

DOES INEQUALITY HARM ECONOMIC DEVELOPMENT AND DEMOCRACY? ACCOUNTING FOR MISSING VALUES, NON-COMPARABLE OBSERVATIONS AND ENDOGENEITY

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The economic crisis that has recently afflicted most of the Western world has accentuated the interest in the question of whether or not, in the long-run, economic inequality is consistent with economic and political development. For example, a recent article – which builds on the book of Acemoglu and Robinson (2012) *Why Nations Fail: The Origins of Power, Prosperity, and Poverty* – by Chrystia Freeland in the *New York Times* has recently advanced the possibility that unequal societies with low levels of social mobility may be likely to create exclusive political institutions and unprosperous economies. These questions seem especially relevant since both the Great Depression of 1929 and the Great Recession of 2007 were preceded by substantial increases in the level of economic inequality in the United States.

This chapter addresses these issues by first reviewing the literatures on the effect inequality on economic development and on democracy. Overall, the findings of previous studies are mixed on both questions. While most recent empirical studies find that inequality harms economic development, there is still considerable controversy over the mechanisms driving the relationship. I discuss three approaches that have been used to explain why inequality impedes economic development: (1) the political economy approach; (2) the social unrest approach; and (3) the credit market imperfections approach.

Empirical findings about the effect of inequality on democracy are even more inconclusive. Some authors find no relationship, whereas others find positive, negative or non-linear

relationships. I argue that previous studies suffer from at least three important flaws that may explain the inconclusiveness of the findings: (1) they rely on data sets with many missing values (at least thirty percent), and the pattern of missingness is non-random; (2) the data that are available are not comparable across countries or even within countries over time; and (3) they do not account for the possible endogeneity between inequality and democracy.

I address these issues by making two important contributions. First, I construct the first complete and comparable data set on inequality covering the period from 1948 to 2006.¹ This is an important improvement since even the most complete data sets on inequality include a maximum of about seventy percent of the country-years during the period they cover (e.g., Houle 2009). The data set is generated by taking advantage of the fact that one of the main determinants of the level of inequality of a country is the type of goods it produces. Since factor endowments are clustered among neighbors, I predict the inequality level in countries for which data is missing using, among other things, the inequality levels of neighboring countries. Second, I also use the neighboring level of inequality – which is clearly exogenous to the domestic level of economic and political development – as an instrument in two-stage least squares estimations to address the issue of endogeneity. My findings largely confirm those of Houle (2009). While inequality does not affect democratization, it reduces the likelihood that a democracy, once established, will survive.

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¹ Only a few countries, mostly Pacific Islands, are excluded from the data set.

Traditionally, arguments in favor of progressive policies designed to create economic equality were based exclusively on ethical concerns. Equality was perceived as potentially valuable since, particularly in low income countries, it means that fewer people suffer from diseases, malnutrition, etc. However, most early economists believed that equality harms economic development, in particular because it reduces incentives to invest and work. This is, for example, the view articulated by Arthur Okun in his 1975 influential book *Equality and Efficiency: The Big Tradeoff*. Another related argument, often referred to as the "Kaldorian" approach after Nicholas Kaldor, suggests that the rich tend to save a greater proportion of their income than the poor, because the latter simply have to spend a larger share of their earnings on basic needs.² According to this view, inequality fosters savings and investments, which in turn increase growth. Early economists thus believed there were a tradeoff between efficiency and equity.

These arguments were later challenged in light of the great economic success of East Asian countries after the Second World War. Despite the fact that these countries have highly equal wealth distributions – often due to successful land redistribution policies – during the 1960s and early 1970s they experienced among the highest growth rates. This is particularly striking when comparing East Asian and Latin American countries. The latter were highly unequal and had smaller growth rates even though their initial per capita GDPs were roughly the same. Other bilateral comparisons raise questions about the relationship between inequality and growth. For instance, Lucas (1993) and Benabou (1996) cite the cases of South Korea and the Philippines. In the beginning of the 1960s, these two countries had similar GDPs per capita, populations, urbanization, and primary and high school enrollment rates. One of the few significant differences between the two was that the Philippines were a lot more unequal than South Korea.

² Smith (2001) indeed finds that inequality stimulates savings.

Surprisingly, in the following twenty-five years, South Korea attained an average per capita growth rate of about 6 percent and the Philippines only 2 percent. While these examples do not demonstrate that inequality *causes* underdevelopment, they certainly raise questions.

During the early 1990s, a first wave of studies using cross-country methods found a negative long-run relationship between income inequality and per capita growth rates. The first of these is Persson and Tabellini (1994), which employ a data set that covers 56 countries between 1960 and 1985. Using Ordinary Least Squares (OLS), they found that increasing the share of the income of the lower class increases growth in the long-run. Alesina and Rodrik (1994) obtain analogous results with a similar statistical specification, but a slightly larger data set. Moreover, they measure income with Gini coefficients. The central finding of these articles – according to which inequality harms growth – was subsequently confirmed by a number of articles (e.g., Alesina and Perotti 1996; Perotti 1996; Benabou 1996). These results were later reconfirmed in a series of work using a new better quality data set on inequality developed by Deininger and Squire (1996) and again relying on cross-national techniques (e.g., Deininger and Squire 1998).

A second wave of studies, spearheaded by Forbes (2000) has obtained quite different results. Contrary to earlier articles, they used panel techniques with fixed-effects. Therefore, instead of examining whether countries with lower inequality levels have on average grow at a faster rate, say over a period of 20 to 30 years, they look at whether change in the level of inequality *within* a given country affects growth. In general, these studies find that an in inequality has a *positive* effect on growth in the short-run – for example, within the next five years (Li, Squire and Zou 1998; Forbes 2000; Balisacan and Fuwa 2003). Moreover, another important study by Barro (2000) reports that, in the medium-term (within a ten years period) the effect of income inequality on growth is statistically insignificant. Nevertheless, when he distinguishes between

low and high income countries, the relationship is negative for the first and positive for the second group.

