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Alberto Chong

Institutions: Inter-American Development Bank

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Chong, Alberto

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Inequality, Democracy, and Persistence: Is There a Political Kuznets Curve?

By

Alberto Chong*

*** Inter-American Development Bank and Georgetown University**

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Abstract[*]

The aim of this paper is to provide comprehensive empirical evidence on recent theories that link democracy and income inequality for the period 1960-1995. In simple cross-country regressions I find a non-monotonic link between these two variables when using ordinary least squares, instrumental variables, and Eusufzai tests. Since these results cannot be taken as 'true' time series findings, even though recent theories that explain such a link are, I also employ recent methods applied to dynamic models on panel data. These techniques allow accounting for potential simultaneity and heterogeneity problems. Using the preferred econometric methodology, I also find support for the existence of a political Kuznets curve. Moreover, it appears that income inequality is unconditionally persistent. Results hold for two different democracy proxies and when sensitivity analysis is applied.

JEL Classification Code: O0, O1,

Key Words: Kuznets, dynamic panel data, persistence, Gini, democracy, quadratic

Word Count: 12,212

[*] The author is affiliated with the Research Department of the Inter-American Development Bank and Georgetown University. Comments and suggestions from César Calderón, Mark Gradstein, Philip Keefer, Branko Milanovic, Lant Pritchett, Martín Rama, Luisa Zanforlin, the editor, François Bourguignon, colleagues at the Latin American Meeting of the Econometric Society, the Latin American and Caribbean Economic Association Meeting, and three anonymous referees are very gratefully acknowledged. Address: Inter-American Development Bank Stop W-0436, 1300 New York Avenue, NW, Washington, DC, 20577, USA. Tel (202) 623-1536; Fax (202) 623-2481. E-mail: *albertoch@iadb.org*. The views and interpretations of this paper are those of the author and should not be attributed to the Inter-American Development Bank or its executive directors.

1. Introduction

The link between democracy and income inequality has been the subject of considerable interest by social scientists. In fact, several researchers have long held the idea that by reducing inequalities in the distribution of political power a reduction in inequality in income and wealth will ensue.[1] For instance, Lipset (1959) argues that democratic structures lead to elections that serve as expression of democratic struggle in such a way that citizens vote for parties that appeal to blue-collar interests. This researcher argues that the extension of the franchise in the last hundred years or so has increased political competition in societies by moving the political process towards the left with the potential of reducing income inequalities.[2] A similar view is argued by Lenski (1966), who argues that democracy redistributes power in favor of the disadvantaged, who are a majority in a society. According to this researcher, this increased political equality leads to more social equality as well, as the typical electoral demand has been for a more egalitarian distribution of goods. Along these lines, Bollen and Jackman (1985) argue that democracy can reduce possible negative inequality effects of authoritarian regimes. For example, it is believed that if an autocratic regime includes representatives of a land-owning class, chances are that land-reform programs aimed at reducing wealth inequality will not be pursued. Similarly, if it includes capitalists, it is likely that labor strikes for better wages will be more easily repressed. Thus, according to this view, democratization is linked with a decrease in income and wealth inequality.

As straightforward as the above view appears, it does not necessarily correspond with the facts. Gradstein and Milanovic (2000) show that according to the recent development history in East Asia, and more recently in Eastern Europe, such a view may be misleading. For example, Taiwan and South Korea have both achieved a relatively equal distribution of income during autocratic regimes. Similarly, in several former communist countries, inequality appears to have increased in the course of democratization. Beitz (1982) has argued for a positive link between democracy and inequality. He argues that authoritarian regimes are more likely to pursue egalitarian policies because they are better at protecting the interests of the poor. This is because

[1] It appears that Aristotle (1962) was the first to argue that in democracies "the poor have more sovereign power than the men of property, for they are more numerous and the decisions of the majority prevail" (p. 237). John Stuart Mill (1862) has also provided further arguments along these same lines.

[2] A historical example of the above is the growth of the British Labour Party at the expense of the Liberals in the first half of the twentieth century. In fact, elections served increasingly as the expression of the democratic class struggle (Bollen and Jackman, 1985).

even though democracies are more receptive to claims of voters, they fail to respect them equally as sources of claims.

In more recent years, economists have provided theories that may help understand this apparent conflict in the relationship between democracy and income inequality. The gist of these models is that the extension of democracy to the masses may first produce an increase in income inequality before it may produce an improvement in the distribution of income. An inverse U-shape relationship between democracy and inequality may thus exist.[3] The main proponents of these theories are Bourguignon and Verdier (1997) and Acemoglu and Robinson (1998a).[4] In its most simple version Bourguignon and Verdier present a model where public decisions are taken on the basis of majority voting and where only educated people, a minority, are allowed to vote. The voting minority rules the country. This elite may subsidize the education of the non-educated. The incentive to do this is a positive externality but the cost is a loss of political control, which means that incomes may be taxed away by the new majority that now includes the newly educated individuals. In its dynamic specification, their model is able to generate a Kuznets curve due to political redistribution so that partial investment in schooling is linked with an increase in inequality. With partial democratization their model displays little redistribution and consequently an increase in inequality. Later, more individuals become educated and the elite sees its political power diluted to the now larger voting group. They vote for further redistribution, which yields a reduction in inequality.[5] Acemoglu and Robinson show that a Kuznets curve may be observed when a society democratizes due to social pressure. These researchers argue that while industrialization allows the rich elite to accumulate, the poor are not able to invest in human capital. In their model, this leads to increased inequality. Once inequality reaches a critical threshold, they explain, a threat of a revolution intensifies, which forces the elite to extend political rights to the masses. This will eventually result in increased redistribution and schooling. Inequality will start to fall.[6] Hence, a Kuznets curve may be observed. These researchers motivate

[3] An early counterpart of this view in the political science literature is the work by Huntington and Nelson (1976).
[4] Gradstein and Justman (1995) also provide a political redistribution model that yields a Kuznets curve.
[5] Bourguignon and Verdier argue that a Kuznets curve may occur for intermediate values of the initial conditions (initial income and initial inequality) with after tax measures.
[6] Acemoglu and Robinson argue that in a democracy when the rich are not sufficiently wealthy a political Kuznets curve may also be observed. This because the transfers from the rich to the poor do not ensure accumulation but yields increased inequality. When the rich become wealthy enough, transfers reach a threshold, the poor are able to accumulate and inequality falls. Again, redistributive taxation is key for non-monotonicity to occur.

their theoretical model by looking at the historical record of several Western countries during the eighteenth and early nineteenth centuries. They explain that at least in Germany, the United Kingdom, France, and Sweden, the extension of the franchise was preceded by increased inequality, which led to unusual social conflict and then to direct or indirect democratization through redistribution and education, respectively.

The purpose of this paper is to provide empirical evidence on the link between measures of democracy and income inequality along the basic lines of some of the above recent theories that argue that such a relationship is non-monotonic. The idea is to empirically study the basic relationship between democracy and income inequality for the period 1960-1995. To do this, I take a rather comprehensive empirical approach. I apply ordinary least squares, instrumental variables, and Goldfeld-Quandt "indirect" tests (Eusufzai, 1997) to a cross-section of countries. Formal sensitivity analysis to the basic results is also applied. The results in this section seem to suggest that, indeed, there is a non-monotonic relationship between democracy and income distribution. This finding is maintained when using two different democracy data sets, and when using either Gini coefficients or income shares.

As robust as they are, cross-sectional results have the weakness of not being able to appropriately account for changes over time. According to Bruno, Ravallion, and Squire (1998) there may be country-level determinants of inequality, in particular past inequality, correlated with current income levels that may lead to biased estimates, so that simple cross-section analysis may not accurately reveal how inequality evolves with democracy through time. The fact that past inequality may be a key predictor of current inequality is also considered in Bourguignon and Verdier's model. In fact, they show that the distribution of income depends on the initial income distribution, to the extent that very unequal and very equal countries are less likely to experience a political Kuznets curve in relation to intermediate countries. Similarly, researchers such as Engerman and Sokoloff (1997), and Engerman, Mariscal, and Sokoloff (1998) provide some historical evidence for Latin America, along the lines that past inequality shaped institutions that reproduced the sort of inequalities that gave rise to them. When inequality was high, they argue, institutions tended to evolve in such a way as to restrict access to opportunities, favoring certain groups and preserving relative inequality. In Latin America, they say, persistence in inequality was the result.

