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Inequality, Tolerance, and Growth

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Abstract:

This paper argues for the importance of individuals' tolerance of inequality for economic growth. By using the political ideology of governments as a measure of revealed tolerance of inequality, the paper shows that controlling for ideology improves the accuracy with which the effects of inequality are measured. Results show that inequality reduces growth but more so in societies where people perceive it as being relatively unfair. Further results indicate that legal quality and social trust are likely transmission channels for the effects of inequality.

JEL Codes: D63, O40, Z13

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1. Introduction

Social scientists have been interested in economic inequality for centuries, although for quite disparate reasons. Marxism was to a large extent born out of a concern for the less privileged in industrializing societies with very unequal distributions of income and power, and concluded that increasing inequality would eventually lead to social strife and division, i.e. the masses would rise against ‘capitalist oppression’. Other classical traditions as those founded by e.g. von Mises and Hayek instead tended to focus on the positive incentive effects of income inequality. A vast theoretical literature now fills the gaps on the scale covering an equally wide range of possibilities. In particular, the new economic growth theory suggests a number of channels leading from inequality to growth: incentive structures may be weakened by fighting inequality, human capital accumulation can be hindered, inequality can lead to political instability and distortions from increased government intervention, the quality of the legal system can be undermined by polarization, and any form of social distance may lead to lower social trust. Such theoretical ambiguity with respect to transmission mechanisms and net effect therefore creates an almost infinite variety of possibilities to be scrutinized in empirical studies.

This paper suggests an extension to the literature by taking into account individuals’ mental models - the “deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action” (Peter Senge, quoted in Lindsay, 2000: 284). Mental models are internal representations that all human beings cognitively create to interpret their environment since they in general neither have full information about the real reasons and underlying mechanisms of events affecting their livelihood, nor possess infinite computational capacities to process such information. These models need not reflect the world as it is; yet they are the representations upon which individuals rationally base their actions and through which they assess the actions of others.¹ Agents with differing mental models can thus

¹ Headey (1991, 593) makes the point clear by concluding that, “it should not be assumed that public perceptions of the distribution of social goods are even remotely accurate”. He furthermore assesses that “a normative standard of equality appears systematically to distort perceptions of reality”. In other words,

rationally react differently to the same stimuli, be it exogenous shocks, policies or structural features of society. Different political ideologies provide different explanations of how inequality comes to be, which, as they become part of individuals' mental models of society, also form the basis for making normative assessments of whether income inequality is fair and what (if anything) ought to be done about it. Such assessments could potentially affect individuals' economic and political behavior.

The paper attempts to shed new light on a much-researched issue by hypothesizing that cultural and ideological features, inherent in people's mental models of the economy, matter for the effect of income inequality on economic growth. Specifically, theoretical considerations point to a particular form of parameter heterogeneity of inequality's effects depending on individuals' tolerance of inequality and the degree to which they perceive it to be fair. The paper proxies such tolerance by political ideology as revealed by voter behavior in national elections. It thereafter tests whether inequality in conjunction with ideology adds insight to the standard association between inequality and growth. The findings support the notion that part of the effect on economic growth is mediated by individuals' tolerance of inequality. Without controlling for ideology, the effects of inequality are imprecisely measured but with such controls estimates become substantially more accurate. The results show that inequality is more detrimental to growth in societies where people perceive it as more unfair and thus have a lower tolerance of inequality. Legal quality and social trust emerge as likely transmission channels for these effects.

The paper is structured as follows. Section 2 explores some of the theoretical mechanisms connecting inequality to economic growth, showing how they might

people's mental models are most often outright wrong, yet persistent features of national culture. In an effort to explain this, North (1994: 363) makes the point that "a common cultural heritage provides a means of reducing the divergence in the mental models that people in a society have and constitutes the means for the intergenerational transfer of unifying perceptions". With the fact that values, ideologies and beliefs are also transmitted intergenerationally and contribute to defining mental models, perceptions can be expected to be relatively stable over time.

depend on tolerance. Section 3 presents the measure of political ideology and section 4 describes the remaining data. Section 5 presents the results of cross-country regressions. Section 6 concludes upon the paper and draws some tentative policy implications.

2. Theoretical and empirical considerations

The theoretical literature suggests a number of different mechanisms while a substantial empirical literature has examined the implications for growth with varying results. In the following, I describe some of the mechanisms implying both negative and positive relations between inequality and growth that could be influenced by voters' tolerance of it. All are causal relations going from inequality to growth; hence, this paper only deals with inequality's effects on growth, not the reverse relation.²

2.1. Growth studies

First of all, the classical textbook mechanism linking inequality to higher growth runs through the influence on incentive structures (e.g. von Mises, 2000 [1955]; North, 1991; Olson, 1996). The argument is that the effort people put into income generation depends on the expected rate of return to effort, which by definition is larger in societies with more unequal distributions of income. Hence, people will in general work relatively harder in such societies than in more egalitarian societies, all other things being equal. Pedersen and Smith (2002) provide a striking example of such effects by estimating the income gains from taking employment in Denmark, one of the most egalitarian societies in the world, where they find that welfare benefits are so generous that 15 percent of all unemployed females would experience a reduction of income by taking employment. Likewise, the extremely egalitarian ideology in the now collapsed communist societies

² The reverse relation, running from income to inequality, is the so-called Kuznets curve for which there are good theoretical arguments and counterarguments. Kuznets and others following him argue that the transition from old to new technologies creates winners and losers and thereby polarizes the income distribution. Max Weber (1992 [1930], p. 68), on the other side, noted that there are winners and losers, but winners are most often from the "hard school of life". Hence, Weber's argument has that development of new technology tends to create a middle class. The empirical literature remains unresolved (Persson and Tabellini, 1992; Deininger and Squire, 1998; Barro, 2000).

created concrete disincentives to work, captured in the popular saying “the state pretends to pay us, we pretend to work”.

