0.003)
Age	-	-	-0.004*** (0.001)	-0.008*** (0.0004)	-0.008*** (0.0004)
Employed	-	-	0.130*** (0.022)	0.148*** (0.013)	0.073*** (0.014)
GINI	-	0.005*** (0.0001)	0.003*** (0.001)	0.007*** (0.0001)	0.008*** (0.001)
Constant	5.498*** (0.010)	5.155*** (0.029)	4.466*** (0.078)	5.026*** (0.042)	4.561*** (0.044)
Observations	300,914	222,079	100,603	207,298	192,592
R-squared	0.007	0.01	0.024	0.017	0.026
Time (wave) F.E.	Yes	Yes	Yes	Yes	Yes

5.2. Identification

Similar to other studies involving panel data across countries over time, we face endogeneity concerns with respect to our main variables of interest. As attitudes about income inequality change, individuals' cultural traits like trust and individualism could be affected. Stronger attitudes towards income inequality could make people less trusting of each other and be more individualistic. Thus, both our variables – trust and individualism – could suffer from endogeneity arising from reverse causality. Additionally, while we have an array of control variables, trust and individualism can still suffer from endogeneity due to omitted variable bias. Failing to control for variables that can affect attitudes about income inequality will bias our main estimates. Finally, our results could suffer from sample selection bias arising out of income inequality attitudes, trust and individualism being determined simultaneously. Below we describe how identification is established to handle endogeneity arising out of these different reasons - reverse causality, omitted variable bias, and sample selection or simultaneity bias.

5.2.1. Identification - omitted variable bias

Although we control with an array of variables as part of benchmark controls, we check our results with additional controls to make sure our results are not subject to omitted variable bias. We present these results in [Table 4](#). In column (1), along with our benchmark controls we include gender and marital status. Specifically, we include separate dummies indicating if an individual is female, and if an individual is married or lives together with his or her partner. Both gender and marital status could affect attitudes about income inequality. Prior literature has also found that individual views about the fairness of the income distribution, as measured by two specific WVS questions may be correlated with attitudes towards redistribution ([Luttens and Valfort, 2012](#); [Corneo and Grüner, 2002](#)). These are individual views on the questions of whether 'hard work brings success in life' (a continuous variable with 1 indicating responses – hard work does not usually bring success and 10 indicating it does) and whether 'work is important in life' (a dummy taking the value 1 for responses of work being *very important* and *important* in life). If hard work matters to individual and they associate it with success, they are likely to believe income differences are justified and thus have more favorable attitudes toward income inequality.¹¹

It may also be possible that these variables measuring the perceived importance of hard work for success could also serve as moderating or conditioning variables requiring an interaction term. One might expect that people who believe that hard work is important for success will respond to low trust by desiring larger income differences. For people who don't believe that hard work matters, there is less reason to desire larger income differences. Thus, we check our results with the two measures of views about the

¹¹ Alternative specifications we originally included but dropped for space considerations (and are thus available by request) included variables assessing life satisfaction ([Oishi et al., 2011](#); [Blanchflower and Oswald, 2003](#)), and variables reflecting different religious affiliations. The results remained robust.

Table 2

Views about Income Inequality, Trust, and Individualism The dependent variable is a measure of an individual’s preference for higher income inequality ranging from 1 to 10 with higher numbers indicating individuals agreeing with the presence of higher levels of income inequality. Trust is a dummy variable with a value of 1 denoting an individual responded ‘most people can be trusted’, 0 otherwise. *Individualism* is a constructed measure using principle-components analysis based on prior literature. *Trust* Individualism* is the interaction term. The control variables include GINI, educational attainment, income levels, age, and employment status. OLS estimation with fixed effects as indicated in the table. Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1

	(1)	(2)	(3)	(4)	(5)
Trust	-0.196*** -0.014	-0.165*** -0.016	-0.146*** -0.024	-0.166*** -0.017	-0.191*** -0.017
Individualism	-0.121*** -0.007	-0.149*** -0.009	-0.140*** -0.013	-0.170*** -0.009	-0.183*** -0.009
Trust*Individualism	-0.02 -0.013	-0.031** (0.015)	-0.078*** (0.021)	-0.039** (0.015)	-0.046*** (0.016)
Edu. Attainment	-	-	0.066*** (0.005)	0.065*** (0.003)	0.036*** (0.003)
Income (Middle)	-	-	0.314*** (0.025)	-	-
Income (High)	-	-	0.619*** (0.034)	-	-
Unskilled	-	-	-0.173*** (0.026)	-	-
Income (decile)	-	-	-	-	0.119*** (0.003)
Age	-	-	-0.004*** (0.001)	-0.008*** (0.0004)	-0.007*** (0.0004)
Employed	-	-	0.102*** (0.025)	0.142*** (0.015)	0.074*** (0.015)
GINI	-	0.005*** (0.001)	0.0001 (0.001)	0.004*** (0.001)	0.005*** (0.001)
Constant	5.559*** (0.011)	5.241*** (0.034)	4.732*** (0.088)	5.246*** (0.047)	4.819*** (0.050)
Observations	221,271	162,105	74,518	156,105	146,778
R-squared	0.010	0.016	0.023	0.022	0.029
Time (wave) F.E.	Yes	Yes	Yes	Yes	Yes
$\frac{\partial \text{Inc. Inq. Att.}_{it}}{\partial \text{Trust}_{it}}$					
Min. Ind.	-0.157*** (0.031)	-0.105*** (0.036)	-0.001 (0.051)	-0.093*** (0.037)	-0.105*** (0.038)
Max. Ind.	-0.240*** (0.029)	-0.233*** (0.034)	-0.314*** (0.047)	-0.250*** (0.034)	-0.290*** (0.035)

fairness of the income distribution both as controls and as moderating variables. We present results with *work important* as a control and moderating variables in columns (2) and (3) of Table 4 respectively. The ones with *work success* are present in columns (4) and (5).