The above issues, namely, changes over time between income distribution and democracy, on the one hand, and the apparent persistence of income inequality, on the other, cannot be appropriately analyzed with simple cross-section techniques. Hence, to tackle these issues a panel data approach is advisable. I apply such an approach to an unbalanced panel of countries for the period 1960-1995. In particular, I use recent GMM procedures (Arellano and Bover, 1995; Arellano and Bond, 1991) that help minimize typical problems of endogeneity in the regressors, which in this case may be particularly important because of the issue of persistence. Similar to the cross-country section, I use two different democracy data sets, as well as Gini coefficients and income shares. Basic sensitivity analysis is also performed on the main results. The basic findings of the panel data approach confirm the cross-section results. Democracy and income distribution display a non-monotonic relationship. Given the fact that the panel data technique employed allows one to draw some inferences on causation rather than simple association between variables, and consistent with the theoretical models of Bourguignon and Verdier (1997) and Acemoglu and Robinson (1998a), the results of this paper may indicate that an increase in the political rights of the masses may first increase income inequality before reducing it. Moreover, past inequality appears to have an impact on current inequality. Not only does the latter provide empirical support to the prediction of persistence but also to the historical evidence presented by Engerman, Mariscal, and Sokoloff (1998) and Engerman and Sokoloff (1997).

The paper is organized as follows. The next section presents some historical perspective on a possible non-monotonic link between democracy and income distribution. The third section presents the data. The fourth section shows the cross-section regressions. The fifth section presents additional cross-section Eusufzai tests. Section 6 presents basic sensitivity analysis. Sections 7 and 8 introduce the dynamic panel data methodology used, and Section 9 shows panel data results as well as corresponding sensitivity analysis. Section 10 provides possible case studies that may be followed in subsequent research. Finally, the last section summarizes and concludes.

2. Some Historical Perspective

The theoretical models developed by Acemoglu and Robinson (1998a), Bourguignon and Verdier (1997), and Justman and Gradstein (1999) are based on historical case studies on the evolution of

democracy in Western Europe and its relationship to the long run pattern of income distribution. In particular, Acemoglu and Robinson show that during the process of political and economic development the distribution of income may first worsen before it improves. It appears that the peak of income inequality occurs with the major periods of democratization and radical political changes. Unsurprisingly, the most detailed case study available is Britain. In terms of income inequality, Williamson (1985) shows that while the Gini coefficient was 0.293 in 1827, it reached 0.358 in 1851 and 0.331 in 1901. The peak is reached somewhere after 1870. Moreover, Williamson's inverted U-pattern is consistent with the patterns presented by Acemoglu and Robinson and other economic historians. Democratic measures were first extended in 1832 (Parliament Reform Act). Prior to this, the electorate stood at 478,000 but after this Act was passed, the electorate was increased to 813,000 (Acemoglu and Robinson, 1998a. p. 20). Subsequent law changes, such as the 1867 Reform Act, the 1884 Reform Act, and the 1885 Redistribution Act, further expanded the total electorate to include about 5.1 million people.[7] In fact, the timing of the franchise extension "corresponds closely to the peak of the Kuznets curve" (Acemoglu and Robinson, 1998a, p. 21). This conclusion is shared by Justman and Gradstein (1999), who explain that the active participation of society in nineteenth-century Britain "increasingly came to be viewed as essential for the smooth running of the emerging capitalist economy, and as their incomes rose, their interests became more closely aligned with those of the middle class. Enfranchisement was a natural conclusion, and successive electoral reforms, beginning with the Reform Act of 1832, swelled the electorate" (p. 120).[8]

Additional evidence on a possible Kuznets pattern is provided by other researchers for Germany, Sweden, and France. In the case of Germany, for example, Dumke (1991) shows that the income share of the top five percent of the population went from 28.4 percent by 1880 to 32.6 percent at the beginning of the 1900s, then to 30.6 percent in the 1910s. By 1926 the income share of the top five percent of the population had fallen by 6.2 percent (Kraus, 1981; Acemoglu and Robinson, 1998a). On the other hand, the first democratic institutions in Germany, parliament and oral voting, were set up after the revolution of 1848 (Gerschenkron, 1943). The creation of

[7] The total population of Britain at the time has been estimated at about 24 million (Acemoglu and Robinson, 1998a, p. 20).

the Weimar Republic in 1919 further extended the franchise and coincided with a decline in income inequality (Acemoglu and Robinson, 1998a). In the case of Sweden, Soderberg (1987) shows that inequality increased before the First World War and fell by the 1920s, which coincides with the time when democracy was established, 1918. This, although male suffrage had already been established eleven years before, in 1907. Finally, there is a similar pattern in France. In fact, Morrison (1997) argues that inequality rose until the 1870s and declined thereafter. This coincides with the accepted date for the establishment of democracy in the country (Campbell and Cole, 1989).

Though the theoretical models shown above are better suited for analyzing historical experiences, Acemoglu and Robinson (1998b) also apply some of the lessons of their theory to the more recent experience in Latin America. They show the existence of a high correlation between democracy and income inequality in several countries of the region. In the case of Brazil, for example, they show that even though initial democratic institutions have been established since 1930, political turmoil, coups, and autocratic governments appear to have been linked with a continuous increase in income inequality until 1985, when democracy was re-instituted. Only since the latter part of the 1980s does inequality appear to have stabilized somewhat. In the case of Chile, the fall of Pinochet and the movement back to democracy in 1989 appear to coincide with the peak in income inequality, which had been increasing in the 1970s. Finally, these researchers also claim that in the case of Nicaragua, El Salvador, and Guatemala, the creation of democracy shows a pattern remarkably similar to the one they discovered in Europe.[9]

3. Data

The inequality measures are from Deininger and Squire (1997). As is well known, the advantages of these data are various. First, the observations are based on household surveys. Second, the population and income coverage are comprehensive. Furthermore, different criteria from different

[8] Justman and Gradstein also mention some other changes of a more "compassionate" nature that preceded the major political reforms. Examples are the Factory Act of 1833, the repeal of the Corn Laws in 1846, and the Ten Hours Bill of 1850.

[9] However, these researchers acknowledge the fact that there has been relatively little time for democratic regimes to significantly affect inequality.

sources are homogenized in order to avoid problems of definition.[10] With respect to the democracy measures two sources are used, Freedom House (Gastil, 1973, 1990), and Polity III (Gurr, 1974, 1997; Gurr, Jaggers, and Moore, 1990; Jaggers and Moore, 1995). The former has been widely used by economists. However, such is not the case for the latter, even though it is well known among political scientists.[11] From Freedom House two variables are used, *Political Rights* and *Civil Liberties*. Similar to Barro (1996) and others, a "democracy index" is constructed and rescaled from 0 to 1, where 0 represents the least free system. From Polity III I use the variable *Institutionalized Democracy*, which is an annual index based on three categories that try to account for different characteristics of a democracy: (i) *executive recruitment* (of the chief executive), (ii) *responsiveness or independence of executive authority*, and (iii) *extent of political competition or opposition*. The first measures the extent of institutionalization of executive transfers, the competitiveness of executive selection in terms of electoral systems, and the openness of executive recruitment. The second category reflects the extent to which preferences of third parties are taken into account in the decision-making process of the head of the government. It measures the extent to which the chief executive is dependent on a cabinet, and the magnitude to which decision rules constrain the actions of the executive. The third category, *political competition*, reflects the extent to which the political system enables a non-elite to influence a political elite and focuses on bot, the degree of institutionalization of political participation and the extent of government restriction on political competition. Based on these categories an index of institutionalized democracy is constructed (Gurr, 1997). Its scale goes from zero to ten, with higher scores representing higher degrees of democracy. Other variables used are initial GDP per capita, government expenditures, and rate of growth of the population (Summers and Heston, 1991), school enrollment ratios (Barro and Lee, 1993), health indicators, inflation rates, agriculture shares of total value added, and other development indicators (World Bank, 1998).

[10] Definitional problems include whether a category applies to household or individuals, whether income is measured gross or net of taxes, and whether expenditure or income is used to calculate the income share and Gini coefficient.

[11] The simple correlation among different sources for democracy proxies is quite high. The correlation between the Polity III measure and the Political Rights measure of Freedom House is 0.92. Jaggers and Moore (1995) report that the correlation between the eight most used democracy data sets is never lower than 0.85.

