

UCLA

Recent Work

Title

The End of Class Warfare: An Examination of Income Disparity

Permalink

<https://escholarship.org/uc/item/56p2z78c>

Authors

Roll, Richard
Talbot, John

Publication Date

2002-04-20

The End of Class Warfare:
An Examination of Income Disparity

by

Richard Roll and John Talbott*

April 20, 2002

Abstract

During the 1990s, the richest quintile of a country had an average income per capita approximately ten times that of the poorest quintile. We find that the poor of a country are better off relatively, and absolutely, when the country ranks higher in average income, union participation, taxation, government spending, education, and property rights. Under these same conditions, the wealthy of a country also have more absolute per capita income, just not a higher percentage relative to the poor.

Countries with substantial black market activity, high levels of international trade (as a percentage of GDP), and former Spanish colonies have greater income disparity; these features also coincide with lower incomes for both rich and poor.

Key features of democracy such as political and voting rights, civil liberties and freedom of the press, while important for economic growth, are not independently associated with income inequality.

We find little empirical support for a tradeoff between a high level of prosperity and greater equality. Above a very low level of development, appropriate policies are associated with both higher average and more equal income.

	Roll	Talbott
Address	Anderson School, UCLA 110 Westwood Plaza Los Angeles, CA 90095-1481	Global Development Group 2260 El Cajon Boulevard, #201 San Diego, CA 92104
Voice	310-825-6118	619-772-3849
Fax	310-206-8404	619-295-5036
E-Mail	rroll@anderson.ucla.edu	johntalbs@hotmail.com

* The authors thank The Heritage Foundation, the World Bank, Freedom House and the International Labor Organization for years of data compilation that make empirical research a possibility. We also thank Daron Acemoglu for patiently explaining his recent work on institutions and development. We deeply appreciate the hard work by the reference librarians at UCSD, whose selfless effort can only be compensated by this short mention of gratitude.

The End of Class Warfare

An Examination of Income Disparity

The cries of “Free Markets!” screamed out by the striking union workers were drowned out by the shouts of “Higher Wages!” from the factory owner and her husband.

-----*A possible storyline from a newspaper in the year 2020.*

I. Introduction

Most studies of inequality within countries have focused on the percentages of income received by various income quantiles, or else on Gini coefficients.¹ But if one seeks to alleviate poverty, perhaps a better gauge of success would be the per capita income of the poor. An effective policy would make the poor richer while having a positive or neutral affect on the rest of the population. Only average income levels by quantile, not percentages, can reveal such an effect.

In this paper, we study a broad geographic mix of developing and developed countries. On average in our sample of 113 countries, the poorest quintile earns 6.4% of total country income, while the richest quintile earns 46.7% of the total. The average country's ratio of the two is 9.8. Table 1 presents the sample of countries along with inequality and income measures. These data cover a period from 1991 through 1996 inclusive. It is impossible to better align the data temporally across nations because inequality measures are based on surveys that occur infrequently at different times in different countries. Pertinent details are available on the internet at the websites of the individual sources.

Although the sample appears to cover a wide range of country incomes, we recognize it could be biased. The very poorest nations are less apt to report statistics of any kind and perhaps are even more reluctant to reveal income inequality figures. Other countries, even when relatively rich, might be embarrassed to report dramatic inequality. Table 1 names 56 countries for which we have no income distribution data. With a few inexplicable exceptions (Iceland, New Zealand), and a few others that may not care to reveal income distributions for their own reasons (Kuwait, Taiwan), most are poor and several are among the poorest on the

¹ See Appendix A for a description of the Gini coefficient.
The End of Class Warfare, April 20, 2002

planet. We hope their exclusion has simply lessened the likelihood of uncovering statistically significant results and has not brought an incorrect inference, but we are unable to provide any assurance and can only plead that it would be entirely unintentional.

We examine 21 different potential determinants of inequality, measuring their relation with Gini coefficients, income percentages by quintile and average dollar incomes per capita by quintile. Table 2 lists and describes them. Multicollinearity among these variables can be overcome with appropriate empirical methods, but the more serious conceptual problem of endogeneity cannot be; hence, conclusions about causality remain unavoidably ambiguous.

In general, richer countries tend to have more egalitarian distributions of income. Only five of the 113 countries in our sample had both above-average inequality, (as measured by the Gini coefficient), and above-average income per capita.² Countries that are richer, or have higher union participation, more extensive education systems, stronger property rights, higher taxes, or more government spending are more egalitarian. Somewhat surprisingly, among these factors associated with greater equality, almost none has a damaging effect on the wealthy as measured by average income per capita for the richest quintile.

Black market activity, international trade (as a percentage of GDP) or being a former Spanish colony is each associated with greater inequality. Although democratic institutions nurture development and growth (Roll and Talbott [2001]), they are not significantly associated with inequality, once the average level of income is taken into account. Of course since greater wealth is associated with more equality, democratic institutions might have an indirect positive egalitarian influence.

If the factors we measure really are causes and not the effects of greater equality, then policies are available to both stimulate growth and diminish income disparity. These goals do not seem to be mutually exclusive.

² These countries were Chile, Malaysia, South Africa, Uruguay, and the United States.
The End of Class Warfare, April 20, 2002

II. The Issues and Some Preliminary Empirical Results.

Journalists and politicians frequently suppose that income redistribution is a zero-sum game; i.e., any action taken to help one class hurts another. Such a conclusion is, in fact, inescapable if redistribution is measured by the percentages of income accruing to various wealth groups. By construction, percentages must aggregate to 100%, so if the poorest quintile's percentage increases, at least some richer quintile percentage must decrease.

But such arithmetic ignores the absolute income level of each class, which is perhaps more relevant. To see the difference, think about the following choice: would one rather be a poor citizen of a country where the poorest quintile earns five percent of the total income and the average per capita income is \$10,000, or a poor citizen of a country where the poorest quintile earns ten percent of the total income and average per capita income is \$1,000? The average poor citizen in the first country has five times the income of the average poor citizen in the second. Unless envy of richer fellow citizens is an overweening sentiment, few would prefer the second alternative.

Across the 113 countries in our sample, the ratio of high to low quintile income percentage ranges from 2.6 to 57.6. Considering such proportions, an understandable gut reaction for improving the lot of the poor is simply to transfer resources from the rich. By transferring 6.4% of total income from the richest quintile to the poorest, the poor incomes would double while the wealthiest incomes would still exceed 40% of the total. A relatively small burden on the rich can appear to loom large in the alleviation of suffering.

A cross-country comparison of income percentages reveals the empirical extent of this apparent tradeoff. Figure 1 plots the lowest quintile (LQ) income percentage against the highest quintile (HQ) income percentage for our 113 countries.³ This certainly looks like a zero-sum game and a casual empiricist might be forgiven for that deduction. Consider, though, that the scatter in Figure 1 is not perfectly co-linear entirely because the three middle quintiles have been ignored. There would be a perfect relation between the percentage in any fractile of the distribution and its complement.

³ No figure in this paper necessarily implies causality running from the x-axis variable to the y-axis variable.
The End of Class Warfare, April 20, 2002

Instead of using percentages, we might employ the same underlying data to compare average dollar incomes per capita in various quintiles. If G_i is average income per capita (GNI/Capita) for country i , N_i is the population, and π_{ij} is the percentage that quintile j receives in country i , then the per capita average income of quintile j in country i is $g_{ij}=(\pi_{ij}G_iN_i)/(N_i/5)=5\pi_{ij}G_i$.⁴ Figure 2 plots, across the same countries used in Figure 1, the lowest quintile versus the highest quintile average incomes per capita.

The results are striking. Based on incomes rather than percentages, there is a strong positive cross-country correlation between the poorest and richest quintile incomes. Not only is there no evidence of a trade-off between rich and poor; the casual empiricist might readily conclude from Figure 2 that the goose and the gander have coincidental interests.

Moving beyond bivariate comparisons of income class percentages complicates the study of inequality. As we shall see, a number of different factors are related to inequality, but causality directions are problematic and multicollinearity is extensive among possible determinants. It is tempting to predict that particular policies will benefit one class, while harming another. Yet there could be unforeseen and unintended consequences. To this point, we do not even know whether policies intended to reduce income disparity actually deliver resources to the poor, nor whether they have any impact whatsoever on the rich or on the average citizen.