In column (1), which adds gender and marital status, we find our conclusions remain unchanged. Greater individualism enhances the impact of trust in strengthening the views about income equality. Our benchmark conclusions with regard to trust and its interaction with individualism are also supported in the specifications adding the views toward work in columns (2) and (4). While we find *work important* is positive and significant in column (2), *work success* is not significant. Thus, individuals considering work to be important prefer greater income inequality. The alternative interaction effect of trust with *work important* is negative but significant as evident from column (3). The interaction effect of *work success* with trust is negative and significant. Thus, the work success variable functions similarly to the individualism variable and is another dimension of this same effect we hypothesize.

5.2.2. Identification – sample selection bias

Endogeneity can also arise due to the cultural traits - trust and individualism - being co-determined This can result in sample selection bias. To handle such bias, matching techniques have been proposed that can mitigate sample selection bias by helping create a carefully matched control group (Dutta and Mallick, 2022; Borin and Mancini, 2016; Mallick and Yang, 2013).

For our case, ideally to test the first part of our hypothesis, we want to observe the same individual in two different scenarios – trusting other people in general and not trusting other people. A solution to this problem is to consider matching techniques that can help us create a counter-factual that is similar in all characteristics among treatment and control groups except the specific treatment effect in which we are interested – in our case, the extent of trust. ‘Treatment effect’ refers to the causal effect of trust on attitudes about income inequality. The main components of a standard matching approach are ATE (the average treatment effect in the population) and the ATET (the average treatment effect for treated individuals). ATE gives the average effect of trust on attitudes about income inequality across the entire population. ATET also give the effect of trusting individuals but for the treatment group.

We consider inverse probability weight (IPW) estimators that use weighted averages of the observed variable to estimate means of the potential outcomes (Stata, 2022). In essence, IPW estimates correct for the fact that each individual is observed only in one of the potential outcomes by using estimated probability weights to find similar individuals in the sample on all other dimensions. Each

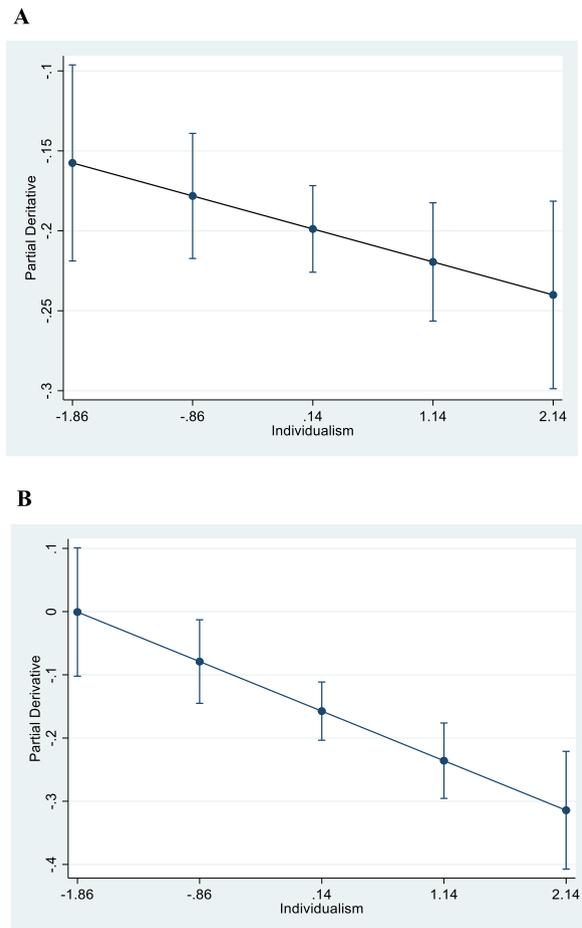


Fig. 1. Graphical Representation of Partial Derivatives. Note: The graphics illustrate the partial derivative, or marginal effects, given by $\frac{\partial \ln c.Inq.Att_{ijt}}{\partial Trust_{ijt}} = \beta_2 + \beta_4 * Ind_{ijt}$, using corresponding coefficient estimates from column (1) and column (3) of Table 2, illustrated for the entire range of values for the individualism values donated on the x-axis. Dots illustrate the point estimate for the effect, and the 95 percent confidence intervals for each point calculated with the Benjamini and Hochberg (1995) adjustment are shown by the high-low markers. If this confidence interval lies entirely below the value of zero on the “Partial Derivative” axis, then the estimated marginal effect at that level of individualism is negative and significant, while it is insignificant if the interval includes the value of zero.

weight is the inverse of the estimated probability that an individual receives a treatment level. Weights closer to one are received by outcomes of individuals who receive a likely treatment. For outcomes of individuals who receive an unlikely treatment are assigned weights much larger than one. The advantage of using IPW estimators is that they model the probability of treatment without any assumptions about the functional form for the outcome model.