These different findings do not necessarily contradict each other. As suggested by Lloyd-Ellis (2003) and even Forbes (2000) herself, the relationship between inequality and growth may be negative in the short-run, insignificant in the medium-run and negative in the long-run. In fact, as discussed below, theories usually predict that these variables should be negatively linked mainly in the long-term, notably through the accumulation of human capital. Figini (1999) directly tests the hypothesis that the negative effect is stronger in the long-run. He runs a number of cross-country regressions with different time spans and show that the relationship indeed strengthens with longer periods.

A third wave of studies, using better quality and more complete data sets, have tended to support the negative relationship reported by the early empirical literature (e.g., Easterly 2007; Roe and Siegel 2011; Woo 2011; Knowles 2013). These studies often use instrumental variable estimation techniques to account for the potential endogeneity problem, i.e. economic development itself may affect inequality for example through the Kuznets curve. Interestingly, these results are not sensitive to the inclusion of country fixed-effects.

While most of the recent literature suggests that, at least in the long-run, inequality harms economic development there is still uncertainty about which causal mechanisms drive the relationship. There are three main mechanisms that have been developed. First, the early literature was dominated by the political economy approach, which is based on the application of median voter theorem by Meltzer and Richard (1981) to the question of redistribution in democracies (e.g. Persson and Tabellini 1994; Alesina and Rodrik 1994). The idea is that, in an unequal society, citizens tend to elect politicians promoting high redistribution and thus, high

taxes. Since high taxes diminish returns to investment, it also lowers growth. A straightforward implication of this approach is that, since the dynamics take place through the voting process, the negative relationship should only be observed among democratic countries. However, empirical studies find that in fact the relationship is much stronger among undemocratic than democratic countries (e.g. Deininger and Squire 1998; Figini 1999).

Moreover, contrary to what it implies, most empirical studies find that the relationship between inequality, on the one hand, and transfers and/or taxation, on the other, is statistically insignificant or even negative (e.g. Persson and Tabellini 1994; Perotti 1996; Figini 1999). Finally, again contrary to the implicit assumptions made by the political economy approach, redistribution and taxation do not necessarily reduce growth (e.g. Perotti 1996).

Second, the social unrest approach claims that economic inequality creates social and political unrest, which reduces growth (e.g. Alesina and Perotti 1996; Benabou 1996; Benhabib and Rustichini 1996; Roe and Siegel 2011). This approach is based on two implicit assumptions: (1) the positive impact of inequality on political instability; and (2) the negative effect of social instability on investment and/or growth. Using different measures of social instability, most authors confirm both relationships. Social and political unrest can take the form of unsuccessful and successful coups d'etat, riots, strikes, protests, revolutions, irregular government turnovers, political assassinations, or crime more generally. These different forms of instability distort incentives by increasing the uncertainty faced by potential investors. A related approach argues that inequality harms property rights or increases policy volatility, which in turn increases uncertainty and reduces growth (see, for example, Keefer and Knack 2002; Woo 2011).

The third and final approach, the credit market imperfections approach, states that in an unequal society some individuals may not be able to invest in a given asset – especially, human capital –

even when faced with high marginal returns. Poor individuals may be unable to borrow the required funds because of credit market imperfections. In a society where laws enforcing loans are relatively inefficient, borrowers have higher incentives to default, since they are unlikely to get caught and reprimanded. Therefore, lenders will ask for collateral, that they can seize in case of default; hence preventing poor individuals that do not have enough collateral from investing even if they would be willing to assume the risk of the investment.

Inequality can adversely affect growth through credit market imperfections if (1) a particular production factor exhibits diminishing returns at the individual level;³ or if (2) individuals are heterogeneous and those that have enough resources to invest are not necessarily those that face the highest returns.⁴ Under those conditions, inequality leads to an inefficient allocation of resources, and distorts incentives to invest and work.

One interesting example, especially for developing countries, is the case of land. There are reasons to believe that large landholders face greater incentive problems. They must hire more workers, whereas small farmers usually work on their own land. It is difficult to monitor agrarian workers, since agricultural activities are subject to high risks, such that the landholder is unable to determine if a bad crop is caused by low effort or by exogenous factors, like weather – i.e. there is a moral hazard problem. Empirical evidences indeed suggest that there is an inverse relationship between the size of a piece of land and its per acre productivity (e.g. Carter 1984). Therefore, if there are borrowing constraints that prevent small farmers from buying land from large landholders, the economy could be inefficient. This is consistent with the observation that

³ In the case of education that would imply that those with less education will benefit more from an additional year of education than those that have high levels of human capital.

⁴ For human capital, this means that those that would have the highest marginal returns from education are not necessarily those that are born with the resources necessary to get educated.

there is a strong negative relationship between land inequality and growth (Deininger and Squire 1998).

Other branches of the literature focus on the inability of the bulk of the population to invest in physical and/or human capital (e.g. Galor and Zeira 1993; Lloyd-Ellis and Bernhardt 2000). For example, Galor and Zeira (1993) present an overlapping generations model where individuals receive unequal bequests. Whether or not a child gets an education depends only on his/her initial bequest. The authors find that inequality decreases the average level of human capital, and thus aggregate output, in both the short- and the long-run.

Since credit market imperfections are hard to measure, there are relatively few empirical studies directly testing this approach. Perotti (1994) uses the loan-to-value ratio for mortgages as a proxy for the quality of credit institutions. He finds credit availability to be significantly related to growth and this effect to be stronger when inequality is high. The credit market imperfections approach is also consistent with the finding according to which the negative effect of inequality on growth is stronger in non-OECD countries, in which credit markets are underdeveloped (see Knowles 2013).

Related to the credit market imperfection approach is the argument that inequality limits social mobility which is an important engine of economic development. This idea is closely related to the line of argument developed by Acemoglu and Robinson in their important 2012 book *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*, although these authors do not focus on the role of inequality but on political institutions limiting social mobility. According to that view, it is not necessarily economic inequality per se that is detrimental to development but rather the lack of social mobility it engenders. In fact, there is strong evidence that there is a negative relationship between inequality and intergenerational mobility (e.g., Andrews and Leigh

2009). The relationship is called the Great Gastby curve. As suggested above, the lack of opportunities for social mobility leads to an inefficient allocation of resources, and reduces incentives to invest and work.