In the long run, such institutionally induced differences in effort are therefore bound to materialize in the growth rate but only to the extent that they affect individuals’ merit assumptions. If individuals for example believe that inequality derives from merit, i.e. that some people earn more because they for one or another reason deserve so, then inequality will be a signal that it is worth doing an effort and thus induce such effort. In other words, the mere perception of an incentive to work harder may raise workers’ productivity and thus also affect the economic performance of a country. It is worth noting that this notion comes close to arguing for the effects of a Weberian work ethic. It thus also follows that when such perceptions prevail, people will in general be more inclined to tolerate income inequality.

A whole family of alternative theoretical channels is suggested by political economy where the median voter theorem indicates that politicians will introduce various schemes to redistribute income to low-income groups to the extent that the median voter has preferences for more equity and thus has low tolerance of inequality. The standard treatment of the argument is that inequality in itself leads the median voter to want redistribution, which is most likely achieved through increasing the marginal taxation of higher incomes with the revenue often used to subsidize low-income owners (e.g. Persson and Tabellini, 1994). This has (at least) four potential effects: 1) placing a higher proportion of the tax burden on the wealthy part of society may in a Kaldorian optic lead to lower savings and thus less growth (Kaldor, 1956); 2) fiscal redistribution can weaken incentive structures; 3) schemes of redistribution have a strong tendency to increase government involvement in the economy, which is often found to retard growth (Kormendi and Meguire, 1985; Barro 1997; Scully, 2002); and 4) redistribution might, on the other hand, alleviate problems of investing in human capital caused by financial markets imperfections (Perotti, 1993; Barro, 2000). Turning to the empirical literature, Persson and Tabellini (1994) suggest that the negative effect of inequality works through government policy whereas Deininger and Squire (1998) fail to find evidence of this association and Rodriguez (1999) even questions whether inequality leads to

more redistribution in the first place. Yet, the median voter's tolerance of inequality should be reflected in actual policy and the normal functioning of democracy therefore has the effect of increasing redistribution, although more so in countries where the median voter has a 'leftwing' political conviction, as the left wing traditionally is more averse to inequality. The scope of intervention thus not only reflects the level of inequality, but also the extent to which voters perceive inequality as something that can and should be alleviated.

Several studies present another explanation deriving from political economy, which suggests that income inequality is associated with political instability, as less privileged groups may opt for using undemocratic means to improve their situation (e.g. Alesina and Perotti, 1996; Perotti, 1996). As this is more likely to happen in societies with more unequal income distributions, inequality may thus create instability, which retards investment and thereby eventually lowers growth (Barro, 1997).³ However, this link indicates that inequality is more harmful to growth in less democratic societies where the scope for undemocratic action by definition is larger, yet Clarke (1995) finds tentative evidence of the opposite relation while Knack and Keefer (1997) fails to find any differences between democracies and non-democratic regimes. Research on political violence has nonetheless stressed the importance of how inequality is perceived and sociologists have for years been interested in the extent to which individuals tolerate inequality. Shepelak and Alwin (1985: 44), for example, find that "when individuals accept responsibility for their social rewards relative to others, rather than challenging the structure of economic relations, voices of discontent are not heard and revolutions in the socioeconomic order do not occur". Wang (1993: 982) also notes that

³ There is some discussion whether political instability affects long run growth. Campos and Nugent (2002) thus suggests that it does not while Fosu (2001) indicates that the insignificant relation found by many studies is caused by measurement error. Using a more precise measure, he finds a robust negative relation between instability and growth in Africa. Carmignani (2003) provides a survey of the literature, showing that the standard result is a negative association. It is worth noting that the idea of this mechanism in its extreme form comes close to an essentially Marxist understanding of the forces of history.

“income or land maldistribution will not translate into widespread discontent if there is no perceived discrepancy between what people actually get and what they expect to get”. Hence, inequality per se may only lead to political instability to the degree that people perceive it to be unfair.

The final mechanisms to be mentioned are suggested by recent research in social capital and institutional economics. Keefer and Knack (2002) find that income inequality reduces growth through its adverse effects on the security of property rights more than through any other channel advanced by the literature. They conclude that polarization “can reduce the legitimacy of property and contractual rights, making their enforcement more costly” (Keefer and Knack, 2002: 132). The weakening of the protection of property rights in turn leads to poorer economic performance (Barro, 1991, 1997; North, 1994; Knack and Keefer, 1995). In this literature, inequality is also found to lead to lower levels of generalized trust by increasing the social distance between rich and poor, making interactions between these groups less likely and contradicting people’s notions of fairness, which in turn leads to lower economic growth (Whiteley, 2000; Zak and Knack, 2001; Uslaner, 2002). However, the effect of inequality on social trust could arguably depend on how people perceive it. Poor people believing that income inequality is a choice variable of some group that defines the income distribution in people’s mental representation of society may come to perceive their own relative poverty as a signal of non-cooperative behavior of those richer than themselves, which undermines trust across income groups. For example, people with leftwing sympathies often subscribe to a quasi-Marxist view of society as divided in distinct ‘classes’ that do not have coinciding objectives and will therefore tend to have less trust in people outside what they perceive as their own class. On the other hand, Uslaner (2002: 86) notes that “if you believe that economic stratification is justifiable, then you have no need to trust those below you on the economic ladder”.⁴ As trust is central to most

⁴ Uslaner (2002) and others make the same argument for racial differences in the US. The core of the argument can be summarized in the question why you should trust someone in another segment of society when it is improbable that you will ever come to belong to that segment.

definitions of social capital the perception and tolerance of inequality may affect growth indirectly, although not in a trivial way.

To summarize the discussion, many researchers have argued that income inequality could either be beneficial or detrimental to economic growth by working through various channels, none of which are mutually exclusive. The empirical literature contains examples of findings suggesting that inequality is good for growth (Barro, 2000; Forbes, 2000; Scully, 2002) and negative for growth (Persson and Tabellini, 1994; Alesina and Perotti, 1996; Perotti, 1994; Mo, 2000).⁵ This ambiguity leads Forbes (2000: 885) to stress the possibility that “within-country and cross-country relationships between inequality and growth work through very different channels and are of opposite signs”. It is nonetheless an unappealing idea to most economists that economic mechanisms somehow should work differently within countries than between them. The alternative arising from the above discussion is that at least part of the discrepancy between these studies derives from failing to account for different levels of tolerance of inequality, as the former may tend to sort out these effects to the extent that they are time-invariant.