IPW estimates require the dependent variable to be binary. Following prior studies, we construct a dummy based on the continuous dependent variable used in our benchmark specifications – the measure for attitudes towards income inequality. The dummy is assigned 1 for above average sample values, 0 otherwise. We consider the treatment group – trust dummy 1 indicating individuals who trust people in general with the control group being the trust dummy equal to 0 implying individuals who do not trust people in general. We present both the ATE and ATET in Table 5A. In addition to the IPW matching method, we also consider the IPWRA (Inverse Probability Weights Regression Adjustment) method to add robustness to our results. The estimates from IPWRA employ weighted regression coefficients to compute averages of treatment-level predicted outcomes with the weights being the estimated inverse probabilities of treatment. The treatment effects are the contrast of the averages. The advantage of IPWRA is their double robust property. In column (1) of Table 5A, we present the ATE and ATET based on IPW estimates. In column (2) of the table, we present the same based on IPWRA estimates..

Based on the results, for both ATET and ATE, we find that the effect remains robust. The effect of trust on attitudes about income inequality is higher for trusting individuals. This is same across the entire population as evident from ATE or considering only the group of individuals who are treated, that is, who generally trust each other.

For testing the next part of our hypothesis, we want to see if this effect is contingent on individualism. Thus, we keep the trust level same across the treated groups but vary individualism. In order to achieve this, the two treatment groups constructed are individuals

Table 3

Views about Income Inequality, Trust, and Individualism – Alternate Measures. Same dependent and control variables as prior tables, except *Respect* is a dummy variable with 1 implying ‘yes’ for individual responses to the question: *Important child qualities: tolerance and respect for other people*. *Respect*Individualism* is the interaction of these two variables. *Individualism1* is the alternate measure of individualism dropping ‘parent proud’. *Individualism2* is the other alternate measure incorporating additional components. *Trust*Ind 1* is the interaction term between trust and *Individualism1*. *Trust*Ind 2* is the interaction term between trust and *Individualism2*. The control variables include GINI, educational attainment, income levels, age, and employment status. OLS estimation with fixed effects as indicated in the table. Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1

	(1)	(2)	(3)
Trust		−0.108*** (0.023)	−0.250*** (0.025)
Respect	−0.003 −0.022		
Individualism	−0.079*** (0.020)		
Respect*Individualism	−0.117*** (0.023)		
Individualism 1		−0.239*** (0.013)	
Trust*Individualism 1		−0.034* (0.020)	
Individualism 2			−0.118*** (0.014)
Trust*Individualism 2			−0.022 (0.023)
Edu. Attainment	0.064*** (0.004)	0.078*** (0.004)	0.087*** (0.005)
Income (Middle)	0.318*** (0.024)	0.350*** (0.024)	0.283*** (0.026)
Income (High)	0.625*** (0.033)	0.699*** (0.033)	0.534*** (0.036)
Unskilled	−0.189*** (0.025)	−0.156*** (0.025)	−0.222*** (0.028)
Age	−0.005*** (0.001)	−0.004*** (0.001)	−0.003*** (0.001)
Employed	0.090*** (0.024)	0.104*** (0.024)	0.140*** (0.027)
GINI	0.0001 (0.001)	0.001 (0.00114)	0.009*** (0.001)
Constant	4.707*** (0.0855)	4.695*** (0.0858)	4.335*** (0.0942)
Observations	78,166	79,567	65,156
R-squared	0.023	0.029	0.024
Time (wave) F.E.	Yes	Yes	Yes
$\frac{\partial \text{Inc. Inq. Att.}_{jit}}{\partial \text{Trust}_{jit}}$			
Min. Ind.	0.214*** (0.049)	−0.083*** (0.030)	−0.230*** (0.36)
Max Ind.	−0.254*** (0.055)	−0.187*** (0.086)	−0.297*** (0.049)

with high trust and low individualism and individuals with high trust and high individualism. Based on the constructed individualism variable, a dummy is constructed which is assigned 1 for high individualism when values are greater than the mean of zero, 0 otherwise. In Table 5B, we present the results for both IPW and IPWRA estimates.

Based on a comparison of columns (1) and (2), as well as (3) and (4), we see that moving from low to high individualism, among those individuals with a high level of trust, results in a much stronger negative relationship consistent with our benchmark results.