Finally, in light of the Great Recession of 2007, many authors have examined the effect of inequality on the likelihood of experiencing an economic crisis. These studies suggest that inequality may inhibit development by reducing the capacity of an economy to sustain high rates of economic growth and by increasing the likelihood that it experiences an economic crisis (e.g., Berg and Ostry 2011; Berg, Ostry and Zettelmeyer 2012). The mechanisms discussed above to explain the negative effect of inequality on economic development could also explain why unequal countries are more likely to fall victims of economic crises. Some authors have also linked inequality to high levels of household debt-to-income ratio that were important causing factors for both the Great Depression of 1929 and the Great Recession of 2007 (see Kumhof and Ranciere 2010; Rajan 2010). Inequality induces the lower and middle classes – who have access to cheap lending from the rich in their country and abroad – to borrow in order to maintain their living standards.

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As pointed out in the introduction, current political commenters have also warned that economic inequality may lead to the creation of exclusive political institutions. Most of the previous theoretical literature has indeed argued that inequality harms democracy by both decreasing the likelihood that an autocracies democratizes and that a democracy remains democratic. This view has first been expressed by Aristotle and reaffirmed by some of the classical authors on

democracy, such as Lipset (1959) and Dahl (1971), as well as more recent authors (e.g., Boix 2003; Muller 1995; Rosendorff 2001). Values often play an important role for these authors. Citizens in equal societies are more likely to have access to education and to share democratic values, such as tolerance, which have been argued to be essential for the establishment and consolidation of democracy. These arguments have also often been closely related to those of the modernization theory, according to which economic development fosters democracy. At a given level of economic development, reducing inequality means that more people have the resources necessary to solve their collective action problem and demand democracy.

These authors also point to the role of the middle class – which they associate with low inequality levels – as a key determinant of democracy. According to these authors, the middle class is a natural supporter of democracy because it is unlikely to adopt extremist positions and is likely to be tolerant. To paraphrase Lipset (1959), a society that is shaped as a diamond – with a large middle class, and small lower and upper classes – is more conducive to democracy than a society that has a diamond shape.

Some of these authors, including Boix (2003), argue that inequality affects regime transitions through its effect on redistribution. According to Meltzer and Richard (1981) – who apply the median voter theorem to the question of redistribution in democracies – unequal democracies redistribute more than those that are more equal.⁵ Therefore, Boix (2003), among others, argues that inequality decreases the willingness of the ruling elites to democratize; reducing the likelihood of democratization. Similarly, when a country is already democratic, inequality

⁵ This causal mechanism has recently been questioned by Kaufman (2009) who finds that in Latin America, inequality is not related to higher demands for redistribution. Moreover, Haggard and Kaufman (2012) demonstrate that redistributive conflicts are rarely at the origin of transitions to and from democracy, even though unequal democracies are more likely to collapse.

increases the expected future level of redistribution; increasing the likelihood that the upper class stages a coup against a democracy.

Acemoglu and Robinson (2006) propose a second possible relationship between inequality and democracy. As the first approach discussed above, they argue that inequality harms the consolidation of already established democracies. However, unlike most authors before them, Acemoglu and Robinson (2006) do not argue that inequality has a linear negative effect on democratization. Instead, they argue that the relationship between inequality and democratization is inverted U-shaped. Like those of Boix (2003), the theoretical arguments of these authors rest on the median voter theorem. However, in Boix (2003) only the willingness of the elites to concede democracy is affected by inequality, whereas in Acemoglu and Robinson (2006) both the willingness of the elites to concede democracy and that of the population to demand it depend on inequality.

In equal autocracies, the population simply does not demand democracy because it has little to gain in terms of redistribution; making such countries unlikely to democratize. At intermediate levels of inequality, however, the population has incentives to demand democracy. At the same time, the ruling elites are unwilling to use repression, because redistribution is relatively inexpensive; and so they democratize. But when inequality is high, the elites prefer to repress. Therefore, the regime remains authoritarian. In this account, regime change occurs because of the inability of the elites (or the masses) to credibly commit to high (low) levels of redistribution.

A third approach has recently been proposed by Ansell and Samuels (2010). These authors build on the contractarian approach to regime transition rather than the redistributive approach, notably used by Boix (2003) and Acemoglu and Robinson (2006). According to the contractarian approach, democracy emerges when powerful groups that are independent from the state demand

protection against expropriation by the state. Historically, democracy has been related to the rise of the bourgeoisie and the collapse of the landed upper class. Ansell and Samuels (2010) thus predict that income inequality – which is often linked with the expansion of the bourgeoisie, at least in the early phases of industrialization – *fosters* democratization, while land inequality harms it.

One important observation is that most of these predictions are primarily about *interclass* inequality, not the overall inequality level in a society. For example, Boix (2003) and especially Acemoglu and Robinson (2006) insist that their predictions only hold for inequality between the capital and labor classes. The same is true for authors such as Lipset (1959) and Ansell and Samuels (2010) that discuss the role of certain social classes in the transition and consolidation processes.

The empirical results on the relationship between inequality and democracy are mixed. Some authors find that there are no relationship (e.g., Barro 1999; Bollen and Jackman 1985, Papaioannou and Siourounis 2005), some find a negative relationship (e.g., Muller 1988, 1995; Boix and Stokes 2003; Boix 2003), others a positive relationship (e.g., Ansell and Samuels 2010; Midlarsky 1992), and yet others an inverted U-shaped relationship (e.g., Burkhart 1997; Epstein et al. 2004). Houle (2009) finds that while inequality harms the consolidation of democracies, it does not affect the likelihood that a country democratizes in the first place. The negative effect of inequality on democratic consolidation has been recently confirmed by Haggard and Kaufman (2012), although they raise questions about the causal mechanisms based on the median voter theorem. Freeman and Quinn (2012) find that the effect of inequality on democratization depends on the extent to which an autocracy is financially opened. On the one hand, when autocracies are financially closed, the relationship between inequality and the probability of

democratization is inverted U-shaped, as predicted by Acemoglu and Robinson (2006). On the other hand, when an autocracy is financially opened, inequality increases the likelihood of democratization.