2.2. Experimental studies

A first indication of how mental models can quantitatively affect economic outcomes comes from recent work in experimental economics, which among many other things also seeks to illuminate the relationship between inequality and economic outcomes. In an experiment where the experimenters are able to distinguish between the degree to which merit translates into higher income, Mitchell et al. (1993: 636) find that “inequality becomes more acceptable as people are better rewarded for their efforts”. In the set-up where merit translates moderately into income, which is arguably closest to

⁵ Forbes (2000) concludes that the positive association in panel data analysis is robust while she also replicates the weak negative effect of previous studies in cross-sectional analyses. That panel studies tend to find a positive effect while cross-sectional studies find a negative effect suggests that time-invariant factors could be central. It is nevertheless an important point to note that studies finding a positive association tend to use slightly different measures of inequality than others.

the reality of most countries, they find that “the magnitude of the relationships between political ideology and distributive strategy was startlingly strong” (Ibid.). In more recent large-scale experimental studies, Scott et al. (2001) and Michelbach et al. (2003) in general confirm these results and find that individuals’ perceptions of what is a just income distribution are significantly determined by political ideology, although with some qualifications. They conclude that when people perceive initial conditions such as the distribution of rights and possibilities as unfair, then no factual income distribution can be perceived as entirely fair or tolerable. Whether it is sufficiently fair to be acceptable depends on how much weight people give an efficiency-equity trade-off, and the way they perceive it. How such conditions are perceived arguably depends on political ideology. In particular, the authors find that equality-efficiency preferences are heavily influenced by political ideology. The studies thus find a strong association between political ideology and tolerance of inequality, which I will use in the following.

Pushed to their logical conclusion, the studies above seem to suggest an impact of Landes’ (2000) cultural distinction: inequality matters more when people ask the essentially Marxian question “who did this to us?” instead of asking the Hayekian question “what did we do wrong?”. Collecting the scattered suggestions from economic history, surveys, experiments and empirical studies provides a potential explanation of the widely varying results in the empirical literature that leads to the following hypothesis: *income inequality is only harmful to the extent that people perceive it to be signaling unfair circumstances in society and hence do not tolerate it*. Where this is so, inequality can for example have adverse effects running through weaker social cohesion and trust, increasing government intervention in the economy, undermining the legitimacy of legal systems, or weaken perceived incentives. It is therefore the aim of this paper to test the broad hypothesis that the potentially negative effects of income inequality are alleviated when substantial parts of the population tolerate the actual level of inequality.

3. Measuring tolerance by political ideology

The implications of the above constitute what is to be tested in section 4. However, a measure of tolerance of income inequality is needed before doing so. The literature on

distributive justice suggests that measures of political ideology could serve as proxies for the differences in mental models with respect to inequality and tolerance of it. The simple distinction made in the introduction also supports this suggestion, as pure Marxists would find inequality strongly unfair and detrimental to society while individuals with a pure Hayekian mental model of society would see inequality as natural, fair and even desirable due to its efficiency effects. All three experimental studies above find that political ideology is strongly associated with how individuals perceive inequality, a notion that can also be supported by research in voter behavior. In particular, Downs (1957) developed the idea of the rationally ignorant voter based on the argument that in an ideal world, voters will be well informed about the fine differences between political parties. However, obtaining this information is costly and time-consuming, and it is therefore irrational to do so since the opportunity costs are prohibitively high. In other words, it is rational to be ignorant and cast ones' vote purely based on cheap talk such as political signals. Political ideology constitutes such a signal and voters who agree with a broad ideological statement will therefore vote for the parties that reveal an ideology by the signals they send, which is consistent with their mental models - whether or not parties follow their own ideology after the election is an entirely different matter. Taking Downs' (1957) argument to its logical conclusion consequently suggests that actual voting behavior could constitute a reasonable proxy for individuals' tolerance of income inequality.

Accepting that political ideology can proxy for tolerance, the next step is to find a measure of ideology for which national election results might represent a natural source. I build on this notion by using the general categorization by Beck et al. (2001) who define the three largest government parties at any time according to whether they have a leftwing, centrist or rightwing political orientation. By coding leftwing parties -1, centrist parties 0, and rightwing parties 1, a crude measure of the self-professed ideology of government is obtained. This measure also corresponds to the political ideology of the median voter and therefore proxies for his or her tolerance of inequality. Moreover, taking the assumption that 'national' ideologies remain relatively stable over

time as given, I average these scores over ten-year periods for which data are available.⁶ This procedure probably sorts out most fads and government changes due to political fatigue, failure and mischance. The resulting index is distributed between -1 and 1 , where countries that have had a fully leftwing government throughout the period are assumed to have a population in which the majority has leftwing sympathies and ideology; people in such countries are thus averse to inequality. Countries with rightwing governments in all years, on the other hand, should have populations that care relatively less for inequality and more for efficiency. Following the arguments above, inequality should have a more positive effect in the latter countries. It must be stressed that although measures of political ideology can be calculated for a large number of countries, they only make sense in democracies where voters are free to vote for whomever they choose and thus reveal their true preferences. The samples used in the rest of the paper therefore only include countries that have been democratic for at least part of the period 1971-2000. Being democratic is defined as having a score of 3 or less on the Gastil index of political rights (Freedom House, 2003).