5.2.3. Identification – cross section analysis and IV estimation

To further demonstrate the robustness of our results, in this section we estimate additional specifications using cross-sectional analysis that allows us to include more country-specific controls, and we also establish identification via Instrumental Variable (IV) estimation by employing external instruments on our cross-sectional sample. The cross section allows us to employ external instruments that are country-specific and/or time-invariant in nature. We collapse the WVS data over time for each country constructing an average value for all our main variables of interest. We add additional data from World Development Indicators (WDI) database and Fraser Institute Database creating averages over the same period for our control variables. Similar to our benchmark specification, we test the following specification

$$\text{Inc Inq. Att.}_i = \beta_1 + \beta_2 \text{Trust}_i + \beta_3 \text{Ind}_i + \beta_4 (\text{Trust} * \text{Ind})_i + \text{Controls}_i + \varepsilon_i \quad (3)$$

Table 4

Views about Income Inequality, Trust, and Individualism – Inclusion of Additional Controls Same dependent and control variables as prior tables, except for the usage of additional controls for female, married, if work is important or not, and if hard work brings success or not. Some specifications interact these work variables with Trust as alternate specifications. OLS estimation with fixed effects as indicated in the table. Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1

	(1)	(2)	(3)	(4)	(5)
Trust	-0.146*** (0.024)	-0.143*** (0.024)	-0.096 (0.079)	-0.173*** (0.029)	-0.074 (0.059)
Individualism	-0.135*** (0.013)	-0.140*** (0.013)	-0.167*** (0.011)	-0.050*** (0.016)	-0.066*** (0.013)
Trust*Individualism	-0.077*** (0.021)	-0.084*** (0.022)	-	-0.049* (0.025)	-
Edu. Attainment	0.069*** (0.005)	0.065*** (0.005)	0.064*** (0.005)	0.089*** (0.006)	0.089*** (0.006)
Income (Middle)	0.300*** (0.025)	0.312*** (0.025)	0.313*** (0.025)	0.354*** (0.030)	0.355*** (0.030)
Income (High)	0.598*** (0.034)	0.617*** (0.034)	0.616*** (0.034)	0.658*** (0.041)	0.654*** (0.041)
Unskilled	-0.161*** (0.026)	-0.176*** (0.026)	-0.176*** (0.026)	-0.229*** (0.032)	-0.229*** (0.032)
Age	-0.006*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.001 (0.001)	-0.001 (0.001)
Employed	0.071*** (0.025)	0.087*** (0.025)	0.087*** (0.025)	0.205*** (0.031)	0.205*** (0.031)
GINI	0.0004 (0.001)	-0.0003 (0.001)	-0.0004 (0.001)	0.026*** (0.001)	0.0268*** (0.001)
Female	-0.056*** (0.021)	-	-	-	-
Married	0.161*** (0.023)	-	-	-	-
Work Important	-	0.109*** (0.040)	0.130*** (0.050)	-	-
Trust*Work Important	-	-	-0.031 (0.052)	-	-
Work Success	-	-	-	-0.007 (0.005)	-0.0003 (0.006)
Trust*Work Success	-	-	-	-	-0.026** (0.011)
Constant	4.704*** (0.0898)	4.641*** (0.0948)	4.613*** (0.0979)	3.543*** (0.109)	3.508*** (0.110)
Observations	74,518	73,915	73,915	48,021	48,021
R-squared	0.024	0.023	0.023	0.035	0.035
Time (Wave) F.E.	Yes	Yes	Yes	Yes	Yes
$\frac{\partial \text{Inc.Inq. Att.}_{jit}}{\partial \text{Trust}_{it}}$					
Min. Ind./Work imp./Work success	-0.002 (0.052)	0.013 (0.052)	-0.096 (0.079)	-0.081 (0.064)	-0.100** (0.049)
Max. Ind./Work imp./Work success	-0.311*** (0.047)	-0.322*** (0.047)	-0.161*** (0.024)	0.277 (0.052)	-0.336*** (0.068)

Table 5A

IPW and IPWRA estimates: Views about Income Inequality and Trust Probit specifications are considered for all the IPW and IPWRA estimates. We report both average treatment effect (ATE) and average treatment effect on the treated (ATET). A dummy variable based on views on income inequality is the dependent variable: 1 for above average value, 0 otherwise. The treatment group is trust dummy being equal to 1.

	(1)	(2)
	IPW	IPWRA
ATE	-0.031*** (0.002)	-0.013*** (0.004)
ATET	-0.029*** (0.002)	-0.012*** (0.004)

The controls included are GINI, trade as percentage of GDP, a variable measuring the strength of laws against violence towards women (rape), and population in the largest city as a percentage of total population. As a measure of human capital, we include primary enrollment. Finally, we also include economic freedom as a measure of economic institutions.

For our IV specifications, we borrow instruments from recent studies exploring the role of individualism in actual levels of income

Table 5B

IPW and IPWRA estimates: Views about Income Inequality, Trust, and Individualism Probit specifications are considered for all the IPW and IPWRA estimates. We report both average treatment effect (ATE) and average treatment effect on the treated (ATET). A dummy variable based on views on income inequality is the dependent variable: 1 for above average value, 0 otherwise. The treatment groups are (high trust, low individualism) and (high trust, low individualism).