4. Cross-Section Evidence

In order to test for the existence of a non-monotonic association between income inequality and democracy a first approach is to take simple averages for the period 1960-1995 for each variable and run cross-country regressions similar to Barro (1991). In the case of the dependent variables (Gini coefficient and income shares) I use the latest inequality measure available for each country.[12] I use a basic specification suggested by the empirical literature on inequality (Deininger and Squire, 1997, and others).[13] The set of control variables in the benchmark regression consists of initial GDP per capita, schooling, health indicators (number of physicians per inhabitant), share of agriculture and industry as a percentage of the total value added of the economy, and the inflation rate.

Tables 3 and 4 show the results. Ordinary least squares estimates do show the expected signs and are statistically significant when using the Polity III proxy but are not significant when using the Freedom House democracy indicators. Since endogeneity in the regressors is a concern (Przeworski and Limongi, 1993), I follow Barro (1996), Chong and Calderón (2000), and others, and instrument the Polity III and Freedom House variables with measures of political democracy in 1960 (Bollen, 1990) and law origin indicators. These variables are supposed to be purely exogenous variables (La Porta, López de Silanes, Shleifer, and Vishny, 1998). I find a statistically significant quadratic relationship between income inequality and democracy that is consistent with a political Kuznets curve, regardless of the income inequality measure or democracy proxy used.[14]

[12] This is similar to Chong and Calderón (2000).

[13] In simple correlation I find that the higher the democracy rating the more equal the distribution of income (Table 2). However, for countries with lower democracy ratings the correlation tends to be negative, but for countries with higher democracy ratings it tends to be positive. This is similar to the result of Chong and Calderón (2000) on institutional measures, such as corruption, bureaucracy, and others.

[14] The turning point in Polity III is given at around is 5.69, roughly the level of Zimbabwe (5.43), Malaysia (6.03) and Sri Lanka (6.50). The turning point using Freedom House is 0.54, roughly the level of Malaysia (0.51), Turkey (0.51), Cyprus (0.57).

5. Eusufzai Tests

In order to further confirm the above results, I also apply a test developed by Eusufzai (1997). This is an indirect test of structural breaks that decomposes the supposedly inverted U-curve into two components: one that displays a positive relationship between income inequality and democracy up to a certain democracy level, and another that displays a negative relationship between these two variables for higher levels of democracy. To find the democracy level at which the break may be taking place it is assumed that the benchmark regression changes abruptly at t = T_B. It is also assumed that the parameter vector for the regression is β_1, the variance of the residuals is σ_1^2, for t = T_B, the parameter vector is β_2, and the variance of the residuals is σ_2^2 for t > T_B. Following Eusufzai, for each arbitrary T_B one computes Quandt log-likelihood ratio tests as follows:

$$QLR\ (T_B) = (1/2)\ T_B\ log\ \sigma_1^2 + (1/2)\ (T - T_B)\ log\ \sigma_2^2 + (1/2)\ log\ \sigma^2 \qquad (1)$$

where σ^2 is the variance of the residuals for the whole sample (T observations) and the optimum break point is the value that minimizes the Quandt log-likelihood ratio test:

$$T_B = argmin_T\ QLR\ (T_B) \qquad (2)$$

T_B takes on a value such that the first regression on the first subsample has 15 degrees of freedom and the last regression for the second subsample in this rolling technique also has 15 degrees of freedom.[15] A set of 20 to 30 regressions for each of the democracy proxies and for each of the measures of inequality is generated. Results are shown in Table 5. This table shows that with both Polity III and Freedom House, I do find break or turning points.[16] To check if the breaks are consistent with the pattern of a political Kuznets curve, the correlation coefficients for the variables of interest for the sub-samples before and after the break are computed. I expect the pattern of correlation between the Gini coefficient and democracy to be positive and then negative before and after the break point, respectively. This is what occurs. Table 5 also shows these results. This finding is further confirmed when using income shares instead of Gini coefficients. Indeed, for the pre and post break the signs go from positive to negative for the top shares but

[15] This criterion is used to check for consistency and validity of the results. When requiring lower degrees of freedom—thus generating sets of 35 to 40 regressions instead—the results remain unchanged.

[16] The break point for Polity III is at around 4.0, the level of Spain and close to the level of Zimbabwe. For Freedom House the breakpoint is given between 0.41 (Morocco and Peru) and 0.60 (Spain and Sri Lanka). These are consistent with the OLS and IV results.

from negative to positive for the lower shares. Notice that instrumented correlations, also shown in Table 5, yield similar results.[17]

6. Cross-Section Sensitivity Analysis

I check the robustness of my main cross-section results by applying a recent methodology by Sala-i-Martín (1997). His approach requires focusing on the fraction of the density function lying on each side of zero, which divides the area under the density in two. The larger of the two areas is denoted as the cumulative distribution function at zero [cdf (0)], regardless of whether this is the area below or above zero. The cdf (0) is computed by running regressions for all the R possible three-combinations of a group of auxiliary variables, similar to Levine and Renelt (1992).[18] Finally, the aggregate cdf (0) for the coefficient of interest is calculated, as defined by the weighted average of all the individual cdf (0)s.[19] Results for the instrumental variable case are shown in Table 6. The results of applying this methodology seem to provide evidence of a robust quadratic relationship between income inequality and democracy, regardless of the democracy proxy or inequality measure used.

7. Panel Data Approach

From the cross-section regressions above, there appears to be evidence on the existence of a political Kuznets curve. However, those results cannot be taken as a "true" time series finding though theories that explain such a link are, indeed, time series in nature. A panel data approach would help sort out doubts on the dynamics of the cross-sectional evidence presented. In this regard, some previous theoretical and empirical research on related issues provides some guidance on the most appropriate econometric methodology to follow.

Previous panel data research shows that inequality has been highly stable in recent decades (Li, Squire, and Zou, 1998). Moreover, it has been estimated that the correlation of inequality between the 1960s and 1980s is around 0.85 (Bruno, Ravallion, and Squire, 1998). Indeed, the ratio of incomes of the richest five percent to the poorest five percent of countries has barely

[17] I use the same instruments as in the instrumental variable case. Notice that in the Political Rights case (Freedom House) only the instrumented correlations give the expected pre and post break signs.
[18] 35 auxiliary variables are used, thus 6545 were run for each specification under consideration.
[19] Following Sala-i-Martín, the weights used are based on the values of the integrated likelihood functions.

moved, from 33.2 in 1960 to 31.7 in 1985 (Bruno *et al*., 1998). The above findings suggest that past inequality may be an important predictor of current inequality and that its influence on current incomes could bias the evidence on the existence of a Kuznets curve in a cross-section of countries (Bruno, Ravallion, and Squire, 1998). Moreover, as mentioned in the introduction, these findings are also consistent with the historical evidence presented by Engerman and Sokoloff (1997) and Engerman, Mariscal, and Sokoloff, (1998) on the persistence of inequality during the colonial period in Latin America.

There is also an econometric reason why one may want to consider previous inequality as a determinant of current inequality. The use of a dynamic specification introduces potential problems of serial correlation into the error process. The presence of serial correlation is important not only because of its implications in testing the validity of the instruments used in the regression analysis but also because of its impact on the consistency of the estimates. As suggested by the literature (Loayza, Schmidt-Hebbel, and Servén, 1998) the modeling strategy for panel data equations with autoregressive errors consists of specifying a dynamic regression with uncorrelated disturbances. This implies that one should include the lagged value of the inequality measure as an additional control.

Finally, there are two issues of no less importance that should be taken into consideration. One is the presence of unobserved country-specific or time effects; the other has to do with the possibility of democracy being an endogenous explanatory variable. Such a regressor, as well as human capital, GDP per capita, and others may well be jointly determined with income inequality.