⁴ This calculation assumes that the pre-tax total GNI is distributed according to the measured quintile fractions, which were essentially based on after-tax consumption. Later, we will examine the implications of this assumption.

III. Inequality and Its Proximate Determinants.

Figure 3 plots Gini coefficients against average GNI/capita across our sample of countries. High income is associated with low Gini values and hence more equality. What is most interesting is not where the data points lie in this figure, but rather where they do not. The upper right hand quadrant is virtually empty. Only a few countries in our sample have both above-average income and above-average inequality.

Following Kuznets [1955], previous researchers (Ahluwalia, [1976], Jha [1996]) have reported an inverted U-shape for the relation between inequality and income, which suggests that a country must transition through a temporary period of increasing inequality as it develops. Thornton [2001] finds that the inflexion point is quite low, around \$2,000 of average per capita income. No inverted U-shape is apparent in Figure 3, but extremely poor countries are bunched close to the vertical axis and any pattern among them would be difficult to discern.

To make them more prominent, we re-plotted the figure using the natural log of GNI/Capita rather than the raw number. The results are depicted in Figure 4. There does indeed seem to be a positive relation between Gini and $\log(\text{GNI/Capita})$ at the very poor end; the vertical line indicates an income level of about \$1100. Thornton's peak around \$2,000 would be broadly consistent with an inverted U drawn through these points.

Beyond the extremely poor nations, higher incomes are unquestionably associated with more equality, but which is the cause and which the effect? A natural surmise is that rapid growth eventually helps the poor, even more in percentage terms than it helps the rich. But there is an opposing argument that inequality impedes development (Alesina and Rodrik [1994], Persson and Tabellini [1994]). Alesina and Perotti [1995] suggest that inequality fuels socio-political instability, which reduces investment and thereby hampers growth. This causality issue cannot, unfortunately, be resolved with cross-sectional data. Time series data in sufficient quantity and quality would be more informative but are limited at this juncture.⁵

⁵ Deininger and Squire [1996] amassed an impressive time series of "high quality" inequality data for some countries. Forbes [2000] used these data in her study of inequality and subsequent growth. Unfortunately, similar time series data for many conceivable determinants of inequality are, to our knowledge, non-existent.

There exists a close positive relation between the Gini coefficient and the percentage of income earned by the richest quintile; see Figure 5. Seeing this plot, a member of the upper class might understandably oppose egalitarian measures to reduce inequality.

But consider Figure 6, a plot of Gini versus dollar income per capita of the upper quintile. The strong linear positive correlation of Figure 5 has vanished. It has been replaced by a weaker and apparently non-linear relation, negatively sloped above the very lowest level of income. The wealthy in countries with more equality are mostly better off in absolute dollar terms than the wealthy in countries with large income disparity. Again, the upper right part of the graph is unsullied white space. Just a single country whose inequality (Gini) exceeds the average has a top quintile earning more than \$30,000. This is the United States, the upper outlier at the far right of the plot, with barely above-average inequality and the second richest upper class among our sample of countries.⁶

IV. Multivariate Cross-Country Evidence.

To this point, we have presented simple visual information about inequality and income without statistical tests of significance. The time has now arrived to become more formal. This section provides evidence about inequality's relation not only to income but also to the other possible proximate determinants listed in Table 2. Unfortunately, data for many of our additional determinant candidates are not available for quite a few countries. For the empirical tests in this section we were obliged to reduce the sample size by almost 40%, from the 113 countries previously considered to only 69. The remaining 69 countries bear asterisks in Table 1.

Table 3 tabulates correlations among the candidate determinants and reveals the presence of substantial multicollinearity. A standard procedure for handling collinear data is regression on principal components (Cf. Judge, et. al. [1985, pp. 909-912]). This method can be justified

⁶ Only one other country, Luxembourg, has an upper quintile earning more than \$60,000 per person.

theoretically here because our explanatory variables are mere proxies for the underlying, but unobservable, latent conditions that affect inequality. It seems possible that the number of proxy variables actually exceeds the true number of underlying determinants.

Examination of the eigenvalues from the 21X21 correlation matrix of the original explanatory variables indicates the presence of quite a few latent variables. The first principal component explains about 41% of the variance and the percentage explained reaches 90% only around the 9th principal component. Consequently, we decided to cut the dimensionality approximately in half by employing the first ten principal components as regressors.

The ten estimated regression coefficients were then transformed back into the original 21-dimensional space, thereby producing a coefficient and a t-statistic for each original variable. This well-known procedure is tantamount to OLS regression subject to a set of linear restrictions corresponding to the eigenvectors of the regressor correlation matrix. Because of these restrictions, the standard errors can often be disentangled precisely even in the presence of multicollinearity.

Table 4 reports results for ten separate and distinct multiple regressions. In column 1, the dependent variable is the Gini coefficient. In the next three columns, the dependent variable is the percentage of total income received by respectively; the poorest quintile, LQ(%), the lowest 60% of the population, 0-60(%), and the richest quintile, HQ(%).

The right most six columns report regressions where average dollar income per capita is the dependent variable. Again, there are separate regressions for the poorest quintile, LQ(\$), the lowest 60% of the population, 0-60(\$), and the richest quintile, HQ(\$). In this case, however, we consider two alternative estimates of quintile income per capita.

The first, labeled “Total Income” is the same as we have been using heretofore, $g_{ij}=(\pi_{ij}G_iN_i)/(N_i/5)=5\pi_{ij}G_i$ where G_i is average income per capita (GNI/Capita) for country i , N_i is the population, and π_{ij} is the percentage that quintile j consumes in country i . A possible difficulty with this definition is its implicit assumption that government spending represents income to each quintile in proportion to that quintile’s consumption. For some government expenditures such as direct cash transfer payments, this is probably acceptable (since the transfer payments are generally spent on consumption purchases.) However, for government

The End of Class Warfare, April 20, 2002

expenditures on public goods (e.g., defense), this calculation might inappropriately measure the relative implicit incomes of the various quintiles while for pure government waste, it would overstate the dollar incomes of all quintiles.

An alternative calculation, which we call “Private Income,” assumes that only the non-government component of total spending represents income to the quintiles. In other words, if φ_i is government spending as a fraction of GDP in country i , the average GNI/Capita for quintile j is $5\pi_{ij}(1-\varphi_i)G_i$. This estimate probably understates income in every quintile because, for example, cash transfer payments such as social security and expenditures on public goods are not counted. Hopefully, reporting both the “total” and the “private” income measures should help us at least bracket whatever effects there might be with respect to unobservable true income, including the imputed income value of public goods.

In all regressions of Table 4, t-statistics are reported in italics below each underlined coefficient⁷. Coefficients significant at a 95% level are bordered. Many variables actually exceed a 99% level of significance, with t-statistics ranging from 2 to 17 in absolute value.

Although the explanatory power (adjusted R-square) is respectable, particularly the 80-90% levels in most regressions for dollar income per capita by quintile, we do not claim to have measured all possible conditions that might impact inequality. The included variables could be proxies for more fundamental underlying factors, (though we have not yet imagined what they might be.)

The proximate determinants fall into four categories based on their level of significance in the regressions. 1) Some are not significant in any regression and thus can probably be dismissed as having any meaningful relation with the dependent variables. 2) Some are significant in the last three columns but in none of the first four. These are income-only factors because they are not related to equality and thus are not a subject of this paper. 3) Next are variables that are associated with greater equality. They are significant and negatively correlated with Gini, and typically have a positive association with the percentage earned by the poor and a negative association with the percentage earned by the wealthy. These are the variables we

⁷ The standard errors are corrected for heteroscedasticity using White’s [1980] method.

are most interested in considering as possible correlates and we shall discuss them in detail below. 4) Finally, some variables are associated with greater inequality. They have positive coefficients in the Gini regression and positive (negative) coefficients in richest (poorest) percentage regressions. Following is a summary categorization of these variables:

Insignificant

Government Intervention, Banking Restrictions, Wages and Prices.