These studies suffer from at least three limitations that may explain the inconclusiveness of their results. First, the inequality data set they use have a very large proportion of missing values. For example, the widely used Gini coefficients' data set of Deininger and Squire (1996) – that is used by Boix (2003) among others – contains only eleven percent of the country-years during the period it covers (Houle 2009). Even the most recent studies typically have around thirty percent missing observations. For example, the democratization models of Freeman and Quinn (2012) contain a maximum of 54 autocracies, and even for these countries many years are missing. Such high levels of missingness are likely to affect results significantly because unavailable observations are not missing at random.

The data set that is used the most widely – including by Freeman and Quinn (2012) – is the one of the World Institute for Development Economics Research (WIID; version 2008), which is an updated version of the data set of Deininger and Squire (1996). In this data set, a very large proportion of the missing observations are from sub-Saharan Africa and the Middle East. This is an obvious problem because countries from these regions often have intermediate levels of inequality and low democracy levels. Their omission could explain, for example, why Freeman and Quinn (2012) find that there is an inverted U-shaped relationship between inequality and the likelihood of democratization in closed economies; since the countries that are likely to contradict such a relationship have simply been excluded from the estimation.

Second, not only are data sets on inequality incomplete, but the observations that are available are not comparable across countries and even within countries over time. Most recent studies use

the data set of the WIID (2008) which report Gini coefficients based on surveys conducted by the countries themselves, using different definitions and methods. These sometimes change even within countries over time. Surveys differ along many dimensions, but three are particularly important: (1) the unit of reference (e.g., household vs. individual); (2) the definition of revenues (e.g., expenditure vs. income); and (3) net vs. gross income. These differences are likely to affect the Gini coefficients that have been calculated (see Galbraith 2012; Solt 2009). For example, Gini coefficients calculated with net income are likely to indicate lower levels of inequality than those calculated with gross income.

Some authors, such as Freeman and Quinn (2012), have tried to resolve this issue simply by adding constants. For example, these authors use regression analysis to estimate the average difference between Gini coefficients calculated on net and gross income and add a constant to the Gini coefficients based on net income. However, this approach has many problems (see Atkinson and Brandolini 2001; Galbraith 2012; Solt 2009). In the case of net and gross income, for example, it assumes that all countries have the same redistribution system during the whole period covered, which is obviously not the case. In general, the impact of using different units of reference and definitions of income depend among other things on the family structure, the details of the tax laws, the redistributive system, state capacity and the propensity to save (Solt 2009). These are likely to differ widely across countries. These issues are partially addressed by Solt (2009) who uses a sounder method to estimate the error generated by the use of non-comparable observations.⁶

Moreover, because of the low number of 'high-quality' observations in the WIID (2008) data set, authors that use it must include observations that are not only non-comparable but also of very

⁶ Solt (2009) uses the fact that the relationship between different units of reference and definitions of income will change slowly in time within countries and are likely to be similar among countries of the same regions.

low quality. For example, Freeman and Quinn (2012) use the observations that have a quality rating of at least 3 (out of 4, where 4 indicated the lowest quality). Observations with a quality rating of 3 are "observations where both the income concept and the survey are problematic or unknown"(United Nations University, p. 15).

In addition, the indicators of inequality used by most previous authors do not directly measure interclass inequality. In fact, most authors use Gini coefficients which capture the overall level of inequality in a society (e.g., Boix 2003; Freeman and Quinn 2012; Ansell and Samuels 2010). Some use other variables that are likely to be related to inequality, such as infant mortality (e.g., Epstein et al 2004). Therefore, most of the literature uses measures of inequality that are not well-suited to test existing theories about interclass inequality.

The third main limitation with previous empirical tests on the effect of inequality on democracy is that they have not account for endogeneity, particularly reverse causation. In fact, in inequality theories of democratization, inequality affects regime transition precisely because it affects the incentives of different social classes to control redistributive policies, and thus change the inequality level. Moreover, country-specific factors could affect both the likelihood of regime change and inequality; hence creating omitted variable bias. The remaining of this chapter contributes to the literature by estimating the effect of inequality on transitions to and from democracy using a complete and comparable data set on inequality, and by using an instrumental variable strategy to address the issue of endogeneity.

Data

The unit of analysis in this study is the country-year. The data set contains nearly 7,000 observations and covers about all countries between 1948 and 2006.

Political Regimes

To determine whether a country is democratic or autocratic, I use the regime type data set of Cheibub et al (2009), which extends the data set of Przeworski et al (2000) until 2006. These authors define a regime as democratic if it satisfies four conditions. The first and the second conditions are that the chief executive and the legislature need to be elected by the population. The next condition is that there must be multiple parties. Lastly, there must have been at least one alternation in power through elections.

Three Measures of Inequality

This study uses three measures of inequality. The first and main one is the capital share of the value added in production. This gives the proportion of the value created within specific firms that accrues to the owners of these specific firms, as opposed to the laborers. This data set is an updated version of the capital shares of Rodrik (1999) and has been assembled by Ortega and Rodriguez (2006). It is constructed from data collected by the United Nations Industrial Development Organization (UNIDO).⁷ Dunning (2008), Acemoglu and Robinson (2006), Przeworski et al. (2000), Haggard and Kaufman (2012) and Houle (2009) have also recently used that same source of capital shares to measure inequality.⁸ According to Dunning (2008), "capital shares represent the best available cross-national indicator of private inequality" (p.143). Low capital shares indicate low levels of inequality, because a large proportion of the value added in

⁷ Capital share is calculated as one minus the labor share, which measures the ratio of compensation of employees to the value added in production.

⁸ Acemoglu and Robinson (2006) and Przeworski et al. (2000) use the version of Rodrik (1999).

production is accruing to the labor class as opposed to the capital owners. The sample contains about 3,500 observations and covers 116 countries between 1960 and 2000.

The capital share has many theoretical and empirical advantages over alternative measures of inequality. First of all, contrary to Gini coefficients which measure the overall level of inequality in a society, capital shares directly capture inequality between social classes. In fact, according to Acemoglu and Robinson (2006), "when the major conflict is between the rich and the poor, one variable that captures inter-group inequality is the share of labor income" (p. 59). Note that the capital share is conceptually similar to the surplus-value of Karl Marx.