8. Panel Data Methodology

To address the issues raised above, the empirical strategy here is based on a GMM methodology applied to dynamic panel data models, that allows to take into account unobserved country and time specific effects, control for potential endogeneity of the explanatory variables, and thus, properly account for the possibility of persistence in the inequality variable (Arellano and Bond, 1991; Arellano and Bover, 1995). The first issue, unobserved time-specific effects, generates important bias in the coefficient estimates in a dynamic panel data model. By controlling for this problem I get rid of information related to those variables that vary across time periods but not across countries. The corrected regression equation, can be written as:

$$y_{i,t} - y_{i,t-1} = (\alpha-1)y_{i,t-1} + \beta' x_{i,t} + \mu_i + \varepsilon_{i,t,} \quad (3)$$

where *y* is the Gini coefficient, *x* is the set of explanatory variables for which time and cross-sectional data are available and the time periods are normalized so that time subscript *t* refers to a five-year interval. Similarly, to account for unobserved country-specific effects, the equation may be written in first-differences, as suggested by Anderson and Hsiao (1981), thus eliminating not only unobserved country-specific effects but also variables for which only cross-sectional information is available:

$$y_{i,t} - y_{i,t-1} = \alpha (y_{i,t-1} - y_{i,t-2}) + \beta (x_{i,,t} - x_{i,,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (4)$$

Note that the error term in equation (4), $\varepsilon_{i,t}-\varepsilon_{i,t-1}$, is now correlated with the differenced lagged dependent variable ($y_{i,t-1} - y_{i,t-2}$). Therefore, even if one assumes strict exogeneity for the set of variables *x*, an OLS estimation of equation (4) would produce biased coefficient estimates. If one assumes that the process $\{\varepsilon_{i,t}\}$ is serially uncorrelated, that is, $E(\varepsilon_{i,t}\varepsilon_{i,s})=0$ for $t\neq s$, values of *y* lagged two periods or more are valid instruments in the equations expressed in first differences.

On the other hand, the second issue, the presence of endogenous regressors, leads to inconsistent coefficient estimates for there is a problem of reverse causation in some variables present not only in the set of regressors *x* in a particular democracy, but also in schooling and initial GDP per capital. Similar to Arellano and Bond (1991), one may assume that the variables present in the regressor matrix *X* are only *weakly exogenous*, that is, $E[x_{i,t}\varepsilon_{i,s}]=0$ for $s>t$. Hence, the values of the regressors *x*, lagged two periods or more, are valid instruments in the equations expressed in first differences. I formulate a set of moment restrictions and estimate consistent and efficient estimates of the parameters of interest by using GMM techniques. The implied set of moment conditions is based on both, absence of serial correlation in the error process, and weak exogeneity of the explanatory variables. Without loss of generality, one could consider a panel data set of N individual time series, each having T periods. The first assumption (i.e., presence of unobserved effects) states that the process $\{\varepsilon_{i,t}\}$ is serially uncorrelated, i.e., $E(\varepsilon_{i,t}\varepsilon_{i,s})=0$ for $t\neq s$. Therefore, for $T\geq 3$, this assumption implies $E[(\varepsilon_{i,t}-\varepsilon_{i,t-1})y_{i,t-j}] = 0$ $(j=2,\ldots,t-1 ; t=3,\ldots,T)$. Additionally, the second assumption (i.e., weakly exogenous regressors) states that $E[x_{i,t}\varepsilon_{i,s}] = 0$ for $s>t$. Hence, for $T\geq 3$, this implies that $E[(\varepsilon_{i,t}-\varepsilon_{i,t-1})x_{i,t-j}] = 0$, $(j=2,\ldots,t-1; t=3,\ldots,T)$. Without any

information on the distributions of $\{\varepsilon_{i,t}\}$ and μ_i, an optimal GMM estimator may be proposed by rewriting the moment conditions equations in the following vector form $E[Z_i' \zeta_i] = 0$, where the instrument matrix, Z_i, is a matrix of the form $Z_i = \text{diag}(y_{i,1} \ldots y_{i,s}, x_{i,1} \ldots x_{i,s})$, (s=1,2,…,T-2), the error process of the first-differenced equation is $\zeta_i = [(\varepsilon_{i,3}-\varepsilon_{i,2}) \ldots (\varepsilon_{i,T}-\varepsilon_{i,T-1})]'$, and the number of columns of Z_i, e.g., matrix of rank column M, is equal to the number of available instruments. According to the GMM estimation discussed by Hansen (1982), the estimator of the *kx1* coefficient vector $\theta=(\alpha\ \beta')'$ is given by

$$\hat{\theta} = (\bar{X}' Z\Omega^{-1} Z' \bar{X})^{-1} \bar{X}' Z\Omega^{-1} Z' \bar{y} \qquad (5)$$

where $\bar{X}$ is a stacked *(T-2)Nxk* matrix of observations $\bar{x}_{i,t}'$ on $\bar{y}_{i,t-1}'$; $\bar{y}$ is a stacked *(T-2)Nx1* vector of $\bar{y}_{i,t}'$; $Z = (Z_i' \ldots Z_N')'$ is a *(T-2)NxM* matrix; and Ω is any *MxM*, symmetric, positive definite matrix. Here, a bar denotes that the variables are expressed in first differences. Moreover, for an arbitrary Ω, a consistent estimate of the asymptotic variance-covariance matrix of $\hat{\theta}$ is given by:

$$Asy.Var(\hat{\theta}) = N(\bar{X}' Z\Omega^{-1} Z' \bar{X})^{-1} \bar{X}' Z\Omega^{-1} \left(\sum_{i=1}^{N} Z_i' \hat{v}_i \hat{v}_i' Z_i \right) \Omega^{-1} Z' \bar{X} (\bar{X}' Z\Omega^{-1} Z' \bar{X})^{-1} \qquad (6)$$

Note that when the matrix Ω is chosen such that $\Omega = E[Z_i' v_i v_i' Z_i]$ (i.e., Ω is equal to the variance-covariance matrix of the moment conditions), one obtains the most efficient GMM estimator for θ). This covariance matrix can be consistently estimated using the residuals obtained from a preliminary, consistent estimation of θ. Arellano and Bond (1991) suggest the following two-step estimation procedure: first, assume that $\{\varepsilon_{i,t}\}$ is independent and homoskedastic, both across units and over time so that the optimal choice of Ω is $\Omega_1 = (1/N)\ \Sigma_{i=1} Z_i' H z_i$, where H is a *(T-2)* square matrix that has 2 in the main diagonal, -1 in the first subdiagonals, and 0 otherwise. Second, relax the assumptions formulated in the first step and use the residuals obtained to construct a consistent estimate of the variance-covariance matrix of the moment conditions. This matrix, denoted by Ω_2, becomes the optimal choice of Ω and is used to re-estimate the coefficients of interest. Here, $\Omega_2 = (1/N)\ \Sigma_{i=1} Z_i' \hat{\eta}_i^1 \hat{\eta}_i^{1\prime} Z_i$, where $\hat{\eta}_i^1$ are the residuals estimated in the first step. I apply a Sargan test of overidentifying restrictions to

contrast the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process; and serial correlation tests to contrast the hypothesis that the error term in the differenced regression, $\varepsilon_{i,t}$-$\varepsilon_{i,t-1}$, does not exhibit second-order correlation.[20]

9. Panel Data Results

The unbalanced panel data sample of 51 countries covers the period 1960-1995.[21] For the sake of completeness and to facilitate comparability with the GMM dynamic panel methodology or "system estimator" approach used here, I also present estimates using (i) ordinary least squares on pooled data that, admittedly, do not take into account the issues of endogeneity and heterogeneity; (ii) within-group estimators that, likewise, ignore endogeneity and are biased in short panels when the regressors include the lagged dependent variables; and (iii) level by level estimators, instrumented by lagged and within-group estimators that also have similar problems. The basic specification is somewhat similar to that of Li, Squire, and Zou (1998), who analyze the determinants of inequality using panel data and try to test whether "an initial state of inequality may be expected to continue because the rich have the capacity to protect their wealth while the poor are unable to augment theirs" (p. 27) but fail to explicitly recognize this as an issue of

[20] The consistency of our GMM estimator depends on the properties of the process $\{\varepsilon_{i,t}\}$. It should not be serially correlated. When $v_{i,t}$ are first differences of $\varepsilon_{i,t}$, $E[v_{i,t}v_{i,t-1}]$ should be zero. Consistency hinges on the assumption that $E[v_{i,t}v_{i,t-2}] = 0$. Consider $v^*(t)_i \equiv [\, v^*_{i,3}, \ldots, v^*_{i,T}\,]'$, $v^*(t-2)_i \equiv [\, v^*_{i,1}, \ldots, v^*_{i,T-2}\,]'$, $v^*(t-2)_i \equiv [v^*(t-2)_1, \ldots, v^*(t-2)_N\,]'$ The serial correlation statistic:

$$m_2 = \frac{v^*(t-2)'\, v^*(t)}{Q}$$

is standard normal (Q is a standardization factor) and is used to test the null that $E[v_{i,t}v_{i,t-2}] = 0$. On the other hand, the Sargan test for over-identifying restrictions, where the null hypothesis is that the instruments are not correlated with the residuals in the first-differenced regressions, that is, $E[Z_i'v_i] = 0$. The test is based on:

$$s = v^{*\prime} Z \left(\sum_{i=1}^{N} Z_i' v_i^* v_i^{*\prime} Z_i \right)^{-1} Z' v^*$$

where $v^* = [v_i^{*\prime}, \ldots, v_N^{*\prime}\,]'$ consists of the residuals estimated in the second stage. Under the null hypothesis, the asymptotic distribution of the statistic s is χ^2 with M-k degrees of freedom (M are instruments and k are explanatory variables).