	IPW		IPWRA	
	(1) High Trust, Low Individualism	(2) High Trust, High Individualism	(3) High Trust, Low Individualism	(4) High Trust, High Individualism
ATE	0.040*** (0.003)	-0.036*** (0.011)	0.039*** (0.005)	-0.036*** (0.012)
ATET	0.043*** (0.005)	-0.038*** (0.002)	0.043*** (0.005)	-0.039*** (0.005)

inequality. Nikolaev et al. (2017) use the evolution adaptation theory to find credible instruments. Evolutionary adaptation theory includes adaptive psychological feelings like disgust, as well as awareness about contagion, that shape attitudes towards out-group and in-group members. Individuals adopt such adaptations to stay away from infectious diseases, for example (Fincher and Thornhill, 2008; Schaller and Duncan, 2007). Changes in attitudes towards out-group members resulted in development of prejudices like xenophobia and ethnocentrism (Thornhill and Fincher, 2014). Studies like Navarrete and Fessler (2006) and Faulkner et al. (2004) find that with rising perceptions of being exposed to infectious disease, the likelihood of displaying ethnocentric behaviors and avoiding interactions with out-group members rises. Following, these studies, we employ historical prevalence of infectious disease, proxied with the pathogen index by Murray and Schaller (2010), as an instrumental variable (IV) for individualism. We call this instrument *pathogen*.

The other instrument we consider is a *pronoun drop* dummy. Studies such as Kashima and Kashima (1998) argue the significance of the individual in society is deemphasized when the personal pronoun is dropped in the linguistic structure used. Feldmann (2019) emphasizes that languages allowing personal pronoun drops may not only enhance beliefs that individuals are embedded in social contexts but might also promote values of viewing the collective being more important than those of the individuals. In contrast, languages that require the use of personal pronouns are likely to emphasize the individual along with their beliefs and achievements. A vast number of studies have employed this instrument, we thus employ it as well (Feldmann, 2019; Kammas et al., 2017; Gordnichenko and Roland, 2017; Davis and Abdurazokzoda, 2016; Klasing, 2013). In addition, we consider additional instruments from the growth literature - Legal origin (French), tropical population, percentage of the population 100 km or less from an ice-free coast, and longitude (see Dutta and Sobel, 2021).

In Table 6, we present the results of the OLS specifications in columns (1) and (2), and the IV estimates in columns (3) and (4). For the IV specifications, the Hansen p values suggest that external instruments satisfy overidentification restrictions. As can be seen in the table, the interaction term between trust and individualism is negative and significant in both IV specifications, and one of the two OLS specifications. However, recall the true statistical significance of the marginal effect in the presence of this interaction term varies by the underlying value of the conditioning variable. Similar to before, we present the marginal effects at various values of individualism in the lowest rows of the table. In all four cases the pattern is identical to our benchmark result, the effect becomes increasingly negative with higher levels of individualism. Low trust leads to a preference for higher inequality, and this grows with the degree of individualism.

6. Conclusion

In small groups, the trust established through tribal or personal relationships can be relied upon to ensure both parties to an exchange perform as promised. However, this is not the case in larger and more complex societies where individuals specialize and exchange in large impersonal marketplaces, especially because many exchanges involve one-time transactions with a time dimension and/or cases where monitoring of effort is difficult. This had led to the evolution of various formal and informal institutions that can help to alleviate trust problems in exchange within this 'extended order'. One of these, highlighted by Adam Smith in his famous invisible hand principle, is that market prices (and profit/loss) help to align the personal rewards individuals earn with how well they satisfy the other parties in market exchange. In essence, when the rewards for satisfying your trading partners are significantly larger than for not satisfying them, the differential reward helps to ensure performance—or in the language of microeconomic theory, incentive-compatibility leads to higher effort. Thus, income differences—that is market-based income inequality—can be a substitute for trust in ensuring performance in interpersonal exchange. More simply put, in the absence of trust one needs to be able to provide higher compensation for better performance to incentivize it.

In this paper we test and confirm a hypothesis that a desire for a greater differential in market incomes is indeed associated with environments with lower levels of interpersonal trust. Based on other literature we further hypothesized that this effect should be even stronger in individualistic societies, which we also find. Thus, the trust-inequality substitute relationship is strengthened by high individualism.

While prior literature has examined a large number of questions related to the actual level of income inequality, we are the first to examine how the social and cultural traits of trust and individualism affect individual desires and preferences for income inequality. We support our hypothesis using both individual and country-level data based on the World Values Survey and show that our results are robust to a variety of controls and techniques to account for potential problems of reverse causality, omitted variable bias, and sample selection bias.

Table 6

Views about Income Inequality, Trust, and Individualism – Cross-Sectional OLS Estimates and IV Estimates Cross-sectional OLS specifications incorporating additional controls and IV specifications. Instruments (external) employed in IV specifications in columns (3), (4), (5) and (6). Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