Affects Average Income Only – No Inequality Significance

Trade Barriers(-), Monetary Policy (Inflation)(-), Foreign Investment Barriers(+), Political Rights (+), Civil Liberties(+), Freedom of the Press(+), British Colonization(-), French Colonization(-).

Greater Equality

GNI/Capita, Union %, Taxes, Government Expenditures, Property Rights, Regulation, Education.

Greater Inequality

Black Market Activity, International Trade, Spanish Colonization.

Before discussing variables in the last two groups, we would be remiss by not saying a brief word about some of the conditions that turn out to have no relation to equality. One can readily concoct a story about each variable in the first two groups. The British and French consulates should be pleased that their former colonies are relatively egalitarian, (though significantly poorer than the average country in our study). The only real surprise is that none of the democratic variables, and here we are talking about Political Rights, Civil Liberties and Freedom of the Press, has any significant association with equality.

In another paper (Roll and Talbott [2001]) we find that these three democratic factors are all highly positively significant in explaining country income and growth; and we see in Table 4 that high income is one of the most significant correlates of more equality. This seems to imply that democracy has a positive impact on equality, but mainly because it is associated with higher average income. Once average income is taken into account, democracy itself seems to exert no further egalitarian influence.

GNI/Capita

Based on the magnitude of its t-statistics in every regression, average GNI/capita is the most significant of all our variables. Higher average income is strongly associated with higher incomes in all quintiles from poor to rich. Note that this result is not an *a priori* tautology since the percentage earned by a given quintile could have, in principle, been adversely impacted by higher average income for the entire country. Of course, if the percentages were not affected by average income, there would necessarily be a positive algebraic relation between the income in each quintile and the average.

But this is not, in fact, the situation. Notice that the Gini coefficient declines with GNI/Capita, thereby revealing more equality in richer countries. Also, as shown in regressions 2 through 4, the percentages earned by the poorest quintile and by the lowest three quintiles are positively related to average income, while the percentage earned by the richest quintile (regression 5) is negatively related to the average. In other words, greater equality with higher average income implies a negative relative impact on the rich, but it is of insufficient magnitude to make the rich worse off in an absolute sense.

These effects are depicted in Figure 7, which plots poorest and richest quintile incomes and Gini against average GNI/Capita for our expanded sample of 113 countries.⁸ The (bivariate) line of best fit is also plotted. The slope of the line through the poorest incomes is 1.13 (t-statistic 30.9) while the slope through the richest is somewhat lower, 0.929 (t-statistic 69.6). Their difference is highly statistically significant.⁹ The slope of the Gini line is -0.103 (t-statistic 5.15.) Hence, the negative inequality/income relation is weaker than either of the positive quintile/average income relations, but it is still very significant. In conclusion, higher average income is very strongly associated with higher incomes for both rich and poor, with the association being somewhat more pronounced for the poor.

Some researchers argue that inequality is the cause of slow development rather than the effect (Alesina and Rodrik [1994]), (Persson and Tabellini [1994], Clarke [1995]). They suggest that as inequality increases there is no immediate effect on income, but the poor and middle

⁸ The natural logarithms of all variables are used to make the plot more linear.

⁹ This is based on a regression of the difference between poorest and richest GNI/Capita against the country average GNI/Capita (not reported); the slope coefficient has a t-statistic of 4.07.

classes eventually rise up as a new majority and force through policies damaging to growth. This argument implies that minimum wage laws, government programs for the poor, union formation and other actions the poor might take to address inequality could be bad for growth.

At least in the case of union participation and higher government spending, we find little supporting evidence; both are associated with higher dollar Total incomes for all classes (columns 5-7 of Table 4) although the association between union participation and rich Total income is insignificant. The coefficients are negative for the rich when the narrower definition, Private income, is employed, (regression 10), but they are not significant. Moreover, Forbes [2000] disputes previous research and argues that currently high levels of inequality are associated with more rapid growth, not less growth, in subsequent periods.

Forbes argues that previous contrary findings are attributable to a combination of poor quality data and omitted variables. By using panel estimation, (dummy variables for individual countries and time periods), and only “high quality” data, she claims to have partially overcome these difficulties. Country dummies in the panel estimation control for omitted variables across countries, but imperfectly unless they remain constant over time in each country. Some possible omitted variables she mentions explicitly, (p. 885), as possible culprits include corruption and education, which are two of the 21 proximate determinants we employ in this paper; (black market activity is our proxy for corruption.)

If Forbes is right that inequality will lead to higher future growth, how does it happen that richer countries currently have more equal distributions of income? Rich countries had more rapid growth in the past, so to reconcile Forbes’ result with current conditions, these countries must have had higher initial inequality, before their growth spurts, followed by a reversal to more equality after they became rich. Though possible, this is a convoluted tale compared to the simple story that growth is the engine behind greater equality.

We suspect that Forbes’ results are sensitive to her sample of countries (employed because of their high quality data.) There are 45 countries in all, mostly large and none from sub-Saharan Africa. (See her Table 2, p. 875.) For almost all the included countries, there is minimal intertemporal variation in Gini coefficients, Forbes’ inequality measure, which suggests that

the observed level of statistical significance could depend on only a handful of countries, those that have gone through at least moderate alterations in equality.

Using similar country data, we verified that the Gini coefficient is positively related to next period's growth and is statistically significant, a t-statistic of 2.18. But after removing just two countries, Finland and Trinidad and Tobago, the t-statistic drops to 1.13. These two countries were intentionally selected for removal because they had meaningful changes in Gini over time, so we cannot claim that Forbes' results are insignificant. Nonetheless, since much of the information in the Forbes sample appears to reside in two relatively small countries, one is entitled to wonder about the generality of her conclusion.

Property Rights, Black Market Activity and Regulation

Table 4 shows that strong property rights are negatively (and significantly) associated with the Gini coefficient. The association between strong property rights and equality is also supported by the income percentage regressions, a positive effect for the poor and a negative effect for the rich. Yet strong property rights are positively related to dollar income levels of all classes from rich to poor, regardless of the definition of income. If truly causative, it is a second example (after average country income per capita) of a condition that benefits everybody positively (de Soto [2000]), and also contributes to reduced inequality.

The connection between property rights and wealth is complex. Consider that individuals without property have little incentive to fight for strong property rights laws, so very poor countries would not likely have many citizens who care about them. Distributing property more broadly by enacting land reform, formalizing rights to squatters' de facto possessions, or arranging some kind of ESOP where workers accumulate an ownership position, might lead to more popular enthusiasm for strong property rights. Programs that encourage ownership, such home mortgage interest deductibility, might indirectly promote popular support for strong property rights legislation. Perhaps this would feed-forward and bring improvement in both equality and average income.

Land reform need not entail confiscation. There are large swaths of unoccupied public land in some countries that, by being distributed, could bring the pride of ownership to the current

dispossessed poor. It is, perhaps, more than a coincidence that the early settlers of the relatively sparse United States, Canada and Australia were able to acquire land rather easily by purchase, squatting or lottery, and today these countries are some of the most advanced in the world. Although their most rapid growth occurred during the industrial revolution (Acemoglu et al. [2002]), the requisite property rights laws for industrialization were in place and well respected by land-holding citizens prior to that time. At the other extreme, Africa and Latin America have considerable income inequality (See Table 1) and undoubtedly similar, if not worse, inequality in the distribution of land ownership.¹⁰ It is, perhaps, no coincidence that they remain in various stages of non-development. Finally, growth in the advanced Pacific Rim countries can be traced back to land reform programs instituted after World War II, (Alesina and Rodrik [1994]).

In Table 4, we see that Black Market Activity is associated with increased inequality and lower incomes for all classes. Black market activity is symptomatic of corruption,¹¹ a lack of formal property titles, and difficulty in registering businesses or qualifying for formal jobs, factors that de Soto [1989, 2000] emphasizes as causes of poverty. Evidently, the same influences impinge on incomes of the wealthy, just to a lesser degree.

Excessive regulation also is significantly associated with reduced income for the wealthy, (Table 4.). There is, however, no significance of regulation in the regressions with poorest and middle-to-poor incomes. Regulation is related to more equality, perhaps because it harms the upper class and brings little benefit to anyone else.