[21] To minimize balance problems I use countries that have at least four observations for my period of study. However, the results here do not depend on this assumption. Even when using countries with at least three or four observations for the period covered, the overall findings are maintained.

persistence in inequality and thus do not model their empirical approach accordingly.[22] Hence, the controls are a lagged measure of inequality, the democracy proxy (linear and squared), initial GDP per capita, schooling, and liquid liabilities as measured by M2/GDP.[23]

Tables 7 and 8 present my main findings.[24] A first result is that there appears to be evidence pointing to the existence of a political Kuznets curve. Regardless of the democracy proxy used, the GMM-IV system estimator results show that while the linear term of democracy is positive, the squared term is negative and both are statistically significant at five percent or higher. In fact, when using the GMM-IV regression estimates in Table 7, I find that if the Gastil proxy increases from 0.1 to 0.2, the Gini coefficient increases 0.7 percentage points in the short run and 5.7 percentage points in the long run. On the other hand, if Gastil increases from 0.8 to 0.9, the Gini coefficient decreases 0.3 and 2.5 points in the short run and long run, respectively. Similarly, an increase in the Polity III democracy measure from 1 to 2 generates an increase in the Gini coefficient of 0.8 points in the short run and 5.2 points in the long run. Finally, an increase in the Polity III index from 8 to 9 is linked with a decrease in the Gini coefficient of 0.6 and 4.2 points in the short run and long run, respectively. When repeating the same exercise but using income share ratios instead, this quadratic result also appears to hold, regardless of the democracy proxy employed, as shown in Table 8.[25]

[22] Li, Squire, and Zou (1998) also argue that "the rich are indeed able to exercise sufficient control over economic policy at least to maintain their wealth […] reinforcing the tendency for unequal distributions of income to remain so" (p. 27). Another shortcoming of their paper has to do with the fact that they fail to test for serial correlation appropriately. Indeed, they use a Durbin-Watson statistic, an inappropriate test when using panel data, as the discussion on methodology presented above implies.

[23] The idea behind liquid liabilities is that credit constraints "perpetuate a low and inequitable growth process" and thus perpetuate inequality (Li, Squire, and Zou, 1998).

[24] As pointed out by an anonymous referee, although a highly statistically significant quadratic pattern results when using all the available observations, the resulting comparative statistics are hard to believe, as the simulated changes in Gini coefficients appear excessive when changes in democracy proxies occur. To avoid this problem I apply a simple outlier analysis by which errors are computed and countries above or below one standard deviation (5 percent) are excluded. This procedure results in having Panama and Zambia excluded from the panel. In particular, the first country shows drastic changes in the Polity III democracy index, from 5 in the 1960s and 1970s to 0 in the 1980s and 1990s to 8 in 1995. The Gini, on the other hand, increases between 1960 and 1970 (from 55 to 57) decreases dramatically towards 1975 (to 48), increases drastically between 1985 and 1990 (48 to 56) and then again decreases drastically by 1995 (56 to 50).

[25] One difference in terms of presentation with respect to the cross-section results is that here I use income share ratios instead of income shares. Results are very similar. To economize space I present only GMM-system estimator results. OLS, within, and level estimates are very similar to those with Gini coefficients (Table 7). I would be more than happy to provide these results upon request.

Notice that consistent with the methodological discussion above, the panel estimates, by construction, exhibit first-order serial correlation. However, one should be concerned with the presence of second order serial correlation or higher. The specification tests (Sargan and serial correlation tests) suggested by Arellano and Bond (1991) show that this is not the case and guarantee the validity of the empirical model as well as of the instruments used in the estimation process. This occurs regardless of the democracy or the inequality measure employed.

A second main finding is that regardless of the measures of democracy, the coefficient of persistence in income inequality is approximately 0.83-0.85 when using the Gini coefficient as the dependent variable. This result is quite consistent with the findings of Bruno, Ravallion, and Squire (1998) researchers who, as mentioned earlier, find a simple correlation of 0.85 for income inequality between the 1960s and the 1980s. Moreover, their idea that past inequality may be an important predictor of current inequality appears to be confirmed. Indeed, persistence appears to be unconditional to the presence of other elements in the society, as our estimates on this variable do not depend on the presence of additional regressors. However, their intuition that the influence of past inequality on current incomes may bias the evidence on the existence of the Kuznets curve in a cross-section of countries is not supported by the evidence presented here. As explained above, at least for democracy, there appears to be a Kuznets curve. Notice that if instead of using the Gini coefficient I use the ratio of income shares of top to bottom quintiles, the coefficient obtained is around 0.72, for top 20/bottom 20, and 0.78 for top 40/bottom 40, but the coefficient of the income share of the middle quintile decreases to 0.61. This is consistent with the finding of Chari, Kehoe and McGrattan (1996) in the sense that mobility appears to be highest in the middle of the distribution. In fact, they show that the distribution of income in countries in recent years has moved from the middle to the extremes while some individual countries have changed their positions in the distribution, sometimes dramatically.

Finally, Table 9 shows results when applying formal sensitivity analysis for the GMM system estimator case. Unlike the cross-country section, here I use a Levine-Renelt-type approach. This simply because the number of potential ancillary variables that can be considered is more limited than in the previous case (35 in the cross-country case). The above somewhat limits the applicability of the Sala-i-Martín (1997) approach used in the cross-country section. The mapping of the necessary spectrum of regressions to fully apply Sala-i-Martín's approach

becomes more difficult. However, since I still use a total of fifteen auxiliary or ancillary variables applied in combinations of three, I am still able to run a fairly high number of different regressions (455) for each of the specifications under consideration.[26] Findings are shown in Table 9. The GMM system estimator results appear to be robust and consistent with the previous findings.[27] In fact, if the Gastil index increases from 0.1 to 0.2 the Gini coefficient will change by 0.28 and 0.41 points in the short run for the minimum and maximum values of the coefficients obtained, respectively. Similarly, an increase in the Polity III proxy from 8 to 9 generates short run decreases in the Gini coefficient of 0.44 for the minimum and 0.65 points for the maximum.

10. Some Possible Case Studies to Follow

Though loosely based on the theoretical work described in previous sections, the results in this paper may be seen as essentially empirical, for there are still not enough solid theoretical arguments to rely upon on in this issue, which is mainly based on historical episodes and case studies. However, as Acemoglu and Robinson (1998b) argue, it may be possible to use some of the lessons of these theories in order to understand more recent country episodes. In this section we detail some country cases that appear to conform to the notion that inequality and democracy are closely linked. More than a confirmation of a "hard" empirical law, the idea of this section is to detail country experiences with changes in democracy and inequality measures which may be viewed as broadly consistent with the theories presented above.

Latin America

(i) Bolivia

From 1956 to 1981 the country experienced very low levels of democracy. In fact, the Polity III democracy index fluctuated between 0 and 1 during this period, which was characterized by a succession of military governments and very brief presidential terms. However, from 1982 and on, the country embarked on a strong democratic push, reflected in a Polity III index of 8 or 9. On the other hand, the Gini coefficient increased from 52 during the 1960s and 1970s to 54 during the 1975-1985 period, and then began to decrease to 46 by 1995.

[26] The list of ancillary variables is spelled out in the footnote of Table 9.
[27] OLS panel results are also robust.

(ii) Argentina

After a mainly autocratic regime during the period 1957-1982, with the Polity III democracy levels between 0 and 3, the country began a strong push for democratization in 1982, reflected in a level of 8 in the Polity III democracy index. On the other hand, while the Gini coefficient remained relatively stable between the 1970s and 1980s, it decreased dramatically by the end of the 1980s to reach 36.6 in 1995.

(iii) Brazil

Between 1964 and 1984 the country was under autocratic rule (democracy index = 2). In 1985 the country began following a democratic path. While the Gini coefficient increased from 55 in the 1960s to 61 in the 1970s, it has remained relatively stable until 1995.

(iv) Chile

From 1955 to 1972 the country experienced moderate levels of democracy (democracy index between 5 and 6). Pinochet held power between 1973 and 1989. From 1990 and onwards Chile has remained a democracy (democracy index at 8). By contrast, the Gini coefficient increased from 45 in the 1960s to 56 in the 1980's, and then has kept increasing slightly to stabilize during the mid 1990s at around 57.