4. Data and estimation

To sum up, the implications of the theoretical considerations in section 2 are that inequality may be bad for growth, but only to the extent that it is perceived to be unfair, i.e. that people do not tolerate it. Hence, it should be expected that the coefficient on inequality is negative and that the interaction term between inequality and ideology is

⁶ A number of values and perceptions have indeed been found to be remarkably stable by e.g. the World Values Survey. Generalized trust, which Uslaner (2002) and others see as a moral value with deep historical roots in e.g. religion, is central to most definitions and measures of social capital. The national scores on generalized trust in the 1981, 1990 and 1999 waves of the World Values Survey have correlations of 0.9. In the analyses below, the ideology measure is normalized to be distributed $N(0,1)$. It should be noted that data from the Comparative Manifestos Project may be an alternative source of political ideology. However, these data to a larger extent depend on the actual situation in countries. For example, the Democratic party in the US seems to put more focus on labour unions than e.g. Scandinavian socialist parties, the reason being that union membership is high in Scandinavia. Such complications make the simple ideology measure adopted here preferable.

positive in the standard linear growth model in equation (1). Moreover, given the theory the effects of income inequality should be measured with greater accuracy when taking ideology into account. The notation of the equation is that γ is inequality, α is political ideology, and X and Z are vectors of control variables.

$$\hat{Y}_i = \beta_0 + \beta_1\gamma_i + \beta_2\gamma_i\alpha_i + \chi_1X_i + \chi_2Z_i + \varepsilon_i \quad (1)$$

The restriction that countries need to be democratic gives rise to estimating equation (1) using one of four different samples dictated by data availability. The 70 countries constituting Sample I have at least one 10-year period in which they have been democratic. However, the political ideology measure is likely to be imprecise for countries that have only been democratic for shorter periods of time. Hence, out of the 70 countries in Sample I, 45 have been democratic (on average) in at least 20 years; they constitute Sample II for which ideology is more precisely measured. Sample III consists of observations for countries only in decades in which they on average have been democratic while Sample IV is Sample III without post-communist countries. Appendix Table A1 lists the countries and how many observations derive from any country in each of the samples. The maximum sample is 185 observations, which is reduced to 128 due to missing observations.

In the following, the dependent variable is average yearly growth over a ten-year period; i.e. growth is measured 1971-1980, 1981-1990 and 1991-2000. Inequality, γ , is measured by the earliest acceptable Gini coefficient in any decade taken from Deininger and Squire (1996); I follow their approach in adding 6.6 to Gini coefficients estimated using data on expenditure instead of income. Tolerance of inequality, α , is measured along the lines of political ideology as outlined above. If the argument above is palpable and the interaction term not simply measures a squared term, political ideology should not be too highly correlated, which is fortunately not the case. The correlation is modest in all samples (0.15-0.26); hence the ideology measure can be used. It does, however, reveal that countries in which inequality is perceived as less of a problem tend to have

slightly more skewed income distributions. The effect is statistically significant, but hardly substantial in economic terms.⁷

I include a vector X consisting of standard explanatory variables found in the literature. These variables include initial GDP per capita to capture conditional convergence, average schooling rate in years, openness to trade and the relative price level on investments as a proxy for the degree of market distortions.⁸ Z is a vector of additional control variables applied in the sensitivity analysis. These variables are chosen so as to cover potential transmission mechanisms and thus include government expenditure, government share of GDP and government size to capture a redistribution channel, a measure of legal quality and an alternative measure of institutional quality, financial depth to proxy for the importance of financial market imperfections, and social capital measured by the generalized trust level. Following the theoretical considerations above, the expectation is therefore that the coefficient on inequality in equation (1), β_1 , and the interaction term, β_2 , should be of opposite signs. The full effect of inequality in country i is thus $(\beta_1 + \alpha_i \beta_2) \gamma_i$. Finally, the coefficient vectors χ_1 and χ_2 should naturally conform to the standard findings. Table 1 describes the data used; Table A2 lists sources and definitions.

INSERT TABLE 1 ABOUT HERE

⁷ Regressing inequality on political ideology, initial GDP and initial GDP squared, i.e. estimating a Kuznets curve, shows that shocking political ideology by one standard deviation leads approximately to a 2 point increase in the Gini coefficient. It shows only limited support for the curve, although GDP squared is only significant at the 10% level and the effect of only a few cases, which is underscored by the fact that the estimated turning point of the curve is at an implausibly high GDP per capita. Estimating the Barro (2000) specification even fares worse in the present samples.

⁸ I use the price level of investments relative to the consumer price level. Similar but slightly less precise results are obtained by following Forbes (2000) in using the price level of investments relative to the US price.

Since the Gini coefficients and certain other variables are measured in the same period as growth, it may be necessary to control for reverse causality. In particular, a Kuznets curve relation would imply that growth leads to first increasing and then decreasing inequality. Most previous research finds no substantial reason for concern with regard to endogeneity between inequality and economic growth. However, I use the panel structure of the data to control for this effect by instrumenting present income inequality with the value lagged one period. Alternatively, using twice-lagged values or the earliest available observation as instruments does not affect the estimates in any significant way. With respect to schooling, openness and legal quality, I use observations at the beginning of each period. The relation between tolerance and growth may also be an issue of some concern. In particular, since most cultures represented in this study look upon unemployed as ‘losers’ in some respect, adopting oppositional identities implying a negative perception of inequality in relation to economic slowdown could be a psychologically appropriate reaction. In other words, low growth could lead to lower tolerance of inequality.⁹ Using political ideology as a proxy for tolerance nevertheless makes no sense unless measured over a prolonged period of time. Otherwise, fads, government takeovers and mere chance may induce too much noise. I therefore refrain from controlling for the above possibility.¹⁰

5. Results

The results of estimating the effects of a baseline model on growth are shown in odd-numbered columns in Table 2. The table reports the results of estimating the baseline

⁹ Tolerance of inequality may thus be connected to opportunities in society. For instance, a lack of employment opportunities may contribute to the active or passive choice of an oppositional identity, implying the perception that inequality is an order of society ‘imposed’ on the individual by certain groups or ‘force’. By choosing such perceptions, it could well be possible to defend ones self-respect while it nonetheless implies adopting an opposition towards those doing better than one self. I am grateful to Karsten Bjerring-Olsen for making this point.

¹⁰ As proper instruments are hard to come by, I test the hypothesis of endogeneity between growth and the political ideology average using a Hausman test as follows (Maddala, 1992, 395). The test conclusively rejects that ideology is an endogenous variable ($p < 0.67$).

with and without controlling for ideology in each of the four samples. As not all results conform to standard findings the control variables warrant a short discussion. Firstly, schooling never becomes significant and the coefficient has the wrong sign. However, this need not be a cause of alarm since a horizon of ten years may not be sufficient to capture the effects of investments in human capital. In addition, research has questioned the robustness of the association between human capital and growth (Lorgelly and Owen, 1999; Pritchett, 2001). Secondly, two control variables can capture the effects of integration into the world economy: openness to trade and market distortions. It is puzzling that openness and distortions each are significant in only two cases. It may nevertheless not be surprising to the degree that inequality measures the importance of institutions, as it has proven difficult to separate the effects of institutions and economic integration (Rodrik et al., 2002; Dollar and Kraay, 2003). Finally, initial GDP per capita is significant in only one case and quite sensitive to the specification as found in previous research (e.g. Temple, 2000).