Strong property rights help growth while black market activity and regulation inhibit growth, (Roll and Talbott [2001]). Consequently, reducing regulation and corruption while improving property rights laws could lead to both increased growth and more equality.

Union Participation

Union participation (as a percentage of the total labor force) is related to greater income for the lowest quintile and the lowest 60% of the population, both absolutely and as a percentage

¹⁰ Birdsall and Londoño [1997] emphasize the influence of asset (including land) inequality.

¹¹ Hongyi Li *et al.* [2000] confirm corruption's positive relationship with inequality and its negative relation with growth.

of total country income. However, the dollar income coefficients are statistically significant only for the broad definition, Total income. The wealthy share of country income falls with greater unionization, but there is no significant association with the absolute income level of the wealthy.¹²

One might expect to find unionization increasing as countries develop from a heavy dependence on agriculture into more manufacturing. We attempted to control for this effect by including average GNI/capita in the regression as an independent variable, but one can never be sure that such a maneuver is adequate. Principal Components (PC) regression was effective in eliminating other variables that seemed to have no explanatory relationship with inequality but were highly correlated with income; e.g., trade barriers, inflation and the democracy-related variables. So we put some credence on the possibility that unionization has its own separate influence. We find no evidence that unions impede development.

Richard Freeman [1993] argues that unions, minimum wage laws, food subsidies and employment protection laws - typically labeled as anti-growth - did little in the 1980's to prevent growth in the developed world. Also, they did not retard structural adjustment programs and the concomitant reductions in wages in the developing world.

Taxes and Government Expenditures

Taxes and Government Expenditures (as a percentage of GDP) are associated with higher incomes per capita;¹³ the strength of the relation is higher for the poor. This is reflected in the inequality measures. Gini declines with government expenditures and the fraction earned by the rich (poor) declines (increases.) The positive association between government spending and both the relative and absolute incomes of the poor seems to make intuitive sense. After all, many government programs are intended to benefit this group. Figure 8 presents a simple bivariate plot of the (log) GNI/Capita for the poorest quintile against government spending for the expanded sample of 113 countries. There is indeed a strongly positive correlation.¹⁴

¹² The sign of the coefficient is positive (14) using Total income and negative (-45) using Private income, but neither is significant.

¹³ Except for government spending and the richest quintile using the Private measure of income. In this case, the coefficient is negative but insignificant.

¹⁴ A few of the more prominent outliers are tagged in the figure. Some of these, such as the Central African Republic, might very well represent suspicious data.

The positive relation between taxes and the richest incomes might seem counter-intuitive. Perhaps taxes are proxying for some other positive government attribute. For instance, La Porta *et al.* [1998] in their study “The Quality of Government” found “that the better performing governments are also larger, and collect higher taxes”. The rich could benefit also from a well-functioning government that promotes societal stability by providing some care for the poor; Cf. Olson [1986]. Friedman [1962] suggests that a negative income tax would be an efficient mechanism for achieving this desirable result.

Education

Education is related to higher absolute incomes for all classes and also to greater equality.¹⁵ Edwards [1997] finds that “countries that improved their education system..., experienced a reduction in inequality.” This makes sense because education here is measured by the average number of years of schooling completed by age 25. Because there is a limit to how much schooling a wealthy student can acquire, the poor might benefit from education more than proportionately. Education is clearly one possible avenue for the poor to climb out of their unfavorable position. Education, however, is not free. It is a real investment that implies foregoing other possible investments along the avenue to development. If the effect really is causative, there is good news in that education brings greater prosperity and a more egalitarian society.

Of course, the causality could actually be reversed. An elite class, in an attempt to defend its privileged and very unequal position, might close off opportunities for the poor to advance themselves through education. There could also be a gender issue. On average, women in unequal poor countries are not encouraged to remain in school as long as men. In some cases, such as in Taliban-controlled Afghanistan, women were blatantly excluded.

¹⁵ The coefficient is only marginally significant in the regression for the percentage earned by the poorest quintile.

International Trade

The level of International Trade is related to exacerbated inequality, a higher Gini and a larger gap between the rich and poor, along with lower absolute incomes of the poorest and lowest three quintiles. The relation of trade levels to absolute income is marginal and insignificant for the rich. One interpretation is that trade *per se* has only a moderate net influence on the total income of a country, but that it does have some distributional effect, perhaps owing to relatively greater international competitive wage pressure on the poor.

Again, however, one must be cautious about the direction of causation. An alternative interpretation is that more unequal countries engage in more trade because their richer citizens have no access to locally produced manufactured luxuries. (There aren't any.) They pay for such imports by exporting cheap goods, (such as cloth, bananas, and beef), produced with inexpensive labor.

Trade Barriers are unrelated to inequality. This result supports Edwards [1997], who argued that opening trade does not exacerbate inequality for developing countries. Supporters of free trade argue now that openness, rather than trade level, is the most important influence on factor price equalization. Similarly, technological advancement comes with openness and serves to reduce the distorting effects of local monopolies. Openness (an absence of barriers) is associated with higher average income, (Roll and Talbott [2001]), so it could still have an indirect positive influence on equality.

Why are more developing countries not promoting trade openness? The answer could very well reside in the observation that trade barriers are useful in maintaining a system of official corruption. Competition from the exterior would reduce the gains from bribery, lower the private benefits from granting special import licenses and lower the payoffs from winking at smugglers. Trade barriers are correlated with black market activity, another possible corruption indicator; see Table 3. There may also be temporary hardships on the citizenry as it shifts from an agrarian to an industrial society that may dampen its enthusiasm for openness to new technology.

Spanish Colonization

Previous Spanish colonies have greater inequality, *ceteris paribus*, and absolute incomes of their poor are significantly lower. As this is an exogenous variable the causality direction is fairly certain, though the observed effect could be a proxy for something else. For instance, Catholicism is the dominant religion in most former Spanish colonies and some believe that religion has been cynically manipulated by the upper class to keep the poor in line. In some countries of Latin America and the Caribbean, this allegedly has an ethnic component; i.e., descendents of European immigrants make up much of the upper class while native people and African immigrants are the faithful (and the poor.)

VI. Conclusion.

Wealthier countries are more egalitarian. After controlling for average income (the single variable with the strongest egalitarian association), we find other conditions also that are positively associated with greater equality. Property rights, unions, taxes, and government spending all share the same feature: they are **negatively** and significantly related to the Gini coefficient (a composite measure of inequality) and to the fraction of income earned by the richest quintile, while they are **positively** and significantly associated with the fractions earned by the poorest quintile and by the poorest 60% of the population. Other conditions such as regulation and education are also related to more equality, but are less pervasively significant.

Somewhat surprisingly, although the wealthiest earn relatively less under these conditions, their absolute dollar incomes are either significantly higher or else insignificant in all cases except under excessive regulation. This suggests that poor countries can become richer in general and more egalitarian without any class losing ground in an absolute sense.

Some conditions are associated with greater inequality and with lower incomes for all classes. These include black market activity, the level of international trade, and being a former Spanish colony. Trade barriers and democracy-related conditions such as freedom of the press, civil liberties, and political rights are all related to higher absolute incomes but appear to have no association with inequality.

By focusing attention on average income per capita by class rather than on percentages earned by class, much of the incitement for class confrontation appears to evaporate. The rich and the poor have more congruent interests than they appear to realize and certainly more than either side admits.

References

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2002. "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution." *Quarterly Journal of Economics*, (forthcoming). Currently available at the following web site: <http://econ-www.mit.edu/faculty/acemoglu/files/papers/qjerffinal1.pdf>. (March).

Alesina, Alberto, and Roberto Perotti. 1996. "Income Distribution, Political Instability, and Investment." *European Economic Review* 40, 6 (June), 1203 –28.

Alesina, Alberto, and Dani Rodrik. 1994. "Distributive Politics and Economic Growth." *Quarterly Journal of Economics* 109 (May), 465 –90.

Birdsall, Nancy, and Juan Luis Londoño. 1997. "Asset Inequality Matters: An Assessment of the World Bank's Approach to Poverty Reduction." *American Economic Review* 87, 2 (May), 32-37.