	(1)	(2)	(3)	(4)
	OLS	OLS	IV	IV
Trust	−4.317* (2.468)	−4.159** (1.857)	−9.111** (4.567)	−6.143 (4.991)
Ind. Index	1.002 (1.490)	1.391 (1.233)	3.031 (2.166)	1.914 (2.170)
Trust*Ind	−8.311 (5.909)	−10.09** (4.444)	−17.34** (8.064)	−14.78** (7.504)
Laws (rape)	−0.877 (0.572)	−0.221 (0.665)	−1.519** (0.618)	−0.368 (0.698)
Pop. (largest city)	−0.0002 (0.010)	0.0001 (0.007)	−0.009 (0.010)	0.003 (0.010)
Enrollment (primary)	−0.015** (0.006)	−0.014** (0.006)	−0.005 (0.007)	−0.006 (0.006)
Trade (% GDP)	0.006** (0.003)	0.003 (0.002)	0.005 (0.003)	0.009*** (0.003)
Female/Male LFPR	0.002 (0.005)	0.002 (0.006)	0.007 (0.006)	0.006 (0.007)
GINI index	−0.011 (0.019)	–	−0.038** (0.017)	–
EFW	–	0.060 (0.146)	–	–
Constant	8.616*** (1.826)	7.600*** (1.490)	10.21*** (2.648)	7.027*** (2.236)
Observations	50	47	38	36
R-squared	0.382	0.397	0.388	0.340
Number of instruments	NA	NA	6	6
Hansen J	NA	NA	0.11	0.13
Instruments	NA	NA	Pathogen, Pronoun drop, Legal origin (French), tropical pop., % pop. 100 km from ice-free coast, longitude	Pathogen, Pronoun drop, Legal origin (French), tropical pop., % pop. 100 km from ice-free coast, longitude
$\frac{\partial \text{Inc.Inq.Att}_{jit}}{\partial \text{Trust}_{jit}}$				
min. Ind.	1.667 (2.483)	3.107* (1.734)	3.375 (3.066)	4.497* (2.609)
mean. Ind.	−4.317* (2.467)	−4.158** (1.856)	−9.110*** (4.567)	−6.143 (4.990)
max. Ind.	−16.617* (9.866)	−19.096** (8.286)	−34.770*** (16.004)	−28.016* (15.667)

Declaration of competing interest

The authors do not have any conflict of interest.

Data availability

Data will be made available on request.

References

- Alesina, A., Cozzi, G., Mantovan, N., 2012. The evolution of ideology, fairness and redistribution. *Econ. J.* 122 (565), 1244–1261.
- Alesina, A., Giuliano, P., 2010. The power of the family. *J. Econ. Growth* 15, 93–125.
- Alesina, A., Di Tella, R., MacCulloch, R., 2004. Inequality and happiness: are Europeans and Americans different? *J. Publ. Econ.* 88, 2009–2042.
- Alesina, A., La Ferrara, E., 2002. Who trusts others? *J. Publ. Econ.* 85, 207–234.
- Alesina, A., Glaeser, E.L., 2004. *Poverty in the US and Europe: A World of Difference*. Oxford University Press, New York.
- Bergh, A., Bjørnskov, C., 2011. Historical trust levels predict the current size of the welfare state. *Kyklos* 64, 1–19.
- Bénabou, R., Tirole, J., 2006. Incentives and prosocial behavior. *Am. Econ. Rev.* 96 (5), 1652–1678.
- Benjamini, Y., Hochberg, Y., 1995. Controlling the false discovery rate: a practical and powerful approach to multiple testing. *J. Roy. Stat. Soc. B* 57 (1), 289–300.
- Berry, D.W., Golder, M., Milton, D., 2012. Improving tests of theories positing interaction. *J. Polit.* 74 (3), 1–19.
- Beugelsdijk, S., Maseland, R., Hoorn, A. van, 2015. Are scores on Hofstede's dimensions of national culture stable over time? A cohort analysis. *Global Strat. J.* 5, 223–240.