INSERT TABLE 2 ABOUT HERE

Turning to the main purpose of the paper, the odd-numbered columns show that the effects of income inequality appear to be fragile. Varying the sample shows that inequality is significant at $p < 0.10$ in two of the four samples and insignificant in the other two. As such, the results replicate Deininger and Squire's (1998) finding that inequality is only borderline significant although they also claim that inequality affects growth in undemocratic societies, but not in democratic ones. Like Knack and Keefer (1997), the results presented in Table 2 dismiss the latter notion, as all countries in these samples are democratic. If anything, the results here therefore suggest that Deininger and Squire's non-result in democratic societies may be an effect of a sample consisting of societies that are relatively diverse with respect to tolerance of inequality. Given the way that the measure of ideology is thought to connect to actual tolerance of income inequality, restricting the attention to democratic countries only increases the accuracy of the measure. The lacking result may therefore be an outcome of considerable parameter heterogeneity and not a lack of effect *per se*.

The even-numbered columns in Table 2 report the results of estimating the effects of inequality taking political ideology into account, i.e. adjusting for different levels of tolerance of inequality. Only when using Sample II is inequality insignificant and although there are rather small gains in terms of explanatory power, the inclusion of an interaction term substantially improves the accuracy of the estimated effect of inequality. What is more, the interaction term meant to capture the interplay between tolerance and inequality is highly significant throughout. The results thus provide substantial support for the notion that part of the effect of inequality on growth is mediated by how individuals perceive it, and that the apparent fragility found by previous research may be due to parameter heterogeneity.¹¹ The results also support the theoretical prediction that some of the transmission mechanisms may depend on tolerance. In order to exemplify the effects, the results indicate that income inequality has a significantly negative overall effect on growth in an average country with a per capita income of about 6000 US\$ and a Gini coefficient of 40. The findings in Table 2 indicate that in countries with a political ideology one standard deviation above the average, the adverse effect of inequality is about 20% smaller than at the average. Hence, the effects of tolerance of inequality as revealed by political ideology are not only of statistical significance but also of economic importance.

Table 3 explores some of the potential mechanisms through which these effects may flow, the idea being that including a measure of a transmission channel should be reflected in the coefficients on inequality and the interaction term. Table 4 further explores these mechanisms by regressing them on initial GDP, income inequality and the interaction term. The tables report findings of using Sample IV but results are robust to varying the sample. Columns one to three test for the effects running through redistribution, which would be captured in either government size, government expenditure or governments' share of GDP. The inclusion of either of these variables has no effect on the coefficients on inequality and thus lends support to Rodriguez's (1999) finding that inequality does not lead to redistribution. Table 4 lends additional

¹¹ An alternative procedure where observations are weighted according to their degree of democracy turned out to yield similar results.

credibility to this interpretation as only government size is affected by inequality. The table also reports the results of estimating the determinants of government size without the interaction term, as this is the only of the three redistribution proxies where inequality becomes significant.

INSERT TABLE 3 ABOUT HERE

INSERT TABLE 4 ABOUT HERE

Column four in Table 3 includes legal quality to test for Keefer and Knack's (2002) finding that the effects of inequality mainly run through its effects on the quality of formal institutions. Although the coefficient on legal quality is insignificant it has the effects of improving the explanatory power substantially, cutting the coefficient on the interaction term in half and significantly reducing the coefficient on inequality. Table 4 substantiates this finding by showing that legal quality is indeed affected by inequality, supporting Keefer and Knack's (2002) findings; yet, legal quality is also strongly affected by the interaction term. However, it should be stressed that both remain significant at $p < 0.10$ in Table 3, although inequality barely so. The effects running through legal quality may thus fail to tell the whole story. I therefore include an alternative measure of formal institutions as a control for the possibility that legal quality is proxying for other institutional effects. The variable, regulatory quality, has only very little impact on the coefficients on inequality and Table 4 moreover shows that it is completely unaffected by inequality.¹² Column six in Table 3 tests for another alternative by including a measure of financial depth, which is left out of Table 4, as none of the three control variables proved to be significant. Financial depth turns out to have no effect on growth or the coefficients on inequality. As a last alternative, I include social trust as a measure of informal institutions found to affect growth. The last column in Table 3 lends substantial support for the claim that trust is an important determinant

¹² Further probing into regulatory quality (not shown) reveals that the near significance at $p < 0.10$ of the interaction term in Table 4 is an effect of political ideology per se. It should be stressed, however, that this might be either due to a real effect of ideology or an ideological bias in the measure.

of economic growth (Whiteley, 2000; Zak and Knack, 2001). Although these findings should be interpreted tentatively since the sample size is substantially reduced, it is worth noting that inequality becomes insignificant and the size of the coefficient dwindles. Social trust, on the other hand, emerges significant with a quite large coefficient. The interaction term between ideology and inequality is nonetheless only slightly reduced and remains significant at $p < 0.10$. Table 4 also indicates that the interaction term has no effect on trust while inequality itself has a substantial effect, a finding that is in accordance with the theoretical arguments in section 2.

The findings in Tables 3 and 4 thus point to the conclusion that inequality has a negative effect on economic growth, which runs through the quality of formal and informal institutions. The results thus support the claims of both Keefer and Knack (2002) and of Zak and Knack (2001) while there is no indication of the more traditional view that inequality affects growth by leading to distortionary redistribution (e.g. Persson and Tabellini, 1994). Both institutional channels have independent effects, yet it should be emphasized that the interaction term between inequality and political ideology remains significant in both cases. One could speculate that this is an indication of an independent incentives channel, yet this question is left for future research.