(v) Peru

After a moderate democratic period between 1963-1968 (democracy index of 6) the military took power between 1968 to 1980 (democracy index between 0 and 1). Democratic institutions were re-established in 1980 and kept an index of around 7, though it later decreased to about 3 after 1992 when then President Fujimori closed the Congress. Meanwhile, the country showed a slightly increasing trend in inequality after democracy was re-instituted, but it has shown relatively large decreases lately to 44.9 in the 1990-1995 period.

(vi) Uruguay

In the period 1952-1971 the country experienced a democratic regime (level of 8) but suffered an autocratic setback between 1973-1984 (index of zero). 1985 represented a comeback of democracy (with a Polity III index that fluctuated between 9 and 10) for the 1986-1995 period. By contrast, the Gini coefficient in Uruguay has shown a slightly decreasing trend in the last decades, from 42 in the 1970s, to 41 in the 1980s, to 39 in the 1990-1995 period.

Industrialized Countries

(i) Canada

The country recorded a perfect democratic score (10) for the period 1960-1995. There was a slight increase in the Gini coefficient between 1960s to 1980s (31 to 33), but a decrease in inequality to 27 in the 1990s

(ii) Switzerland

Switzerland recorded a perfect democratic score between 1960-1995 and a continuous decrease in the Gini coefficient, from 31 in the 1960s, to 33 in the 1980s, to 28 in the 1990s.

(iii) Germany

Germany achieved a perfect democratic score (10) for the 1960-1995 period along with a slight decline in the Gini coefficient, from 31 in the 1960s and 1970s to around 32 more recently (probably due to the reunification of the country).

(iv) Spain

After a long dictatorship period with Franco, Spain resumed a democratic regime in 1978. The country currently registers a Polity III index of about 9 or 10. By contrast, the Gini coefficient increased slightly during the 1980s to about 28. It has decreased to about 26 in the 1990s.

(v) Japan.

The country achieved a perfect democratic score (10) during the period 1952-1995. The Gini coefficient increased from 35 to 37 in the 1980s, and it has decreased continuously since the end of the 1980s.

East Asia and the Pacific

(i) Singapore

Singapore recorded the worst possible score (0) in the Polity III democracy indicator during the period 1960-1995. The Gini coefficient has increased during this period, from 32 in the 1960s, to 36 in the 1980s, to 38 in the 1990s.

(ii) Indonesia

The country recorded the worst possible democratic score (0) during the period 1960-1995. The Gini coefficient has increased from 31 in the 1960s, to 34 in the 1980s, declining slightly to around 32 in the 1990s.

(iii) Philippines

After recording the worst possible democratic score (0) during the period 1972-1985 under Marcos, since the democratic transition (1987) the country has recorded Polity index scores of about 8 and 9. On the other hand, the Gini coefficient increased from 48 in the 1960s to 50 in the 1970s, and it has declined in the 1990s to around 45.

From the cases described above, a couple of stylized facts may be claimed for the period 1960-1995 or so. First, there appears to be a strong link between democracy and inequality. Countries with high levels of democracy have low Gini coefficients, while countries with low levels of democracy have high Gini coefficients. In particular, developed countries appear to be at one extreme of the distribution, while developing countries are at the other extreme. Second, though not a generalized occurrence in countries around the world, there seem to be cases in which an inverted U-curve may be observed in the link between measures of democracy and income inequality, as measured by the Gini coefficient. To some extent, this pattern seems to occur in, at least, Bolivia, Argentina, Spain, and the Philippines in my sample and, to some extent, in Chile after Pinochet. Notice that, in general, movements in the Gini coefficient have been relatively large for some specific country experiences. For instance, this is the case of Argentina.

The findings above are consistent with the econometric results of the previous section and appear to be particularly relevant in the case of the recently democratized, poor, and very unequal countries. These countries in particular may still have to endure additional worsening in income inequality before an improvement in the distribution of income can appear. On the other hand, industrialized countries appear to be on the "downward slope" of this Kuznets curve, reflected in the fact that, in our case studies, the link between democracy and income inequality tends to be only negative for this group.

11. Conclusions

In this paper I have employed different measures of political rights, income inequality, and also different econometric techniques, and have consistently found that there may be a non-monotonic relationship between democracy and income inequality. On top of standard cross-country regressions that take simple averages of variables in specific periods, I also use a dynamic panel data technique that allows minimizing for heterogeneity and endogeneity problems. These findings are broadly consistent with recent theories by Acemoglu and Robinson (1998a), Bourguignon and Verdier (1997), and Justman and Gradstein (1995). Moreover, the results here are also consistent with the historical evidence provided by economists such as Williamson (1985), Morrison (1997), Engerman and Sokoloff (1997), Acemoglu and Robinson (1998b), and others. Furthermore, the findings are also consistent with some broad patterns that appear in the data that show that, for the relatively short span this research covers, there appears to be a strong link between democracy and inequality, too. For countries below some "democracy level" such a link is positive, but for countries below it, the link is negative. Poor and highly unequal countries are the ones where such a link tends to be positive. Rich, relatively equal countries are the ones where such a link tends to be negative. Finally, the results in this paper are consistent with work by Bruno, Ravallion, and Squire (1998), Chari, Kehoe, and McGrattan (1996), and others, by providing further empirical evidence regarding persistence of inequality.

Clearly, the results are not absolute evidence on the existence of a political Kuznets curve. Perhaps the findings in this paper are driven by a few noticeable changes in the extremes of the distribution of the democracy indices employed in this research. In other words, a few countries where the democracy indices changed drastically with some concomitant change in inequality, as

opposed to resulting changes in inequality, may be driving the results. In fact, while there appear to be some outlier countries (footnote 24) at least some case studies presented show that an overall non-monotonic pattern in the link between democracy and inequality may be present. The above, rather bold findings, however, need to be confirmed with future research, especially since the theoretical grounds on which this analysis relies still needs further development. Additionally, the issue of data quality should also be taken into consideration.[28]

[28] As Atkinson and Brandolini (1999) have shown recently, the income inequality data of Deininger and Squire are far from perfect. Again, current research under way at the World Bank on ways to improve these data will help provide a better understanding on this and other issues (Milanovic, 2000).

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Appendix 1
Countries in Sample

Africa
01. Algeria
02. Cameroon
03. C. African R.
04. Congo
05. Egypt
06. Ethiopia
07. Gambia
08. Gabon
09. Ghana
10. Guinea
11. Guinea-Bissau
12. Cote d'Ivoire
13. Kenya
14. Lesotho
15. Madagascar
16. Malawi
17. Mauritania
18. Mauritius
19. Morocco
20. Niger
21. Nigeria
22. Rwanda
23. Senegal
24. Seychelles
25. Sierra Leone
26. South Africa
27. Sudan
28. Tunisia
29. Uganda
30. Zimbabwe
31. Tanzania

Americas
32. Bahamas
33. Barbados
34. Canada
35. Costa Rica
36. El Salvador
37. Dominican R.
38. Guatemala
39. Honduras
40. Jamaica
41. Mexico
42. Nicaragua
43. Trinidad & Tobago
44. United States
45. Argentina
46. Bolivia
47. Brazil
48. Chile
49. Colombia
50. Ecuador
51. Guyana
52. Paraguay
53. Peru
54. Puerto Rico
55. Uruguay
56. Venezuela

Asia
57. Bangladesh
58. China
59. Hong Kong
60. India
61. Indonesia
62. Iran
63. Iraq
64. Israel
65. Japan
66. Jordan
67. South Korea
68. Malaysia
69. Nepal
70. Pakistan
71. Philippines
72. Singapore
73. Sri Lanka
74. Taiwan
75. Thailand

Europe
76. Austria
77. Belgium
78. Bulgaria
79. Czech Republic
80. Denmark
81. Finland
82. France
83. Germany
84. Greece
85. Hungary
86. Ireland
87. Italy
88. Netherlands
89. Norway
90. Poland
91. Soviet Union
92. Spain
93. Sweden
94. Switzerland
95. Turkey
96. United Kingdom