Central Intelligence Agency. 2001. *CIA World Factbook*. Washington, D. C.: Central Intelligence Agency; Supplier of Documents.

Clarke, George, R. G., 1995, "More evidence on income distribution and growth," *Journal of Development Economics* 47, 2 (August), 403-427.

De Soto, Hernando. 1989. *The Other Path: The Invisible Revolution in the Third World*. New York: Harper and Row.

_____. 2000. *The Mystery of Capital. Why Capitalism Triumphs in the West and Fails Everywhere Else*. New York: Basic Books -Perseus Books Group.

Edwards, Sebastian. 1997. "Trade Policy, Growth, and Income Distribution." *American Economic Review* 87, 2 (May), 205-210.

Forbes, Kristin J., 2000, "A Reassessment of the Relationship Between Inequality and Growth," *American Economic Review* 90, 4 (September), 869-887.

Freeman, Richard B. 1993. "Labor Markets and Institutions in Economic Development." *American Economic Review* 83, 2 (May), 403-408.

Friedman, Milton. 1962. *Capitalism and Freedom*. Chicago, IL: University of Chicago Press.

Jha, Sailesh K. 1996. "The Kuznets Curve: A Reassessment." *World Development* 24, 4, 773-780.

Judge, George C., W. E. Griffiths, R. Carter Hill, Helmut Lütkepohl, and Tsoung-Chao Lee, 1985, *The Theory and Practice of Econometrics*, (New York: Wiley.)

Kuznets, Simon. 1955. "Economic Growth and Income Inequality." *American Economic Review* 45,1 (March), 1-28.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny. 1998. "The Quality of Government." *Journal of Law, Economics and Organization* 15, 222-279.

Li, Hongyi, Lixin Colin Xu, and Heng-Fu Zou. 2000. "Corruption, Income Distribution, and Growth." *Economics and Politics* 12, 2 (July), 155-182.

Olson, Mancur, 1986, Why Some Welfare-State Redistribution to the Poor Is a Great Idea, in Charles K. Rowley, ed., *Public Choice and Liberty: Essays in Honor of Gordon Tullock*, (Oxford: Basil Blackwell.)

Persson, Torsten, and Guido Tabellini. 1994. "Is Inequality Harmful for Growth? Theory and Evidence." *American Economic Review* 84, 3 (June), 600 –21.

Roll, Richard, and John Talbott. 2001. "Why Many Developing Countries Just Aren't." Working paper. On http://www.anderson.ucla.edu/acad_unit/finance/wp/2001/19-01.pdf. (November).

Thorton, John. 2001. "The Kuznets Inverted-U Hypothesis: Panel Data Evidence from 96 Countries." *Applied Economics Letters* 8, 15-16.

White, H., 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", *Econometrica* 48, 817-838.

Appendix

The Gini Coefficient

The Gini coefficient, named for the Italian statistician Corrado Gini, (1994-1964), is based on the area under the “Lorenz curve.” The Lorenz curve plots cumulative income as a fraction of total country income on the y-axis, from poorest to richest, against the cumulative fraction of the population on the x-axis. By construction, the resulting curve passes through the origin and also through the point (1,1) corresponding to 100% of the population and 100% of the income. If everyone had exactly the same income, the Lorenz curve would be a 45° line, but actual populations are unequal so the curve usually appears something like Figure A-1.

The lightly shaded area under the curve is smaller the greater the inequality of incomes across the population. Call the lightly shaded area L and note that $0 \leq L \leq \frac{1}{2}$. The Gini coefficient is $1-2L$, so it varies between zero, complete equality and 1.0, complete inequality. The darker shaded area is one-half Gini.

Although the merits of the Gini coefficient could be and have been disputed, it remains one of the most popular composite measures of income inequality.

Figure A-1

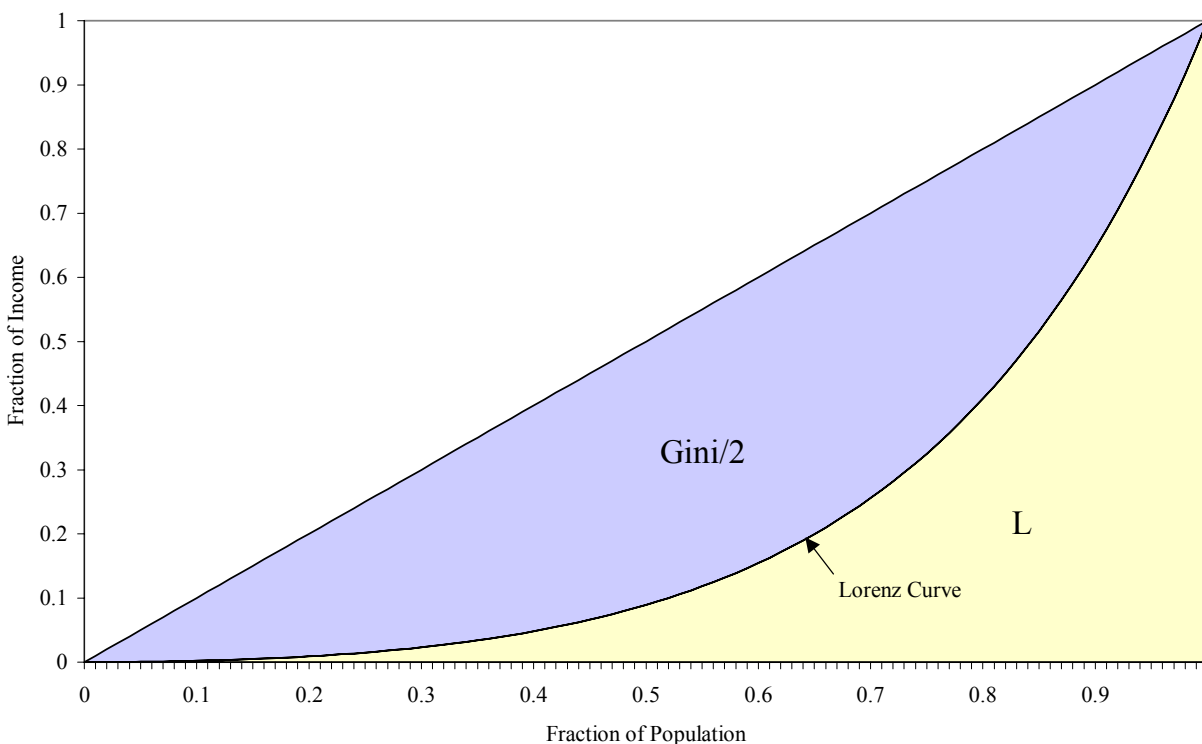


Table 1. Gini Coefficients, Percentages Earned by Quintile, and Total Income per Capita (from the 1990s)¹⁶