6. Conclusions and implications

This paper has examined the much-researched connection between income inequality and economic growth. A review of a set of potential transmission mechanisms connecting inequality and growth argued that some of these might depend not only on inequality per se, but also on individuals' tolerance of inequality. By using political ideology as a measure of revealed tolerance of inequality and normative attitudes such as merit assumptions and equity-efficiency tradeoffs, the paper tested for the influence of such features. The findings suggest that the weakly identified effect of inequality in previous cross-country studies may be due to parameter heterogeneity as part of the effect depends on tolerance. Furthermore, the findings suggest that inequality leads to lower legal quality, but more so in an ideologically leftwing environment while it affects social trust equally across all countries. Consequently, the main part of the effects of inequality on growth is likely due to its effects on legal quality and trust.

The interpretation of the results nevertheless rests on accepting that political ideology is in fact an appropriate proxy for individuals' tolerance of inequality. Other interpretations exist, yet the immediate implication of the findings irrespective of the interpretation is that the perspective that 'one size fits all' is faulty. Voters' sensitivity must be taken into consideration but is not necessarily reflective of the economically optimal level of inequality. In a broader perspective there are a number of other disputed transmission mechanisms and findings that probably depend on individuals' perceptions of them and their tolerance of existing conditions. Future empirical research may therefore benefit from taking such features into account.

Appendix

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References

- Alesina, A., Perotti, R., 1996. Income distribution, political instability, and investment. *European Economic Review* 40, 1203-1228.
- Barro, R.J., 1991. Economic growth in a cross-section of countries. *Quarterly Journal of Economics* 106, 407-443.
- Barro, R.J., 1997. *Determinants of Economic Growth: A Cross-Country Empirical Study*. Cambridge (MA), MIT Press.
- Barro, R.J., 2000. Inequality and growth in a panel of countries. *Journal of Economic Growth* 5, 5-32.
- Barro, R.J., Lee, J-W., 2001. International data on educational attainment: updates and implications. *Oxford Economic Papers* 53, 541-563.
- Beck, T., Clarke, G., Groff, A., Keefer, P., Walsh, P., 2001. New tools in comparative political economy: the database of political institutions. *World Bank Economic Review* 15, 165-176.
- Campos, N.F., Nugent, J.B. 2002. Who is afraid of instability? *Journal of Development Economics* 67, 157-172.
- Carmignani, F., 2003. Political instability, uncertainty and economics. *Journal of Economic Surveys* 17, 1-54.
- Clarke, G.R.G., 1995. More evidence on income distribution and growth. *Journal of Development Economics* 47, 403-427.
- Deininger, K., Squire, L., 1996. A new data set measuring income inequality. *World Bank Economic Review* 10, 565-569.
- Deininger, K., Squire, L., 1998. New ways of looking at old issues: inequality and growth. *Journal of Development Economics* 57, 259-287.
- Dollar, D., Kraay, A., 2003. Institutions, trade and growth. *Journal of Monetary Economics* 50, 133-162.
- Downs, A. 1957. *An Economic Theory of Democracy*. New York, Harper and Row.
- Forbes, K., 2000. A reassessment of the relation between inequality and growth. *American Economic Review* 90, 869-887.
- Fosu, A.K. 2001. Political instability and economic growth in developing countries: some specification empirics. *Economics Letters* 70, 289-294.

Freedom House, 2003. *Freedom in the World 2003. The Annual Survey of Political Rights and Civil Liberties*. Lanham, Rowman and Littlefield.

Gwartney, J., Lawson, R., 2002. *Economic Freedom of the World: 2002 Annual Report*. Vancouver (BC), the Fraser Institute.

Headey, B., 1991. Distributive justice and occupational incomes: perceptions of justice determine perceptions of fact. *British Journal of Sociology* 42, 581-596.

Inglehart, R., Basañez, M., Moreno, A., 1998. *Human Values and Beliefs. A Cross-Cultural Sourcebook*. Ann Arbor, University of Michigan Press.

Kaldor, N., 1956. Alternative theories of distribution. *Review of Economic Studies* 23, 83-100.

Keefer, P., Knack, S., 2002. Polarization, politics and property rights. Links between inequality and growth. *Public Choice* 111, 127-154.

Knack, S., Keefer, P., 1995. Institutions and economic performance: cross country tests using alternative institutional measures. *Economics and Politics* 7, 202-227.

Knack, S., Keefer, P., 1997. Does inequality harm growth only in democracies? A replication and extension. *American Journal of Political Science* 41, 323-332.

Kormendi, R., Meguire, P., 1985. Macroeconomic determinants of growth. *Journal of Monetary Economics* 16, 141-163.

Landes, D.S., 2000. Culture makes almost all the difference, in: Harrison, L.E., Huntington, S.P. (Eds.), *Culture Matters. How Values Shape Human Progress*. New York, Basic Books, pp. 2-13.

Lindsay, Stace. 2000. Culture, mental models, and national prosperity, in: Harrison, L.E., Huntington, S.P. (Eds.), *Culture Matters. How Values Shape Human Progress*. New York, Basic Books, pp. 282-295.

Lorgelly, P.K., Owen, P.D., 1999. The effect of female and male schooling on economic growth in the Barro-Lee model. *Empirical Economics* 24, 537-557.

Maddala, G.S., 1992. *Introduction to Econometrics*. London, Prentice-Hall.

Michelbach, P.A., Scott, J.T., Matland, R.E., Bornstein, B.H., 2003. Doing Rawls justice: an experimental study of income distribution norms. *American Journal of Political Science* 47, 523-539.

Mises, L. von., 2000 [1955]. *Inequality of wealth and incomes*. Reprinted in *Policy* 16, 62-64.

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

Mo, P.H., 2000. Income inequality and economic growth. *Kyklos*, 53, 293-316.

North, D.C., 1991. Institutions. *Journal of Economic Perspectives* 5, 97-112.

North, D.C., 1994. Economic performance through time. *American Economic Review* 84, 359-368.

Olson, M., 1996. Big bills left on the sidewalk: why some nations are rich, and others poor. *Journal of Economic Perspectives* 10, 3-24.

Pedersen, P.J., Smith, N., 2002. Unemployment traps: do financial disincentives matter? *European Sociological Review* 18, 271-288.

Perotti, R., 1993. Political equilibrium, income distribution, and growth. *Review of Economic Studies* 60, 755-776.