Oceania
97. Australia
98. Fiji
99. New Zealand

Table 1. Summary Statistics

	Gini Coefficient	Bottom 20%	Bottom 40%	Middle 20%	Top 40%	Top 20%	Gastil Index	Polity III Index
Full Sample								
Obs	80	75	75	75	75	75	117	114
Mean	42.60	0.05	0.15	0.15	0.70	0.48	0.42	3.88
Std. Dev	9.09	0.02	0.04	0.03	0.04	0.08	0.28	4.04
Min	25.91	0.01	0.05	0.09	0.53	0.34	0.01	0.00
Max	62.30	0.10	0.23	0.25	0.84	0.65	0.86	10.00
Lat Am								
Mean	49.03	0.04	0.12	0.13	0.75	0.54	0.49	3.93
Std. Dev.	5.90	0.01	0.03	0.02	0.04	0.06	0.20	3.04
Min	40.22	0.02	0.07	0.09	0.68	0.45	0.12	0.40
Max	59.60	0.06	0.17	0.16	0.84	0.65	0.86	10.00
East Asia								
Mean	40.70	0.06	0.17	0.14	0.69	0.47	0.41	3.59
Std. Dev.	6.87	0.02	0.03	0.02	0.05	0.06	0.20	3.97
Min	33.09	0.04	0.12	0.12	0.63	0.42	0.26	0.00
Max	48.80	0.09	0.21	0.17	0.75	0.55	0.82	10.00
Africa								
Mean	47.29	0.05	0.14	0.14	0.73	0.53	0.21	1.52
Std. Dev	9.94	0.03	0.05	0.03	0.08	0.09	0.16	2.77
Min	28.90	0.01	0.05	0.09	0.61	0.39	0.01	0.00
Max	62.30	0.09	0.23	0.21	0.84	0.65	0.66	10.00
OECD								
Mean	34.83	0.06	0.18	0.17	0.65	0.41	0.80	9.14
Std. Dev.	4.47	0.01	0.02	0.02	0.04	0.04	0.10	1.79
Min	25.91	0.05	0.14	0.14	0.53	0.34	0.51	4.00
Max	44.09	0.08	0.23	0.26	0.71	0.50	0.86	10.00

Table 2. Simple Correlation

	Gini	Income Shares				
	Coefficient	Bottom 20 %	Bottom 40 %	Middle 20%	Top 40 %	Top 20 %
Freedom House						
Gastil Democracy Index	-0.3802	0.0851	0.2479	0.4479	-0.3432	-0.4491
Polity III						
Institutional Democracy	-0.3353	0.0839	0.2182	0.3994	-0.3041	-0.3918

Table 3. Cross-Section Estimates, 1960-1995
Dependent Variable: Gini Cefficient

	Ordinary Least Squares		Instrumental Variables	
	Freedom House	Polity III	Freedom House	Polity III
	Gastil Index	Inst Democ	Gastil Index	Inst Democ
	(R1)	(R3)	(R4)	(R6)
Constant	62.402	65.501	50.270	62.011
	(8.415)	(9.798)	(7.599)	(10.823)
Initial GDP	0.456	0.475	-0.310	-0.232
per capita	(0.520)	(0.604)	-(0.428)	-(0.312)
Democ	19.499	2.486	71.210	3.156
	(0.876)	(2.649)	(4.483)	(5.266)
Democ Sqrd	-18.076	-0.218	-66.311	-0.304
	-(0.817)	-(2.422)	-(3.671)	-(3.948)
Secondary	-17.515	-19.021	-19.025	-18.280
Enrollment	-(3.391)	-(3.600)	-(3.216)	-(2.916)
Physicians per	-4.611	-4.839	-2.791	-2.906
Habitants	-(2.127)	-(2.288)	-(1.708)	-(1.715)
Share of	-0.392	-0.415	-0.431	-0.456
Agriculture	-(3.268)	-(3.085)	-(4.217)	-(4.175)
Share of	-0.260	-0.306	-0.226	-0.235
Industry	-(2.053)	-(2.299)	-(2.169)	-(2.155)
Inflation	0.006	0.006	0.005	0.005
Rate	(1.826)	(2.028)	(1.973)	(1.896)
Turning point	0.539	5.692	0.536	5.179
Nobs.	75	73	71	69
R**2	0.393	0.436	0.517	0.536
Rbar**2	0.320	0.365	0.454	0.474

T-stats in parentheses. Four observations are lost when using instrumental variables.

Table 4. Cross-Section Estimates, 1960-1995
Dependent Variable: Income Shares

	Democ		Democ Sqrd		Turning			
	Coef	t-Stat	Coef	t-Stat	Point	Obs.	R**2	Rbar**2
A. Gastil Democ Index								
OLS								
Bottom 20%	-0.050	-0.80	0.040	0.65	0.62	70	0.233	0.133
Bottom 40%	-0.138	-1.22	0.131	1.16	0.53	70	0.311	0.220
Middle 20%	-0.141	-2.49	0.154	2.72	0.46	70	0.436	0.363
Top 40 %	0.279	1.74	-0.284	-1.77	0.49	70	0.373	0.291
Top 20 %	0.361	1.99	-0.397	-2.18	0.45	70	0.460	0.389
IV								
Bottom 20%	-0.172	-3.86	0.156	2.98	0.55	67	0.407	0.325
Bottom 40%	-0.320	-3.76	0.286	2.82	0.56	67	0.443	0.366
Middle 20%	-0.202	-4.10	0.188	3.51	0.54	67	0.488	0.417
Top 40%	0.522	4.49	-0.474	-3.51	0.55	67	0.484	0.413
Top 20%	0.585	4.68	-0.534	-3.70	0.55	67	0.534	0.470
B. Polity III Inst Democ								
OLS								
Bottom 20%	-0.005	-1.72	0.000	1.66	5.82	68	0.248	0.146
Bottom 40%	-0.012	-2.34	0.001	2.22	5.74	68	0.347	0.259
Middle 20%	-0.007	-2.33	0.000	2.40	5.28	68	0.441	0.366
Top 40 %	0.020	2.44	-0.001	-2.38	5.56	68	0.401	0.319
Top 20 %	0.024	2.53	-0.002	-2.49	5.40	68	0.481	0.411
IV								
Bottom 20%	-0.008	-5.20	0.001	3.85	5.11	65	0.437	0.357
Bottom 40%	-0.015	-5.05	0.001	3.50	5.28	65	0.474	0.399
Middle 20%	-0.009	-4.42	0.001	3.43	5.28	65	0.515	0.445
Top 40%	0.024	5.58	-0.002	-3.95	5.28	65	0.514	0.445
Top 20%	0.026	5.40	-0.002	-3.85	5.45	65	0.557	0.494

Results obtained from analogous specification to Table 3. Number of observations corresponds analogously to the ones in that table.

Table 5. Cross-Section Eusufzai Tests, 1960-1995

		Break Point*	Quandt LR Test**	Simple Correlations		Instrumented Correlations		Democ
				Pre-break	Post-break	Pre-break	Post-break	level
Freedom House								
a.Democ	Gini	80	-40.22	0.002	-0.394	0.407	-0.490	0.60
	Shares							
	- Top 20%	80	-41.53	0.053	-0.412	0.426	-0.423	0.60
	- Top 40%	77	-35.16	0.182	-0.237	0.381	-0.109	0.51
	- Middle 20%	80	-32.98	-0.112	0.439	-0.471	0.381	0.60
	- Bottom 40%	77	-33.63	-0.140	0.094	-0.339	0.029	0.51
	- Bottom 20%	77	-31.51	-0.120	0.029	-0.375	0.023	0.51
Polity III								
b. Democ	Gini	71	-33.85	0.007	-0.479	0.386	-0.544	4.00
	Shares							
	- Top 20%	71	-33.34	0.005	-0.489	0.448	-0.540	4.00
	- Top 40%	71	-31.09	0.021	-0.440	0.438	-0.506	4.00
	- Middle 20%	71	-29.08	-0.034	0.455	-0.499	0.493	4.00
	- Bottom 40%	71	-31.84	-0.013	0.390	-0.382	0.468	4.00
	- Bottom 20%	59	-33.78	-0.101	0.116	-0.474	0.110	2.41

* Refers to the time break obtained by using Eusufzai procedure described in text.
** Quandt log-likelihood ratio test computed to detect a time break in regressions