Country	Gini (%)	Poor	2	3	4	Rich	Income/ Capita (\$)
		Percentage of Income by Quintile ¹⁷					
Algeria *	35.3	7.0	11.6	16.1	22.7	42.6	4,560
Armenia	44.4	5.5	9.4	13.9	20.6	50.6	2,019
Australia *	35.2	5.9	12.0	17.2	23.6	41.3	21,030
Austria *	23.1	10.4	14.8	18.5	22.9	33.3	22,577
Azerbaijan	36.0	6.9	11.5	16.1	22.3	43.3	1,962
Bangladesh *	33.6	8.7	12.0	15.7	20.8	42.8	1,344
Belarus	21.7	11.4	15.2	18.2	21.9	33.3	5,286
Belgium *	25.0	9.5	14.6	18.4	23.0	34.5	23,092
Bolivia *	58.9	1.9	5.9	11.1	19.3	61.8	2,189
Brazil *	59.1	2.6	5.7	10.3	18.5	63.0	6,647
Bulgaria	26.4	10.1	13.9	17.4	21.9	36.8	4,912
Burkina Faso	48.2	5.5	8.7	12.0	18.7	55.0	844
Burundi	33.3	7.9	12.1	16.3	22.1	41.6	574
Cambodia	40.4	6.9	10.7	14.7	20.1	47.6	1,337
Canada *	31.5	7.5	12.9	17.2	23.0	39.3	22,499
Central African Republic	61.3	2.0	4.9	9.6	18.5	65.0	1,066
Chile *	57.5	3.4	6.3	10.5	17.9	62.0	7,726
China *	40.3	5.9	10.2	15.1	22.2	46.6	2,758
Colombia *	57.1	3.0	6.6	11.1	18.4	60.9	5,886
Costa Rica *	45.9	4.5	8.9	14.1	21.6	51.0	5,737
Croatia	29.0	8.8	13.3	17.4	22.6	38.0	6,420
Czech Republic	25.4	10.3	14.5	17.7	21.7	35.9	12,871
Denmark *	24.7	9.6	14.9	18.3	22.7	34.5	23,407
Dominican Republic *	47.4	5.1	8.6	13.0	20.0	53.3	4,017
Ecuador *	43.7	5.4	9.4	14.2	21.3	49.7	3,001
Egypt *	28.9	9.8	13.2	16.6	21.4	39.0	2,976
El Salvador *	50.8	3.7	7.8	12.8	20.4	55.3	4,018
Estonia	37.6	7.0	11.0	15.3	21.6	45.1	6,811
Ethiopia	40.0	7.1	10.9	14.5	19.8	47.7	591
Finland *	25.6	10.0	14.2	17.6	22.3	35.8	18,885
France *	32.7	7.2	12.6	17.2	22.8	40.2	20,813
Gambia *	47.8	4.4	9.0	13.5	20.4	52.8	1,428
Georgia	37.1	6.1	11.4	16.3	22.7	43.6	2,982
Germany *	30.0	8.2	13.2	17.5	22.7	38.5	21,713
Ghana *	39.6	5.9	10.4	15.3	22.5	45.9	1,730

¹⁶ Countries with asterisks constitute the sample for the multivariate analysis.

¹⁷ Since the percentages are based on consumption surveys or similar sources, they are effectively after tax. They should include direct government transfers. Average country income (or GNI) is pre-tax.

Greece *	32.7	7.5	12.4	16.9	22.8	40.3	13,620
Guatemala *	55.8	3.8	6.8	10.9	17.9	60.6	3,431
Guinea	40.3	6.4	10.4	14.8	21.2	47.2	1,723
Guinea Bissau	56.2	2.1	6.5	12.0	20.6	58.9	817
Guyana	40.2	6.3	10.7	15.0	21.2	46.9	3,153
Honduras *	59.0	1.6	5.6	11.0	20.1	61.8	2,313
Hungary *	24.4	10.0	14.7	18.3	22.7	34.4	9,252
India *	37.8	8.1	11.6	15.0	19.3	46.1	1,979
Indonesia *	31.7	9.0	12.5	16.1	21.3	41.1	2,963
Ireland *	35.9	6.7	11.6	16.4	22.4	42.9	16,079
Israel *	35.5	6.9	11.4	16.3	22.9	42.5	17,366
Italy *	27.3	8.7	14.0	18.1	22.9	36.3	20,485
Ivory Coast	36.7	7.1	11.2	15.6	21.9	44.3	1,622
Jamaica *	36.4	7.0	11.5	15.8	21.8	43.9	3,509
Japan *	24.9	10.6	14.2	17.6	22.0	35.7	24,804
Jordan *	36.4	7.6	11.4	15.5	21.1	44.4	2,752
Kazakstan	35.4	6.7	11.5	16.4	23.1	42.3	4,404
Kenya *	44.5	5.0	9.7	14.2	20.9	50.2	993
Korea, South *	31.6	7.5	12.9	17.4	22.9	39.3	14,305
Kyrgyz Republic	40.5	6.3	10.2	14.7	21.4	47.4	2,108
Laos	37.0	7.6	11.4	15.3	20.8	45.0	1,649
Latvia	32.4	7.6	12.9	17.1	22.1	40.3	5,218
Lesotho	56.0	2.8	6.5	11.2	19.4	60.1	2,343
Lithuania	32.4	7.8	12.6	16.8	22.4	40.3	5,815
Luxembourg	26.9	9.4	13.8	17.7	22.6	36.5	36,509
Madagascar	46.0	5.4	9.2	13.4	19.9	52.0	742
Malaysia *	49.2	4.4	8.1	12.9	20.3	54.3	8,260
Mali *	50.5	4.6	8.0	11.9	19.3	56.2	663
Mauritania	37.3	6.4	11.2	16.0	22.4	44.1	1,499
Mexico *	51.9	4.0	7.6	12.2	19.6	56.7	7,055
Moldova	40.6	5.6	10.2	15.2	22.2	46.8	2,222
Mongolia	33.2	7.3	12.2	16.6	23.0	40.9	1,454
Morocco	39.2	6.5	10.6	14.8	21.3	46.6	3,247
Mozambique	39.6	6.5	10.8	15.1	21.1	46.5	637
Nepal *	36.7	7.6	11.5	15.1	21.0	44.8	1,183
Netherlands *	32.6	7.3	12.7	17.2	22.8	40.1	21,740
Nicaragua *	60.3	2.3	5.9	10.4	17.9	63.6	1,780
Niger	50.5	2.6	7.1	13.9	23.1	53.3	720
Nigeria	50.6	4.4	8.2	12.5	19.3	55.7	762
Norway *	25.8	9.7	14.3	17.9	22.2	35.8	25,844
Pakistan *	31.2	9.5	12.9	16.0	20.5	41.1	1,724
Panama *	48.5	3.6	8.1	13.6	21.9	52.8	4,959

Papua New Guinea *	50.9	4.5	7.9	11.9	19.2	56.5	2,466
Paraguay *	57.7	1.9	6.0	11.4	20.1	60.7	4,609
Peru *	46.2	4.4	9.1	14.1	21.3	51.2	4,260
Philippines *	46.2	5.4	8.8	13.2	20.3	52.3	3,819
Poland *	31.6	7.8	12.8	17.1	22.6	39.7	7,000
Portugal *	35.6	7.3	11.6	15.9	21.8	43.4	14,026
Romania	28.6	8.9	13.6	17.6	22.6	37.3	6,698
Russia	48.7	4.4	8.6	13.3	20.1	53.7	6,780
Rwanda *	28.9	9.7	13.2	16.5	21.6	39.1	400
Senegal *	41.3	6.4	10.3	14.5	20.6	48.2	1,262
Sierra Leone	62.9	1.1	2.0	9.8	23.7	63.4	597
Slovak Republic	19.5	11.9	15.8	18.8	22.2	31.4	9,083
Slovenia	28.4	9.1	13.4	17.3	22.5	37.7	13,640
South Africa *	59.3	2.9	5.5	9.2	17.7	64.8	8,645
Spain *	32.5	7.5	12.6	17.0	22.6	40.3	15,437
Sri Lanka *	34.4	8.0	11.8	15.8	21.5	42.8	2,793
Swaziland	60.9	2.7	5.8	10.0	17.1	64.4	4,327
Sweden *	25.0	9.6	14.5	18.1	23.2	34.5	19,519
Switzerland *	33.1	6.9	12.7	17.3	22.9	40.3	26,677
Tanzania	38.2	6.8	11.0	15.1	21.6	45.5	474
Thailand *	41.4	6.4	9.8	14.2	21.2	48.4	6,378
Trinidad and Tobago *	40.3	5.5	10.3	15.5	22.7	45.9	6,571
Tunisia *	41.7	5.7	9.9	14.7	21.8	47.9	4,905
Turkey *	41.5	5.8	10.2	14.8	21.6	47.7	6,238
Turkmenistan	40.8	6.1	10.2	14.7	21.5	47.5	2,985
Uganda *	37.4	7.1	11.1	15.4	21.5	44.9	1,053
Ukraine	29.0	8.8	13.3	17.4	22.7	37.8	3,362
United Kingdom *	36.1	6.6	11.5	16.3	22.7	43.0	20,004
United States *	40.8	5.2	10.5	15.6	22.4	46.4	28,649
Uruguay *	42.3	5.4	10.0	14.8	21.5	48.3	8,209
Uzbekistan	33.3	7.4	12.0	16.7	23.0	40.9	2,042
Venezuela *	48.8	4.1	8.3	13.2	20.7	53.7	5,666
Vietnam	36.1	8.0	11.4	15.2	20.9	44.5	1,571
Yemen	33.4	7.4	12.2	16.7	22.5	41.2	657
Zambia *	52.6	3.3	7.6	12.5	20.0	56.6	721
Zimbabwe *	56.8	4.0	6.3	10.0	17.4	62.3	2,593
Mean	39.7	6.4	10.6	15.0	21.3	46.7	7,199
Minimum	19.5	1.1	2.0	9.2	17.1	31.4	400
Maximum	62.9	11.9	15.8	18.8	23.7	65.0	36,509