Perotti, R., 1994. Income distribution and investment. *European Economic Review* 38, 827-835.

Perotti, R., 1996. Growth, income distribution and democracy: what the data say. *Journal of Economic Growth* 1, 149-187.

Persson, T., Tabellini, G., 1992. Growth, distribution and politics. *European Economic Review* 36, 593-602.

Persson, T., Tabellini, G., 1994. Is inequality harmful for growth? *American Economic Review* 84, 600-621.

Pritchett, L., 2001. Where has all the education gone? *World Bank Economic Review* 15, 367-391.

Rodriguez, F.C., 1999. Does distributional skewness lead to redistribution? Evidence from the United States. *Economics and Politics* 11, 171-199.

Rodrik, D., Sumbramanian, A., Trebbi, F., 2002. Institutions rule: the primacy of institutions over geography and integration in economic development. NBER working paper 9305.

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

- Scully, G.W., 2002. Economic freedom, government policy and the trade-off between equity and economic growth. *Public Choice* 113, 77-96.
- Shepelak, N.J., Alwin, D.F., 1985. Beliefs about inequality and perceptions of distribute justice. *American Sociological Review* 51, 30-46.
- Summers, R., Heston, A., 1988. A new set of international comparisons of real product and price levels estimates for 130 Countries, 1950-1985. *Review of Income and Wealth* 34, 1-25.
- Summers, R., Heston, A., 1991. The Penn World Tables (Mark 5): an expanded set of international comparisons, 1950-1988. *Quarterly Journal of Economics* 106, 327-368.
- Temple, J., 2000. Growth regressions and what the textbooks don't tell you. *Bulletin of Economic Research* 52, 181-205.
- Uslaner, E.M., 2002. *The Moral Foundations of Trust*. Cambridge (UK), Cambridge University Press.
- Wang, T.Y., 1993. Inequality and violence revisited. *American Political Science Review* 84, 979-983.
- Weber, M., 1992 [1930]. *The Protestant Ethic and the Spirit of Capitalism*. London, Routledge.
- Whiteley, P., 2000. Economic growth and social capital. *Political Studies* 48, 443-466.
- World Bank. 2003. *World Development Indicators*. CD-ROM and online database, Washington (DC), World Bank.
- Zak, P., Knack, S., 2001. Trust and growth. *The Economic Journal* 111, 295-321.

Table 1. Descriptive statistics

	Minimum	Maximum	Average	Std. dev.	Observations
Decadal growth	7.84	339.19	79.63	55.56	160
Initial GDP per capita	322	23217	6090	5438	162
Schooling	0.5	12.0	6.08	2.72	159
Openness	11.5	226.3	68.2	38.15	168
Market distortion	0.79	4.58	1.40	0.68	168
Gini coefficient	21.5	70.7	40.2	9.97	171
Political ideology	-1.00	1.00	0.09	0.74	155
Government share of GDP	4.14	46.02	17.24	8.57	162
Government size	1.87	8.69	5.47	1.48	167
Legal quality	1.95	9.62	6.35	1.82	166
Government expenditure	4.51	37.40	16.37	5.93	169
Social trust	5.0	66.1	33.5	15.64	69

Note: statistics are for the full sample I.

Table 2. Results – Different samples

Dependent variable Sample	Decadal growth rate, GDP per capita							
	1	I 2	3	II 4	5	III 6	7	IV 8
Inequality	-0.197* (-1.693)	-0.268* (-1.801)	-0.138 (-0.728)	-0.275 (-1.213)	-0.215 (-1.562)	-0.369** (-2.314)	-0.271* (-1.770)	-0.451** (-2.541)
Inequality*ideology		0.204** (2.491)		0.247*** (2.678)		0.272*** (3.052)		0.302*** (3.249)
Openness	0.119* (1.746)	0.061 (0.863)	0.094 (1.209)	0.057 (0.719)	0.124 (1.610)	0.022 (0.274)	0.144* (1.851)	0.051 (0.646)
Schooling	-0.035 (-0.334)	-0.056 (-0.529)	-0.139 (-1.073)	-0.137 (-1.073)	-0.040 (-0.392)	-0.011 (-0.096)	-0.067 (-0.550)	-0.054 (-0.431)
Market distortions	-0.034 (-0.391)	0.014 (0.155)	0.071 (0.685)	0.139 (1.280)	0.137 (1.273)	0.210* (1.916)	0.165 (1.468)	0.256** (2.194)
Initial GDP	-0.205* (-1.669)	-0.160 (-1.284)	0.008 (0.048)	-0.006 (-0.037)	-0.085 (-0.605)	-0.106 (-0.735)	-0.074 (-0.484)	-0.083 (-0.535)
Observations	128	118	95	92	102	97	98	93
Adjusted R squared	0.512	0.534	0.528	0.555	0.503	0.508	0.502	0.511
F statistic	20.026	17.766	16.045	15.185	15.600	13.414	14.974	13.037
Standard error of estimate	37.256	35.569	36.568	35.724	35.118	33.374	35.833	33.986

Note: all regressions include a constant term and period dummies; *** denotes significance at $p < 0.01$; ** at $p < 0.05$; * at $p < 0.10$.