Another advantage of using capital shares is that they are calculated based on surveys distributed directly by the UNIDO to firms using similar definitions and methodology for all countries, making cross-country comparisons meaningful. This stands in stark contrast to the WIID's Gini coefficients that are calculated based on national surveys. The comparability of the capital shares data set of Ortega and Rodriguez (2006) has recently been challenged by Freeman and Quinn (2012). Their skepticism stems from the positive relationship between capital shares and GDP per capita. They claim that Ortega and Rodriguez (2006) themselves give three possible explanations for this, all of which suggest that capital shares should not be used as measures of inequality: (1) that it is driven by the fact that capital shares do not include the informal sector which would bias the capital shares upwards in poor countries; (2) that the definition of the wages that are reported are sometimes different across countries and that rich countries tend to include compensations; and (3) that they do not include the agricultural sector which again should bias the capital shares upwards in poor countries.

However, Freeman and Quinn (2012) omit to mention that Ortega and Rodriguez (2006) have examined these three possibilities and that they found that none of them can explain the positive

relationship between capital shares and GDP per capita. In fact, since the capital shares give the proportion of the value that is created within specific firms that accrues to the owners of *these* specific firms, the exclusion of the informal sector cannot affect the value of the capital shares, only whether or not it is representative of the whole economy, an issue that is addressed in more detail below. The same point can also be made regarding the exclusion of the agricultural sector. Moreover, Gini coefficients, when drawn from national income surveys, also omit the informal sector. Finally, regarding the second point, it is true that OECD countries use a more inclusive definition of wages, which may partially explain why they have lower capital shares. However, all of the results reported below are robust to the exclusion of OECD countries, and so are not driven by the differences in the definition of wages between OECD and non-OECD countries.⁹

That inequality diminishes at lower levels of development, by itself, is hardly surprising. In fact, according to Ortega and Rodriguez (2006) "there is nothing in the current state of either the empirical or theoretical literature that would lead us to treat the negative relationship between capital shares and per capita income [...] as an anomaly" (p. 6). Most authors indeed agree that development should, at least in the long-run, decrease inequality (e.g., Boix 2003; Boix and Stokes 2003; Lipset 1959). One possibility, for example, is that rich democracies are more likely to have legislations that favor the labor class, such as the authorization of founding unions; thus increasing the share of the value created that accrues to the workers. The negative correlation between capital shares and GDP per capita seems to be entirely driven by rich democracies. In fact, the correlation is only -0.03 among non-democracies. Moreover, many models demonstrate formally that the share of the wealth created that accrues to the labor class should increase as a

⁹ Freeman and Quinn (2012) also argue that the number of firms surveys within the same countries vary widely from year to year. However, the very fact that capital shares are highly persistent within countries over time implies that this does not have an important effect on the capital share values.

country develops, because human capital surpasses physical capital as the primary engine of growth in the later stages of development (see Galor and Moav 2004). That inequality tends to be low in rich countries is also fully consistent with the predictions of Kuznets.

One potential limitation with the capital shares data set is that, although its observations are comparable, they may not be representative of the class relationships outside the manufacturing sector. Moreover, the size of the manufacturing sector itself varies across countries, such that the capital shares may be a better approximation of the level of interclass inequality in some societies than in others. However, previous studies demonstrate that inequality within a specific sector of the economy tends to reproduce itself in the other sectors of its economy (Galbraith 2012; Williamson 1982). Therefore, using interclass inequality within a given sector of the economy – the manufacturing sector in this case – gives a good approximation of the overall level of interclass inequality of that country. This is consistent with the widespread finding, discussed below, according to which inequality does not vary much within countries over time, even though the structure of the economy itself does change.

Second, I also use the Gini coefficients data set of Solt (2009), which, as discussed above, contains observations that are relatively comparable. Although its observations are not fully comparable and do not capture the type of inequality that is theoretically relevant, it still enables us to test the robustness of our results. The data set contains about 5,300 observations on 173 countries between the late 1940s and 2006.

Third, I use the income Gini coefficients of the Estimation of the Household Inequality and Inequity (EHII) constructed by the University of Texas Inequality Project (UTIP). The UTIP uses the UNIDO data set to compute inequality in wage pay, measured with the Theil's T. It regresses the Gini coefficients of Deininger and Squire (1996) on the Theil's T and corrects for

the bias in the data source (e.g., net vs. gross income). It then uses the predicted values as estimated Gini coefficients. The data set includes more than 3,500 observations on 154 countries between 1963 and 1999.

Constructing a Complete and Comparable Data Set on Inequality

I use *Amelia II* to generate a complete data set on inequality. The data set contains three measures of inequality: the capital share data set of Ortega and Rodriguez (2006), the Gini coefficients data set of Solt (2009), and the Gini coefficients data set of the EHII. For each missing observation, I impute twenty-five predicted values. This enables me to account for the level of uncertainty of each imputed observation during the estimation process.¹⁰ I use three types of evidence to impute missing observations. First, inequality is highly persistent within countries over time (see, for example, Deininger and Squire 1998; Glaeser 2005; Solt 2009). For example, Lindert and Williamson (2003) find no systematic tendency for inequality within country to change over the last two centuries, and Lindert (2000) found that the level of inequality in England in the 17th and 18th centuries is about the same as in 1995. He also finds that wealth inequality was about the same in the United States in 1983 as in 1776. Therefore, given that inequality within countries is relatively stable over time, I use the observations that are available to impute those that are not available for the same country in other years.

Second, for many country-years while we do not have observation for some of the measures, we often have it for some of the others. For example, in a given case we may not have values for capital shares, but have Gini coefficients from Solt (2009) or the EHII. In such cases, I use the

¹⁰ The imputation model includes two polynomials of time, which are interacted with the cross-sectional unit. This enables the patterns over time to differ across countries, which is important because we have no reason to believe that inequality evolves in the same way over time in all countries. As recommended by Honaker and King (2007), I include lags and leads for my central variables, the three measures of inequality. I also include all control variables.

observations that are available for one measure of inequality to impute those that are not available for other measures. In addition to the three measures of inequality discussed above, I also use the proportion of farming land that is used by family farms, which is reported by Vanhanen (1997). These provide a proxy for the level of inequality in the farming sector.