Table 1, Part 2
Some Important Countries Without Available Income Distribution Data

Albania	Congo, Dem. Rep. of	Iraq	Puerto Rico
Angola	Congo, Republic of	Korea, North	Qatar
Argentina	Cuba	Kuwait	Samoa
Bahamas	Cyprus	Lebanon	Saudi Arabia
Bahrain	Djibouti	Libya	Singapore
Barbados	Equatorial Guinea	Macedonia	Somalia
Belize	Eritrea	Malawi	Sudan
Benin	Fiji	Malta	Suriname
Bosnia	Gabon	Mauritius	Syria
Botswana	Haiti	Myanmar	Taiwan
Cameroon	Hong Kong	Namibia	Tajikistan
Cape Verde	Iceland	New Zealand	Togo
Chad	Iran	Oman	United Arab Emirates

Table 2. Components of Variables as Described in Original Sources.

Banking Restrictions

- Government ownership of banks.
- Restrictions on the ability of foreign banks to open branches and subsidiaries.
- Government influence over the allocation of credit.
- Government regulations.
- Freedom to offer all types of financial services, securities, and insurance policies.
- Source: Heritage Foundation (a).

Black Market Activity

- Smuggling.
- Piracy of intellectual property in the black market.
- • Agricultural production supplied on the black market.
- Manufacturing supplied on the black market.
- Services supplied on the black market.
- Transportation supplied on the black market.
- Labor supplied on the black market.
- Source: Heritage Foundation (a).

Civil Liberties

- Equality of opportunity.
- Rule of law, with people treated fairly under the law, without fear of unjust imprisonment or torture.
- Freedom of press, association, religion, assembly, demonstration, discussion and organization.
- Source: Freedom House (b).

Colonization History

- Dummy variable equal to one or zero with one signifying prior colonization.
- French, British and Spanish colonies observed.
- Source: Previous study on growth.

Education

- Average number of years of schooling attained by 25 year olds
- Source: World Bank.

Foreign Investment Restrictions

- Foreign investment code.
- Restrictions on foreign ownership of business.
- Restrictions on the industries and companies open to foreign investors.

- Restrictions and performance requirements on foreign companies.
- Foreign ownership of land.
- Equal treatment under the law for both foreign and domestic companies.
- Restrictions on the repatriation of earnings.
- Availability of local financing for foreign companies.
- Source: Heritage Foundation (a).

Freedom of the Press

- System of mass communication and its ability to permit free flow of communication.
- Government laws and decisions that influence content of the media.
- Political or financial influence over the media.
- Oppression of the media.
- Censure of the media.
- Source: Freedom House (b).

Gini and Percentage Income by Quintiles

- Based on surveys from 1991 to 1996.
- Based on consumption or income.
- GNI/capita
- 1996 GNI per capita.
- GNI adjusted for Purchasing Power Parity (PPP).
- Source: World Bank Data (PPP Adjusted) and CIA World Factbook.

Government Expenditures

- Government Expenditures as a % of total GDP.
- Government Expenditures include transfer payments.
- Source: Heritage Foundation (a).

Government Intervention in the Economy

- Government consumption as a percentage of the economy.
- Government ownership of businesses and industries.
- Share of government revenues from state-owned enterprises and government ownership of property.
- Economic output produced by the government.
- Source: Heritage Foundation (a).

International Trade

- Level of trade as a % of GDP.
- Source: World Bank.

Monetary Policy

- Weighted average inflation rate from 1990 to 1999 with more recent data more heavily weighted.
- Source: Heritage Foundation (a).

Political Rights

- Free elections.
- Right to vote.
- Self-determination.
- Freedom from military and totalitarianism
- Source: Freedom House (b).

Property Rights

- Freedom from government influence over the judicial system.
- Commercial code defining contracts.
- Sanctioning of foreign arbitration of contract disputes.
- Government expropriation of property.
- Corruption within the judiciary.
- Delays in receiving judicial decisions.
- Legally granted and protected private property.
- Source: Heritage Foundation (a)(b).

Regulation

- Licensing requirements to operate a business.
- Ease of obtaining a business license.
- Corruption within the bureaucracy.
- Labor regulations, such as established work-weeks, paid vacations, and parental leave, as well as selected labor regulations.

- Environmental, consumer safety, and worker health regulations.
- Regulations that impose a burden on business.
- Source: Heritage Foundation (a).

Taxes

- Top income tax rate.
- Tax rate that the average taxpayer faces.
- Top corporate tax rate.
- Source: Heritage Foundation (a).

Trade Barriers

- Average tariff rate.
- Non-tariff barriers.
- Corruption in the customs service.
- Source: Heritage Foundation (a).

Union Participation

- Union membership as a % of total labor force.
- Includes farming in labor force
- Source: International Labour Organization.

Wages and Prices

- Minimum wage laws.
- Freedom to set prices privately without government influence.
- Government price controls.
- The extent to which government price controls are used.
- Government subsidies to businesses that affect prices.
- Source: Heritage Foundation (a).

For ease of interpretation, we reversed the scale of four variables, Property Rights, Political Rights, Civil Liberties and Freedom of the Press, from their original source, so that now a larger value is associated intuitively with a higher degree of rights, liberty, and freedom.

We also broke the Heritage Foundation's Fiscal Burden Index into its two constituents, Taxes and Government Expenditures, in order to check their separate influences. Heritage's Fiscal Burden index is the simple average of two of its own sub-indices, the first measuring levels of personal and corporate tax rates, and the second reflecting levels of government expenditures as a percentage of GDP. Heritage's summary tax rating is our Taxes variable, and their raw government expenditures as a percentage of GDP is our Government Expenditures variable. We selected raw percentages for the Government Expenditures variable, because Heritage's summary rating score is based on different scales for developed versus developing countries.

(a) The *2001 Index of Economic Freedom*. This Heritage publication provides a narrative description of each variable for every country. It is also available on the internet. The 2002 version is now available.

(b) Original scale reversed, so that a larger value now means more.

Table 3. Correlations of Candidates for Determinants of Inequality.