- Bjornskov, C., 2021. Social Trust and Patterns of Growth. <https://doi.org/10.2139/ssrn.3895905>. Available at: Bjornskov, C., 2019. The political economy of trust. In: Congleton, Roger, Grofman, Bernard, Voigt, Stefan (Eds.), Oxford Handbook of Public Choice. Oxford University Press, Oxford (Chapter 32).
- Bjornskov, C., 2018. Social trust and economic growth. In: Oxford Handbook of Social and Political Trust. Eric M. Uslaner. <https://doi.org/10.1093/oxfordhb/9780190274801.013.24>.
- Bjornskov, C., Méon, P.-G., 2015. The productivity of trust. *World Dev.* 70, 317–331.
- Bjornskov, C., Svendsen, G.T., 2013. Does social trust determine the size of the welfare state? Evidence using historical identification. *Publ. Choice* 157, 259–286.
- Bjornskov, C., 2008. Social trust and fractionalization: a possible reinterpretation. *Eur. Socio Rev.* 24, 271–283.
- Bjornskov, C., 2007. Determinants of generalized trust. A cross-country comparison. *Publ. Choice* 130, 1–21.
- Blanchflower, D., Oswald, A., 2003. Does Inequality Reduce Happiness? Evidence from the States of the USA from the 1970s to the 1990s. Mimeographed. Warwick University.
- Blekesaune, M., 2007. Economic conditions and public attitudes to welfare policies. *Eur. Socio Rev.* 23 (3), 393–403.
- Brambor, T., Clark, W., Golder, M., 2006. Understanding interaction models: improving empirical analyses. *Polit. Anal.* 14 (1), 63–82.
- Braumoeller, B., 2004. Hypothesis testing and multiplicative interaction terms. *Int. Organ.* 58 (4), 807–820.
- Bobo, L., 1991. Social responsibility, individualism, and redistributive policies. *Socio. Forum* 6 (1), 71–92.
- Borin, A., Mancini, M., 2016. Foreign direct investment and firm performance: an empirical analysis of Italian firms. *Review of World Economics (Weltwirtschaftliches Archiv)*. In: Springer; Institut für Weltwirtschaft (Kiel Institute for the World Economy), pp. 705–732, 152(4).
- Cline, B.N., Williamson, C.R., 2016. Trust and the regulation of corporate self-dealing. *J. Corp. Finance* 41, 572–590.
- Corneo, G., Grüner, H.-P., 2002. Individual preferences for political redistribution. *J. Publ. Econ.* 83, 83–107.
- Cruces, G., Perez-Truglia, R., Tetaz, M., 2013. Biased perceptions of income distribution and preferences for redistribution: evidence from a survey experiment. *J. Publ. Econ.* 98, 100–112.
- Davis, L.S., Williamson, C.R., 2019. Does individualism promote gender equality? *World Dev.* 123, 104627. ISSN 0305-750X.
- Davis, L.S., Williamson, C.R., 2016. Culture and regulation of entry. *J. Comp. Econ.* 44 (4), 1055–1083.
- Davis, L., Abdurazokzoda, F., 2016. Language, culture and institutions: evidence from a new linguistic dataset. *J. Comp. Econ.* 44 (3), 541–561.
- Delhey, J., Newton, K., 2005. Predicting cross-national levels of social trust: global pattern or Nordic exceptionalism? *Eur. Socio Rev.* 21, 311–327.
- Dutta, N., Mallick, S., 2022. Gender and access to finance: perceived constraints of majority-female-owned Indian firms. *Br. J. Manag.* <https://doi.org/10.1111/1467-8551.12623>.
- Dutta, N., Giddings, L., Sobel, R.S., 2022. Does trust always help gender role attitudes? The role of individualism and collectivism. *Soc. Indic. Res.* 159, 379–408. <https://doi.org/10.1007/s11205-021-02755-y>.
- Dutta, N., Sobel, R.S., 2021. Entrepreneurship, fear of failure, and economic policy. *European Journal of Political Economy* 66. <https://doi.org/10.1016/j.ejpoleco.2020.101954>.
- Faulkner, J., Schaller, M., Park, J.H., Duncan, L.A., 2004. Evolved disease-avoidance mechanisms and contemporary xenophobic attitudes? *Group Process. Intergr. Relat.* 7 (4), 333–353.
- Feldmann, H., 2019. Do linguistic structures affect human capital? The case of pronoun drop. *Kyklos* 72 (1), 29–54.
- Fincher, C.L., Thornhill, R., 2008. A parasite-driven wedge: infectious diseases may explain language and other biodiversity? *Oikos* 117 (9), 1289–1297.
- Fukuyama, F., 1995. *Trust: The Social Virtues and the Creation of Prosperity*. Free Press, Glencoe, IL.
- Gabel, M., 1998. Public support for European integration: an empirical test of five theories. *J. Polit.* 60 (2), 333–354.
- Gorodnichenko, Y., Roland, G., 2017. Culture, institutions and the wealth of nations. *Rev. Econ. Stat.* 99 (3), 402–416.
- Guillaud, E., 2013. Preferences for redistribution: an empirical analysis over 33 countries. *J. Econ. Inequal.* 11, 57–78.
- Hayek, F.A., 1989. *The Fatal Conceit: the Errors of Socialism*. The University of Chicago Press.
- Hainmueller, J., Mummolo, J., Xu, Y., 2019. How much should we trust estimates from multiplicative interaction models? Simple tools to improve empirical practice. *Polit. Anal.* 27 (2), 163–192.
- Hasenfeld, Y., Rafferty, J.A., 1989. The determinants of public attitudes toward the welfare state. *Soc. Forces* 67 (4), 1027–1048.
- Hofstede, G., 2001. *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations*, second ed. Sage, Thousand Oaks, CA.
- Hofstede, G., 1980. *Culture's Consequences: International Differences in Work-Related Values*. Sage, Beverly Hills, CA.
- Inglehart, R., Oyserman, D., 2004. Individualism, autonomy, self-expression. In: *The human development syndrome*. Institute for Research on Intercultural Cooperation In: Institute for Research on Intercultural Cooperation; Comparing cultures: dimensions of culture in a comparative perspective, pp. 74–96.
- Johnson, N.D., Mislin, A., 2012. How much should we trust the World Values Survey trust question? *Econ. Lett.* 116 (2), 210–212.
- Jordahl, H., 2008. Economic inequality. In: Svendsen, G.T., Svendsen, G.L.H. (Eds.), *Handbook of Social Capital*. Edward Elgar, Cheltenham.
- Kaltenthaler, K., Ceccoli, S., Gelleny, R., 2008. Attitudes toward eliminating income inequality in Europe. *Eur. Union Polit.* 9 (2), 217–241.
- Kammas, P., Kazakis, P., Sarantides, V., 2017. The effect of culture on fiscal redistribution: evidence based on genetic, epidemiological, and linguistic data. *Econ. Lett.* 160 (C), 95–99.
- Karadja, M., Möllerström, J., Seim, D., 2017. Richer (and holier) than thou? The effect of relative income improvements on demand for redistribution. *Rev. Econ. Stat.* 99 (2), 201–212.
- Kashima, E., Kashima, Y., 1998. Culture and language: the case of cultural dimensions and personal pronoun use. *J. Cross Cult. Psychol.* 29 (3), 461–486.
- Klasing, M.J., 2013. Cultural dimensions, collective values and their importance for institutions. *J. Comp. Econ.* 41 (2), 447–467.
- Cluegel, J.R., Smith, E.R., 1986. Beliefs about Inequality: Americans' Views of what Is and what Ought to Be. *Aldine de Gruyter*.
- Knack, S., Keefer, P., 1997. Does social capital have an economic pay-off? *Q. J. Econ.* 112, 1251–1288.
- Kyriacou, A.P., 2016. Individualism–collectivism, governance and economic development. *Eur. J. Polit. Econ.* 42, 91–104.
- Langsæther, P.E., Evans, G., 2020. More than self-interest: why different classes have different attitudes to income inequality. *Br. J. Sociol.* 71 <https://doi.org/10.1111/1468-4446.12747>.
- Leeson, P.T., 2008. How important is state enforcement for trade? *Am. Law Econ. Rev.* 10 (1), 61–89.
- Licht, A., Goldschmidt, C., Schwartz, S., 2007. Culture rules: the foundations of the rule of law and other norms of governance. *J. Comp. Econ.* 35, 659–688.
- Linos, K., West, M., 2003. Self-interest, social beliefs, and attitudes to redistribution. Re-Addressing the issue of cross-national variation. *Eur. Socio Rev.* 19 (4), 393–409.
- Lu, W., Niu, G., Zhou, Y., 2021. Individualism and financial inclusion. *J. Econ. Behav. Organ.* 183. Available at: SSRN: <https://ssrn.com/abstract=3650809>.
- Lutens, R., Valfort, M.-A., 2012. Voting for redistribution under desert-sensitive altruism. *Scand. J. Econ.* 114, 881–907.
- Mikucka, M., Sarracino, F., Dubrow, J.K., 2017. When does economic growth improve life satisfaction? Multilevel analysis of the roles of social trust and income inequality in 46 countries, 1981–2012. *World Dev.* 93, 447–459.
- Murray, D.R., Schaller, M., 2010. Historical prevalence of infectious diseases within 230 geopolitical regions: a tool for investigating origins of culture. *J. Cross Cult. Psychol.* 41 (1), 99–108.
- Nannestad, P., 2008. New work on trust: what have we learnt, if anything? *Annu. Rev. Polit. Sci.* 11, 413–436.
- Navarrete, C.D., Fessler, D.M., 2006. Disease avoidance and ethnocentrism: the effects of disease vulnerability and disgust sensitivity on intergroup attitudes? *Evol. Hum. Behav.* 27 (4), 270–282.
- Nikolaev, B., Boudreaux, C., Salahodjaev, R., 2017. Are individualistic societies less equal? Evidence from the parasite stress theory of values. *J. Econ. Behav. Organ.* 138 <https://doi.org/10.1016/j.jebo.2017.04.001>.
- Nikolaev, B., Salahodjaev, R., 2017. Historical prevalence of infectious diseases, cultural values, and the origins of economic institutions. *Kyklos* 70 (1), 97–128.
- Nikolaev, B., Salahodjaev, R., 2016. Are individualistic societies more democratic-evidence from a new instrument (*Working Paper*).
- North, D.C., 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge.