Table 3. Transmission mechanisms

Dependent variable	Decadal growth rate, GDP per capita						
	1	2	3	4	5	6	7
Inequality	-0.436** (-2.250)	-0.452** (-2.540)	-0.452** (-2.570)	-0.309* (-1.644)	-0.430** (-2.206)	-0.474** (-2.544)	0.069 (0.339)
Inequality*ideology	0.301*** (3.218)	0.302*** (3.226)	0.302*** (3.210)	0.164* (1.765)	0.267*** (2.663)	0.299*** (3.213)	0.219* (1.809)
Openness	0.049 (0.620)	0.062 (0.712)	0.053 (0.629)	0.007 (0.086)	0.064 (0.767)	0.069 (0.848)	0.070 (0.564)
Schooling	-0.044 (-0.337)	-0.052 (-0.414)	-0.054 (0.430)	-0.136 (-1.148)	-0.115 (-0.873)	-0.116 (-0.797)	-0.100 (-0.512)
Market distortions	0.256** (2.194)	0.246** (2.027)	0.256** (2.202)	-0.081 (-0.654)	0.192 (1.435)	0.240** (2.059)	-0.252 (-1.103)
Initial GDP	-0.093 (-0.586)	-0.070 (-0.433)	-0.087 (-0.543)	-0.292* (-1.828)	-0.105 (-0.633)	-0.059 (-0.376)	-0.612** (-2.252)
Government size	-0.026 (-0.257)						
Government expenditure		-0.034 (-0.322)					
Government share of GDP			-0.006 (-0.063)				
Legal quality				0.115 (0.894)			
Regulatory quality					0.095 (1.055)		
Financial depth						0.087 (0.938)	
Social trust							0.453** (2.519)
Observations	92	92	92	87	90	92	48
Adjusted R squared	0.509	0.506	0.508	0.564	0.508	0.505	0.462
F statistic	11.600	11.486	11.551	13.400	11.211	11.443	6.046
Standard error of estimate	34.030	34.184	34.195	24.316	34.222	34.221	16.876

Note: all regressions include a constant term and period dummies; *** denotes significance at $p < 0.01$; ** at $p < 0.05$; * at $p < 0.10$. The sample is Sample IV.

Table 4. Transmission mechanisms

Dependent variable	Government size		Government expenditure	Government share	Legal quality	Regulatory quality	Social trust
	1	2	3	4	5	6	7
Inequality	0.220 (1.396)	0.292** (1.907)	-0.274 (-1.584)	-0.214 (-0.670)	-0.297** (-2.437)	-0.012 (-0.073)	-0.434** (-2.253)
Inequality*ideology	0.121 (1.365)		0.108 (1.153)	0.029 (0.285)	0.162** (2.479)	0.146 (1.550)	0.023 (0.205)
Initial GDP	-0.394*** (-2.747)	-0.291** (-2.075)	0.472*** (3.011)	-0.652*** (-3.878)	0.736*** (6.560)	0.443*** (2.924)	0.455*** (2.857)
Observations	96	101	96	96	95	96	49
Adjusted R squared	0.394	0.337	0.312	0.228	0.686	0.352	0.498
F statistic	13.364	13.733	9.634	6.596	41.982	11.327	12.908
Standard error of estimate	1.194	1.212	5.162	6.787	1.043	0.756	11.936

Note: all regressions include a constant term and period dummies; *** denotes significance at $p < 0.01$; ** at $p < 0.05$; * at $p < 0.10$. The sample is Sample IV.

Table A1. Countries included in the study

Country name	Periods in sample				Country name	Periods in sample			
	I	II	III	IV		I	II	III	IV
Argentina	3	3	2	2	Japan	3	3	3	3
Australia	3	3	3	3	Latvia	1	0	1	0
Austria	3	3	3	3	Lithuania	1	0	1	0
Bahamas	3	3	3	3	Luxembourg	3	3	3	3
Bangladesh	3	0	1	1	Madagascar	3	0	1	1
Barbados	3	3	3	3	Mali	3	0	1	1
Belgium	3	3	3	3	Mauritius	3	3	3	3
Bolivia	3	3	2	2	Mongolia	1	0	1	0
Botswana	3	3	3	3	Namibia	3	0	1	1
Brazil	3	3	2	2	Netherlands	3	3	3	3
Bulgaria	1	0	1	0	New Zealand	3	3	3	3
Canada	3	3	3	3	Norway	3	3	3	3
Chile	3	0	1	0	Panama	3	0	1	1
Colombia	3	3	2	2	Papua New Guinea	3	3	3	3
Costa Rica	3	3	3	3	Peru	3	0	1	1
Czech Republic	1	0	1	0	Philippines	3	0	1	1
Denmark	3	3	3	3	Poland	1	0	1	0
Dominican Republic	3	3	2	2	Portugal	3	3	2	2
Ecuador	3	3	2	2	Romania	1	0	1	0
El Salvador	3	0	1	1	Slovakia	1	0	1	0
Estonia	1	0	1	0	Slovenia	1	0	1	0
Finland	3	3	3	3	South African Republic	3	0	1	1
France	3	3	3	3	South Korea	3	0	1	1
Gambia	3	3	2	2	Spain	3	3	2	2
Germany	3	3	3	3	Sri Lanka	3	3	2	2
Greece	3	3	3	3	Sweden	3	3	3	3
Guyana	0	0	1	1	Switzerland	3	3	3	3
Honduras	3	3	2	2	Taiwan	3	0	1	1
Hungary	1	0	1	0	Thailand	3	3	2	2
Iceland	3	3	3	3	Trinidad and Tobago	3	3	3	3
India	3	3	3	3	Turkey	3	0	1	1
Ireland	3	3	3	3	United Kingdom	3	3	3	3
Israel	3	3	3	3	United States	3	3	3	3
Italy	3	3	3	3	Uruguay	3	3	2	2
Jamaica	3	3	3	3	Venezuela	3	3	3	3

Table A2. Data definitions and sources

Variable	Source	Description
GDP per capita, GDP growth, market distortions, government share, openness	Penn World Tables, Mark 6	GDP; Growth in real GDP; price of investment relative to consumer prices; government share of GDP; trade volume as percent of GDP. All data are adjusted for purchasing power, see Summers and Heston (1988; 1991)
Inequality	Deininger and Squire (1996)	Gini coefficient.
Schooling	Barro and Lee (2001)	Average years spent in school.
Political ideology	Beck et al. (2001)	Constructed as average political ideology 1975-2000, which is average of three largest of government parties' ideology. Leftwing parties are indexed -1, centrist 0, and rightwing 1. The measure is standardized.
Government size, Legal and regulatory quality	Gwartney and Lawson (2002)	Subjective indices distributed from one (worst quality) to ten (best quality). Government size includes both the level of taxation and government share of GDP.
Social trust	World Values Survey, Inglehart et al. (1998)	Percentage of population answering yes to "In general, do you think most people can be trusted, or can't you be too careful?"
Government expenditure, financial depth	World Bank (2003)	Government expenditure as a share of GDP; Money supply (M2) as percent of GDP.

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