Third, the level of inequality of a country depends primarily on its factor endowment (see Easterly 2007; Glaeser 2005; Engerman and Sokoloff 2002; Sokoloff and Engerman 2000; Roe and Siegel 2011). For example, countries which have historically relied on the production of cash crops or minerals have inherited highly unequal social structures that still persist today. Such factor endowments have led to the creation of a very small and rich economic elite, and a large and poor lower class – often composed of a large proportion of slaves. The former have maintained the economic status quo by creating exclusive political institutions that reproduce economic inequalities at the political level. The high correlation between inequality and factor endowments has led many authors to use the latter to measure the former. For example, Easterly (2007) uses the abundance of land suitable for growing wheat relative to land suitable for growing sugarcane as an instrument for inequality.

Moreover, factor endowments are clustered within regions. Countries that are neighbors tend to rely on the same natural resources. Therefore, neighbors often share similar inequality levels. In fact, the correlation between the level of inequality of a country and that of its neighbors ranges between 0.45 and 0.79 depending on the measure of inequality used. The previous literature has indeed noticed that there is little variation in inequality within sub-regions (e.g., Deininger and Squire 1998). Moreover, international shocks that affect inequality are likely to have similar effects on neighbors because they share factor endowments (see Alquist and Wibbels 2012).

Other factors that are likely to affect inequality, such as colonial heritage, also tend to be shared among neighbors. Historical events that had important effects on inequality, like the establishment of communist regimes in Eastern Europe, have also been regionally clustered. I thus use the level of inequality of neighbor countries to impute the missing inequality values. Therefore, contrary to Houle (2009), I am able to impute missing observations even for countries on which there are no observations available using both the observations that are available for alternative indicators of inequality and the inequality levels of neighboring countries.

It is very important to note that I do not simply fill in the missing inequality values of a country by using the inequality levels of its neighbors. That would be equivalent to assuming that there is a perfect correlation between inequality in one country and its neighbors, which is clearly not the case. I rely on the observed correlation between a country's inequality level and that of its neighbors to predict twenty-five values for each missing observation. In order to make sure that my results are not entirely driven by the imputation model, I run my analysis with three data sets: (1) the full data set that includes both imputed and non-imputed observations; (2) the original data set that includes only non-imputed observations; and (3) a data set that includes non-imputed observations along with imputed observations for countries on which we have at least one capital share observations. The intuition for using the latter data set is that since inequality is highly persistent within countries over time, it is much easier to impute missing observations for countries for which we have at least some inequality values than for those for which we have none. This imputation procedure does not rely on the inequality level of neighbors.¹¹ In all cases, the results are unchanged.

¹¹ See Appendix in Houle (2009) for more information on this imputation process.

Control Variables

I use the same domestic control variables as in Przeworski et al (2000): GDP per capita, growth, an oil exporter dummy variable, the proportion of the population that is Muslim, Protestant or Catholic, ethnic and religious fractionalization, the number of past transitions, a dummy variable for countries that did not exist prior to 1946, and a dummy for former British colonies. I also include decade dummy variables, the age of the regime as well as its square and its cube.

Empirical Tests of the Effect of Inequality on Democracy

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In this section, I test the relationship between inequality and democracy using dynamic probit models. These models estimate the probability that countries with a certain regime (in the current period) transition to a new regime in the next period. One advantage with this estimation technique is that it enables us to distinguish between the effect of inequality on democratization and on consolidation. Tables 1 and 2 present respectively the impact of each independent variable on the likelihood that a democracy collapses and on the probability of that an autocracy democratize within a given year.¹²

Column 1 of Table 1 estimates the effect of inequality on the likelihood of a democratic breakdown when inequality is measured with the capital shares, which is the indicator of inequality that is the most sound theoretically. Positive coefficients signify that the associated independent variables increase the probability of backsliding to dictatorship. As expected,

¹² The results reported in Tables 1 and 2 are estimated by the same regressions. Dynamic probit models estimate the likelihood of transitions to and from democracy at the same time. The results are reported separately to facilitate interpretation.

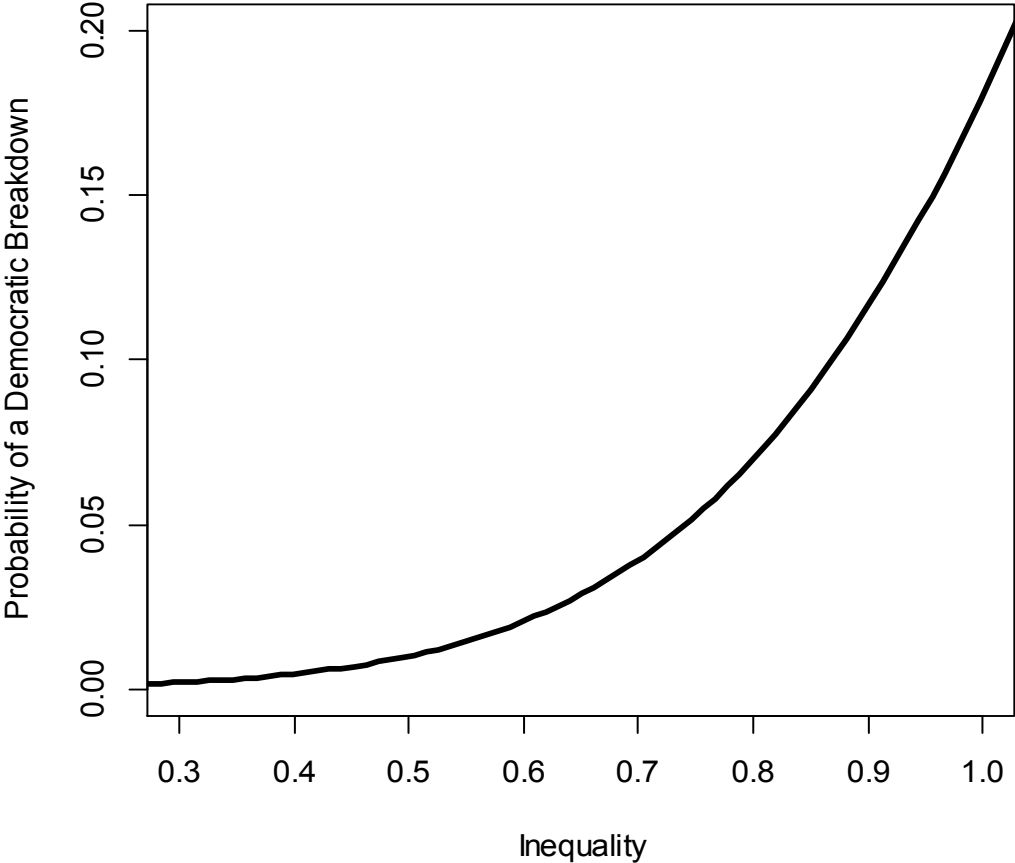
inequality increases the likelihood that a democracy breaks down. The relationship becomes even stronger both substantively and statistically when only the non-imputed observations are used (see Houle 2009, Table 2). Results are also unchanged when one includes only non-imputed observations along with imputed observations for countries on which we have at least one capital share observation (again, see Houle 2009, Table 2, for the results, and the Appendix for the multiple imputation procedure). Figure 1 shows the effect of inequality on the probability of a transition away from democracy, when other variables are at their median.