- Oishi, S., Kesebir, S., Diener, E., 2011. Income inequality and happiness. *Psychol. Sci.* 22 (9), 1095–1100.
- Persson, T., Tabellini, G., 2002. *Political Economics: Explaining Economic Policy*. The MIT Press.
- Schaller, M., Duncan, L.A., 2007. The behavioral immune system: its evolution and social psychological implications. In: *Evolution and the Social Mind: Evolutionary Psychology And Social Cognition*, pp. 293–307.
- Seguino, S., 2011. Help or hindrance? Religion's impact on gender inequality in attitudes and outcomes. *World Dev.* 39 (8), 1308–1321.
- Smith, Adam. 1763/1978. *Lectures on Jurisprudence*. Oxford: Oxford University Press.
- Steele, L.G., 2015. Income inequality, equal opportunity, and attitudes about redistribution. *Soc. Sci. Q.* 96 (2), 444–464.
- Tabellini, G., 2010. Culture and institutions: economic development in the regions of Europe. *J. Eur. Econ. Assoc.* 8 (4), 677–716.
- Tabellini, G., 2008. Presidential address: institutions and culture. *J. Eur. Econ. Assoc.* 6 (2–3), 255–294.
- Thornhill, R., Fincher, C.L., 2014. *The Parasite-Stress Theory of Values and Sociality: Infectious Disease, History and Human Values Worldwide*. Springer.
- Uslaner, M.E., 2003. Trust, democracy and governance: can government policies influence generalized trust? In: Hooghe, M., Stolle, D. (Eds.), *Generating Social Capital: Civil Society and Institutions in Comparative Perspective*. Palgrave Macmillan Basingstoke.
- Uslaner, E.M., 2002. *The Moral Foundations of Trust*. Cambridge University Press, Cambridge, MA.
- Williamson, C.R., 2009. Informal institutions rule: institutional arrangements and economic performance. *Publ. Choice* 139 (3), 371–387.
- Williamson, O., 2000. The new institutional economics: taking stock, looking ahead. *J. Econ. Lit.* 38, 595–613.
- Mallick, S. and Y. Yang (2013). Productivity performance of export market entry and exit: Evidence from Indian firms, *Review of International Economics*, 21 (4): 809-824.