Table 6. Cross-Country Sensitivity Analysis
Instrumental Variables Case

	Type	Lower Bound	Upper Bound	Coefficient	Std Dev	CDF(0) Normal	CDF(0) Non-Normal
A. Freedom House Gastil Democracy Index							
Gini Coefficient	Linear	59.803	85.619	76.490	16.121	0.99	0.99
	Squared	-83.249	-83.249	-72.423	17.174	0.99	0.99
Income Shares:							
Bottom 20 %	Linear	-0.210	-0.143	-0.193	0.043	0.99	0.99
	Squared	0.141	0.141	0.186	0.046	0.99	0.99
Bottom 40 %	Linear	-0.401	-0.240	-0.375	0.082	0.99	0.99
	Squared	0.229	0.229	0.355	0.088	0.99	0.99
Middle 20 %	Linear	-0.206	-0.138	-0.186	0.050	0.99	0.99
	Squared	0.121	0.121	0.168	0.054	0.99	0.99
Top 40 %	Linear	0.379	0.602	0.562	0.118	0.99	0.99
	Squared	-0.589	-0.589	-0.524	0.127	0.99	0.99
Top 20 %	Linear	0.378	0.680	0.628	0.133	0.99	0.99
	Squared	-0.635	-0.634	-0.579	0.145	0.99	0.99
B. Polity III Institutionalized Democracy							
Gini Coefficient	Linear	2.502	3.665	3.226	0.642	0.99	0.99
	Squared	-0.373	-0.373	-0.319	0.075	0.99	0.99
Income Shares:							
Bottom 20 %	Linear	-0.008	-0.006	-0.008	0.001	0.99	0.99
	Squared	0.001	0.001	0.001	0.000	0.99	0.99
Bottom 40 %	Linear	-0.017	-0.010	-0.016	0.003	0.99	0.99
	Squared	0.001	0.001	0.001	0.000	0.99	0.99
Middle 20 %	Linear	-0.009	-0.006	-0.008	0.001	0.99	0.99
	Squared	0.001	0.001	0.001	0.000	0.99	0.99
Top 40 %	Linear	0.017	0.026	0.024	0.004	0.99	0.99
	Squared	-0.003	-0.003	-0.002	0.001	0.99	0.99
Top 20 %	Linear	0.016	0.029	0.026	0.005	0.99	0.99
	Squared	-0.003	-0.003	-0.002	0.001	0.99	0.99

Specification employed is analogous to that on Table 3.

Table 7. Panel Data Estimates, 1960-1995
Dependent Variable: Gini Coefficient

	Gastil Democracy Index				Polity III Institutional Democracy			
	OLS	Within-group	Level by Level	GMM-IV System	OLS	Within-group	Level by Level	GMM-IV System
Constant	3.177	1.865	5.703	0.503	5.700	1.564	3.740	2.503
	(0.946)	(2.144)	(1.439)	(0.205)	(2.127)	(1.793)	(1.414)	(2.477)
Inequality lagged	0.833	0.330	0.913	0.869	0.836	0.322	0.915	0.852
	(31.405)	(4.680)	(36.662)	(47.294)	(28.491)	(4.386)	(35.197)	(43.151)
Democracy	5.594	9.225	0.841	9.648	0.046	0.096	0.316	1.062
	(1.201)	(1.222)	(0.123)	(2.258)	(0.199)	(0.197)	(0.804)	(2.965)
Democ Squared	-5.767	-12.029	-(2.152)	-7.604	-0.015	-0.043	-0.010	-0.099
	-(1.497)	-(1.901)	-(0.396)	-(2.014)	-(0.655)	-(0.804)	-(0.282)	-(2.771)
GDP per capita	0.564	-0.016	-0.416	0.437	0.358	-0.428	-0.107	0.419
	(1.626)	-(0.010)	-(1.142)	(1.515)	(1.363)	-(0.265)	-(0.372)	(3.177)
Schooling	-0.073	-0.090	-0.067	-0.065	-0.068	-0.074	-0.072	-0.072
	-(4.435)	-(1.956)	-(3.403)	-(7.007)	-(4.276)	-(1.725)	-(4.134)	-(8.730)
Liquid Liabilities	-0.786	-0.114	-0.712	-0.621	-0.723	-0.025	-0.787	-0.338
	-(1.563)	-(0.206)	-(2.195)	-(2.274)	-(1.389)	-(0.044)	-(2.272)	-(1.131)
Sargan			0.385	0.260			0.403	0.528
Serial Correlation								
1st. Order:	0.008	0.003	0.039	0.006	0.007	0.004	0.037	0.031
2nd. Order:	0.484	0.891	0.831	0.300	0.486	0.465	0.776	0.353
3rd. Order:	0.699	0.992	0.752	0.822	0.728	0.953	0.807	0.603
Countries	51	51	51	51	51	51	51	51
Observations	283	232	232	283	283	232	232	283

T-statistics in parenthesis.

Table 8. Gmm System Estimator Results, 1960-1995
Dependent Variable: Income Shares

	Ratio (t-1)		Democ		Demo Sqrd		Sargan	Serial Correlation		
Dep Var	Coef	t-Stat	Coef	t-Stat	Coef	t-Stat		1st. Order	2nd. Order	3rd. Order
Gastil Democracy Index										
Top20 / Bot20	0.7186	(34.24)	18.3368	(5.72)	-14.9772	-(5.01)	0.673	0.005	0.303	0.682
Top 40 / Bot40	0.7779	(44.77)	6.2135	(5.50)	-5.0588	-(5.13)	0.410	0.002	0.236	0.301
Polity III Democracy										
Top20 / Bot20	0.6939	(28.60)	1.3558	(6.07)	-0.1387	-(5.73)	0.698	0.001	0.468	0.694
Top40 / Bot40	0.7590	(41.33)	0.4852	(5.96)	-0.0485	-(5.60)	0.781	0.004	0.397	0.432

Results obtained from analogous specification as in Table 7, GMM-IV system estimator case. 51 countries, 283 observations.

Table 9. Panel Data Sensitivity Analysis, 1960-1995
Dependent Variable: Gini Coefficient
GMM System Estimator Case

	Democracy: Linear Term		Democracy: Squared Term		Sargan	Serial Correlation Test			A
	Coefficient	t-Statistics	Coefficient	t-Statistics	Test	1st.	2nd.	3rd.	M
A. Gastil Democracy Index									
Dependent Variable: Gini Coefficient									
Minimum	6.804	(2.078)	-5.658	-(1.893)	0.281	0.012	0.403	0.945	Manu
Benchmark	9.648	(2.258)	-7.604	-(2.013)	0.260	0.006	0.300	0.822	
Maximum	11.118	(2.504)	-8.932	-(2.279)	0.319	0.007	0.288	0.793	Physic
Dependent Variable: Income Shares									
Minimum	14.172	(3.991)	-12.128	-(3.873)	0.491	0.003	0.297	0.759	Black
Benchmark	18.337	(5.716)	-14.977	-(5.010)	0.673	0.005	0.303	0.682	
Maximum	20.051	(5.646)	-16.332	-(4.925)	0.507	0.002	0.263	0.723	Physic
B. Polity III Inst. Democracy									
Dependent Variable: Gini Coefficient									
Minimum	0.766	(2.023)	-0.071	-(1.850)	0.515	0.016	0.244	0.742	Manu
Benchmark	1.062	(2.965)	-0.099	-(2.771)	0.528	0.031	0.353	0.603	
Maximum	1.069	(3.040)	-0.101	-(2.834)	0.534	0.032	0.360	0.597	Physic
Dependent Variable: Income Shares									
Minimum	1.006	(6.777)	-0.101	-(6.103)	0.617	0.001	0.359	0.512	Open,
Benchmark	1.356	(6.065)	-0.139	-(5.730)	0.698	0.001	0.468	0.694	
Maximum	1.454	(5.957)	-0.148	-(5.624)	0.602	0.004	0.387	0.507	Physic

Sensitivity analysis follows Levine and Renelt (1992). From a pool of 15 ancillary variables, I include combinations of 3 va equation. Thus, 455 regressions per specification under consideration are performed. The last column shows the specific three-v included in the core regression, yields minimum, benchmark, and maximum democracy and democracy squared coefficients, re used are: (1) public consumption as a ratio to GDP; (2) public investment as a ratio to GDP; (3) share of agriculture in GDP; GDP; (5) inflation rate; (6) degree of openness; (7) terms of trade shocks; (8) black market premium on foreign exchange; (9) ratio of GDP; (10) number of physicians per inhabitant; (11) number of nurses per inhabitant; (12) number of hospital beds p growth; (14) age dependency ratio; (15) urban population as a ratio of total population. Source of ancillary variables: World Ban

black market premium (Wood, 1988). Also, Income share ratio employed is Top 20/Bottom 20. Top 40/Bottom 40 and Top 2
Results are very similar.