TABLE 1: DYNAMIC PROBIT ANALYSIS OF THE EFFECT OF INEQUALITY ON TRANSITION FROM DEMOCRACY TO AUTOCRACY

	Measures of Inequality			
	Capital Shares		Solt's Gini	EHII's Gini
	(1)	(2)	(3)	(4)
Inequality	2.822 (1.11)**	12.628 (1.142)***	1.912 (.95)**	3.803 (1.658)**
GDP pc	-.383 (.105)***	-.142 (.315)	-.414 (.104)***	-.359 (.107)***
Growth	-.037 (.012)***	-.029 (.012)***	-.036 (.012)***	-.038 (.012)***
Oil	.058 (.345)	-.503 (.369)	.143 (.333)	.073 (.312)
Muslim	.003 (.003)	-.005 (.005)	.003 (.004)	.005 (.004)
Protestant	.00009 (.004)	.008 (.008)	-.003 (.004)	-.001 (.004)
Catholic	-.002 (.004)	-.005 (.004)	-.003 (.005)	-.002 (.004)
Ethnic fract.	-.005 (.004)	.009 (.007)	-.004 (.004)	-.005 (.004)
Religious fract.	-.0009 (.004)	.019 (.011)	-.001 (.004)	-.0005 (.005)
# Past Break.	.162 (.074)**	-.002 (.112)	.193 (.072)***	.192 (.073)***
New Country	.197 (.215)	1.747 (.559)***	.127 (.203)	.107 (.212)
Former British	-.645 (.255)**	-.892 (.455)***	-.527 (.25)**	-.62 (.241)***
% Regional Dem.		.007 (.006)		
IV	N	Y	N	N
Log-pseudolik.	-551.42	-4535.57	-553.51	-554.16
N	6842	1268	6842	6842
# Country	175	62	175	175

Note : Robust standard errors clustered by country in parentheses. All models include decade dummy variables, the age of the regime along with its square and cube. ***\$p<.01\$, **\$p<.05\$ and *\$p<.1\$.

FIGURE 1: PREDICTED PROBABILITIES OF DEMOCRATIC BREAKDOWN



Column 2 reproduces model 1 but using an instrumental variable approach. It uses the level of inequality of neighboring countries as an instrument for the domestic level of inequality. Basic tests show that the inequality level of neighbors is indeed a very strong instrument for domestic inequality levels. In the first-stage regression, the F-statistic on the level of inequality of neighbors is 186.75, which is well above the threshold for strong instruments that is usually set at

10.¹³ Since I use the inequality level of neighbors to impute missing values, I only use the non-imputed capital shares in the estimation reported in column 2 (and column 2 of Table 2). Results are unchanged when imputed capital shares are also included (available upon request).

It is possible that inequality in neighboring states affect the regimes of neighbors, which in turn influences the domestic political regime. If that were the case, the instruments would not be exogenous. Therefore, in order to account for this potential mechanism I control for the proportion of neighbors that are democratic. Other than through its effect on the regime of neighbors, the level of inequality of neighbors is exogenous to the regime of a country. As shown in column 2, results are unchanged when I account for endogeneity.¹⁴ Columns 3 and 4 of Table 1 reproduce column 1 but with the Gini coefficients of Solt (2009) and of the EHII respectively. Again, inequality is found to increase the likelihood of a democratic breakdown.

Table 2 reports the impact of inequality on the probability of transition from dictatorship to democracy. Column 1 tests the hypothesis that inequality has a linear negative effect on democratization using the capital shares. Contrary to what has been predicted by much of the literature, inequality does not reduce the likelihood of transition to democracy. As found by Ansell and Samuels (2010), inequality fosters democratization, although, contrary to what these authors find, the relationship is not statistically significant.

Column 2 redoes the same analysis as in column 1 but using the same instrumental variable approach as in model 2 of Table 1. Column 3 of Table 2 test the nonlinear relationship of Acemoglu and Robinson (2006), according to which the relationship is inverted U-shaped, by

¹³ Only non-imputed capital shares are included when calculating the F-statistic. It is 56.69 when all observations are included.

¹⁴ Regressions using instrumental variables are ran separately for democratization and consolidation, which explains the lower number of observations (e.g., only autocracies are included in column 2). This is done in order to limit the number of instruments needed and does not affect the validity of the results.

adding capital shares squared. This prediction would be supported if the coefficient on capital share is positive and the one on capital share squared negative. As shown in model 2, both coefficients turn out to have the wrong sign, although none is statistically significant. The variables are also not jointly significant.

TABLE 2: DYNAMIC PROBIT ANALYSIS OF THE EFFECT OF INEQUALITY ON TRANSITION FROM AUTOCRACY TO DEMOCRACY

	Measures of Inequality							
	Capital Shares			Solt's Gini			EHII's Gini	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inequality	.008 (.006)	.046 (.042)	-.039 (.049)	.164 (.163)	-.6 (.627)	-3.074 (4.074)	.39 (1.006)	.848 (7.062)
Inequality sq.			.0003 (.0004)	-.0009 (.001)		.0003 (.0005)		-.00005 (.0008)
Cap. Open				.101 (.125)				
Cap. Open * Inequality				-.0004 (.005)				
Cap. Open * Inequality sq.				.00002 (.00003)				
GDP pc	.007 (.066)	-.168 (.108)	.015 (.066)	.115 (.092)	-.008 (.066)	-.012 (.067)	.0005 (.069)	-.0002 (.069)
Growth	-.014 (.006)**	-.011 (.013)	-.015 (.006)**	-.019 (.012)	-.014 (.006)**	-.014 (.006)**	-.014 (.006)**	-.014 (.006)**
Oil	-.456 (.254)*	.183 (.492)	-.483 (.249)*	-.276 (.301)	-.451 (.268)*	-.433 (.269)	-.458 (.275)*	-.455 (.279)
Muslim	-.003 (.003)	-.004 (.005)	-.003 (.003)	-.002 (.004)	-.003 (.003)	-.003 (.003)	-.003 (.003)	-.003 (.003)
Protestant	-.002 (.004)	.005 (.01)	-.002 (.004)	.004 (.007)	-.002 (.004)	-.002 (.004)	-.003 (.004)	-.003 (.004)
Catholic	.001 (.003)	-.008 (.008)	.001 (.003)	-.001 (.004)	.002 (.003)	.002 (.003)	.002 (.003)	.002 (.003)
Ethnic fract.	-.0009 (.002)	-.005 (.003)	-.0007 (.002)	-.003 (.003)	-.002 (.003)	-.002 (.003)	-.001 (.002)	-.001 (.002)
Religious fract.	.002 (.004)	.018 (.01)*	.002 (.004)	.006 (.006)	.002 (.004)	.002 (.004)	.0009 (.004)	.0009 (.004)
# Past Break.	.272 (.067)***	-.167 (.271)	.265 (.067)***	.215 (.064)***	.29 (.065)***	.287 (.066)***	.29 (.067)***	.286 (.067)***
New Country	-.238 (.19)	-.988 (.303)***	-.232 (.193)	-.45 (.229)**	-.26 (.191)	-.268 (.194)	-.251 (.195)	-.268 (.197)
Former British	-.043 (.137)	.039 (.2)	-.043 (.136)	.063 (.183)	-.01 (.141)	-.008 (.14)	-.022 (.141)	-.02 (.141)
% Regional Dem		.016 (.008)**						
IV	N	Y	N	N	N	N	N	N
Log-pseudolik.	-551.42	-5662.7	-551.26	-375.46	-553.51	-550.79	-554.16	-553.78
Wald Joint test			[0.23]	[0.3]		[0.54]		[0.93]
N	6842	1505	6842	4166	6842	6842	6842	6842
# Country	175	69	175	91	175	175	175	175

Note : Robust standard errors clustered by country in parentheses, and p-values in brackets. All models include decade dummy variables, the age of the regime along with its square and cube. ***\$p<.01\$, **\$p<.05\$ and *\$p<.1\$.

Model 4 tests the argument of Freeman and Quinn (2012) capital openness conditions the relationship between inequality and democratization.¹⁵ When autocracies are financially closed, the relationship between inequality and the probability of democratization is inverted U-shaped, as predicted by Acemoglu and Robinson (2006). However, when an autocracy is financially opened, according to Freeman and Quinn (2012), inequality increases the likelihood of democratization. In fact, the hypothesis of Boix (2003) himself is also conditional: when assets are immobile inequality harms democracy, but when assets are mobile inequality has little effect, although in his empirical section Boix (2003) does not account for the interaction effect between inequality and asset mobility. Column 3 of Table 2 tests this relationship using the same set up as Freeman and Quinn (2012), i.e. by including inequality interacted with capital openness, and inequality squared interacted with capital openness. The findings show no evidence that the relationship between inequality and democratization is conditional on capital openness.

Columns 5-8 redo columns 1 and 3 with the Gini coefficients of Solt (2009) and the EHII. In all cases, previous theories on the relationship between inequality and democratization are not supported by my empirical findings. Finally, the effect of the control variables is generally robust across model specifications and consistent with our expectations.

Conclusion

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This chapter has reviewed the main literature on the relationship between inequality, on the one hand, and economic development and democracy, on the other. Although previous empirical findings on the effect of inequality on economic growth are mixed, some tentative conclusions

¹⁵ Freeman and Quinn (2012) argue that such a relationship does not exist for democratic consolidation.

may be drawn. Most recent studies show that inequality harms economic development, at least in the long-run. Moreover, the relationship is especially strong in non-OECD countries. The relationship is probably driven by a combination of the mechanisms described by the social unrest and credit market imperfections approaches. In particular, inequality inhibit social mobility, which is essential to economic development and innovation.

There is even more confusion about the effect of inequality on democracy. This chapter has argued that this may in large part be explained by the fact that previous studies use data sets with very large proportion of missing values and non-comparable observations, and that they do not account for endogeneity between inequality and democracy.

I address the issue of missingness by generating the first complete and comparable data set on inequality. It contains nearly 7,000 observations between 1948 and 2006. To generate the data set I take advantage of the fact that inequality depends on the type of goods produced by a country. Since the economies of neighboring countries tend to be similar, I predict the inequality level of countries for which data is missing using the inequality levels their neighbors. Results suggest that, contrary to what previous theories predict, inequality does not affect the likelihood of democratization. These findings do not depend on the measure of inequality used or on whether we estimate a linear or a non-linear relationship. However, inequality increases the likelihood that democracy collapses.

It is important to note that the results that inequality harms development and democratic consolidation do not imply that redistribution would necessarily promote development and democratic sustainability, at least in the short-run. In fact, redistribution may itself undermine growth, for example because it distorts incentives; often resulting in lower investment levels and labor supply. Moreover, there is a deadweight loss to redistribution – i.e. the amount transferred

to the poor is smaller than the amount extracted from the rich, leading to further inefficiencies. Redistribution may also harm democratic consolidation. For one thing, lower growth created by inefficient redistribution could destabilize democracies. Furthermore, large-scale redistribution may incite a worried economic elites to overthrow a democracy, especially in new regimes. Evaluating the best policies to adopt to promote development and democracy requires comparing the short-term risks and costs of redistribution to its long-term benefits. Moreover, the cost and benefits of different redistributive tools – for example, investment in education as opposed to direct income and wealth redistribution – also ought to be compared.

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