	GNI/Capita																																										
Union %	0.546																																										
Trade Barriers	-0.610	Union %																																									
Taxes	0.600	0.373	Trade Barriers																																								
Government Expenditures	0.743	0.684	-0.404	Taxes																																							
Government Intervention	0.105	0.374	0.205	0.258	Government Expenditures																																						
Monetary Policy	-0.705	-0.346	0.382	-0.466	-0.496	Government Intervention																																					
Foreign Investment Barriers	-0.316	-0.239	0.463	-0.157	-0.321	0.061	Monetary Policy																																				
Banking Restrictions	-0.418	-0.257	0.427	-0.193	-0.289	0.088	0.349	Foreign Investment Barriers																																			
Wages and Prices	-0.372	-0.267	0.339	-0.137	-0.314	0.008	0.256	0.437	Banking Restrictions																																		
Property Rights	0.751	0.411	-0.563	0.516	0.556	-0.071	-0.624	-0.343	-0.445	Wages and Prices																																	
Regulation	-0.604	-0.350	0.422	-0.360	-0.497	-0.003	0.487	0.373	0.395	0.501	Property Rights																																
Black Market Activity	-0.790	-0.481	0.462	-0.489	-0.658	-0.083	0.615	0.225	0.445	0.447	-0.743	Regulation																															
Political Rights	0.640	0.340	-0.437	0.295	0.538	-0.090	-0.419	-0.416	-0.303	-0.352	0.566	-0.514	-0.496	Black Market Activity																													
Civil Liberties	0.738	0.411	-0.564	0.330	0.575	-0.109	-0.509	-0.502	-0.415	-0.432	0.653	-0.514	-0.571	0.878	Political Rights																												
Press Freedom	0.708	0.339	-0.520	0.334	0.585	0.013	-0.523	-0.403	-0.349	-0.381	0.656	-0.487	-0.580	0.879	0.892	Civil Liberties																											
Education	0.833	0.566	-0.521	0.412	0.641	0.026	-0.559	-0.409	-0.472	-0.455	0.698	-0.606	-0.678	0.610	0.698	0.634	Press Freedom																										
International Trade	0.118	0.181	0.033	-0.015	0.208	-0.010	-0.315	-0.038	-0.196	-0.075	0.274	-0.303	-0.194	0.088	0.137	0.142	0.209	Education																									
British Colonization	-0.148	-0.122	0.210	0.133	-0.045	0.075	-0.034	0.085	-0.007	0.015	0.035	-0.002	0.053	-0.158	-0.227	-0.131	-0.056	0.077	International Trade																								
French Colonization	-0.206	0.038	0.288	-0.094	-0.118	0.083	0.106	0.088	0.075	0.114	-0.206	0.020	0.140	-0.233	-0.165	-0.198	-0.314	-0.020	-0.185	British Colonization																							
Spanish Colonization	-0.285	-0.261	-0.050	-0.508	-0.408	-0.283	0.364	-0.205	-0.072	-0.079	-0.315	0.175	0.343	-0.004	0.030	-0.085	-0.135	-0.101	-0.349	-0.147	French Colonization																						

Table 4. Cross-Country Regressions of Gini, Percentage Income by Quintile and Two Measures of Dollar Income by Quintile on Twenty-One Determinants.

The cross-country model is

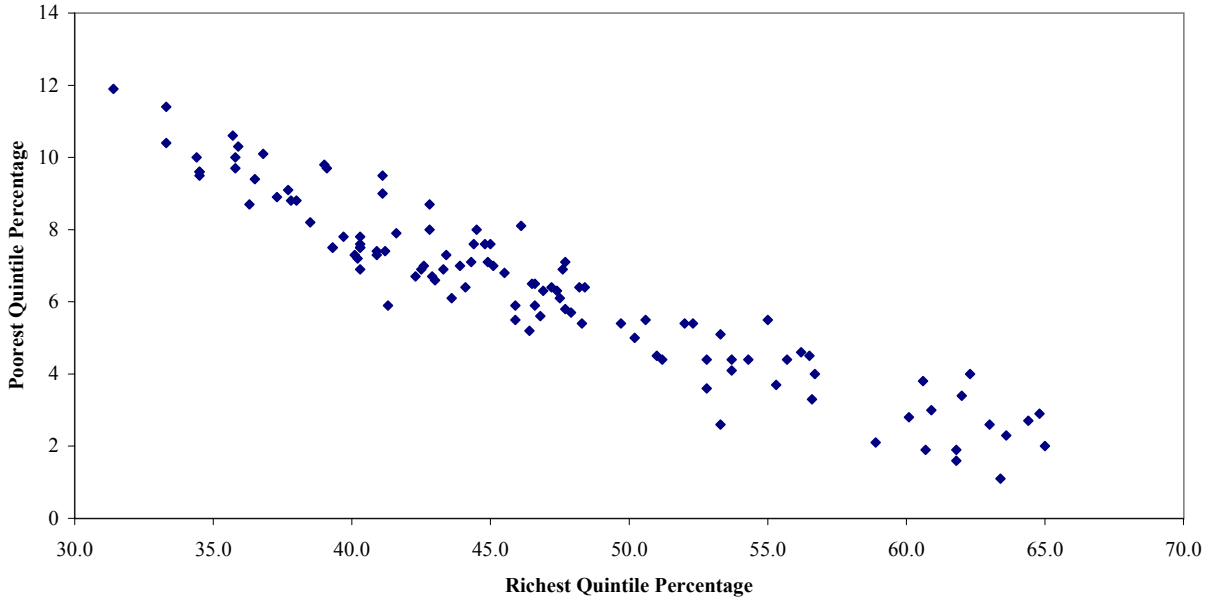
$$\text{Dependent Variable} = a + \sum_{i=1}^{21} b_i X_{i,j}, j=1, \dots, N,$$

where a and b_i are estimated coefficients, $X_{i,j}$ is the explanatory variable i for country j , and N is the number of countries observed. To mitigate multicollinearity, the model was estimated using the method of principal components regression with a 52% reduction in dimensionality; i.e., the first 10 principal components of the covariance matrix of the X 's were the regressors. Those results were then transformed back into the space of the 21 original variables. The coefficient is underlined in the table and its t -statistic is italicized and reported below each coefficient. Bordered entries indicate at least a 95% level of significance.

	<u>Gini</u>			LQ (%)			0-60 (%)			HQ (%)		
	LQ (%)	0-60 (%)	HQ (%)	LQ (\$)	0-60 (\$)	HQ (\$)	LQ (\$)	0-60 (\$)	HQ (\$)	LQ (\$)	0-60 (\$)	HQ (\$)
	Percentage of Country Income			Total Income			Private Income					
	<u>Coefficient</u>											
	<i>t-statistic (italicized)</i>											
<u>GNI/Capita</u> ¹⁸	-0.17	0.04	0.12	-0.14	79	118	282	38.8	57.3	130		
	-6.80	5.92	6.81	-6.68	12.39	17.05	12.68	7.71	9.85	8.33		
<u>Union %</u>	-0.12	0.03	0.08	-0.10	33	38	14	4.94	2.20	-45.0		
	-3.11	2.59	3.04	-3.19	4.54	3.91	0.32	0.92	0.26	-1.24		
<u>Trade Barriers</u>	0.58	-0.08	-0.42	0.54	-336	-544	-1671	-194	-312	-996		
	1.26	-0.76	-1.32	1.42	-5.09	-5.74	-5.12	-4.95	-5.59	-4.65		
<u>Taxes</u>	-2.51	0.57	1.78	-2.04	499	789	1894	244	367	611		
	-4.99	4.53	5.09	-5.04	5.53	5.70	3.87	4.91	4.87	2.04		
<u>Government Expenditures</u>	-0.09	0.02	0.06	-0.07	28	37	67	6.69	7.58	-3.40		
	-4.99	4.75	4.93	-4.89	7.97	7.20	3.25	2.66	1.89	-0.23		
<u>Government Intervention</u>	-0.92	0.21	0.63	-0.74	206	272	-140	-128	-227	-1246		
	-1.03	1.09	1.05	-1.01	1.35	1.09	-0.15	-1.26	-1.30	-1.90		
<u>Monetary Policy</u>	0.58	-0.10	-0.42	0.50	-325	-533	-1140	-172	-276	-530		
	1.32	-1.07	-1.37	1.37	-5.56	-6.31	-3.22	-5.07	-4.89	-2.15		
<u>Foreign Investment Barriers</u>	-1.19	0.38	0.82	-0.78	582	765	1430	422	557	1123		
	-1.25	1.67	1.24	-1.01	2.59	2.72	1.52	2.61	2.83	1.86		
<u>Banking Restrictions</u>	0.57	0.05	-0.42	0.70	-115	-272	506	-10.2	-87.7	431		
	0.69	0.23	-0.74	0.99	-0.68	-1.27	0.67	-0.09	-0.59	0.85		
<u>Wages and Prices</u>	-1.86	0.50	1.40	-1.45	215	189	-1014	10.0	-67.5	-1170		
	-1.80	1.91	1.94	-1.75	1.43	0.91	-0.95	0.09	-0.41	-1.43		
<u>Property Rights</u>	-0.88	0.17	0.62	-0.74	344	549	1600	214	336	927		
	-2.91	2.44	3.03	-3.06	7.85	7.76	6.21	7.61	7.08	4.92		
<u>Regulation</u>	-2.08	0.46	1.56	-1.72	241	258	-2218	-23.7	-81.4	-1946		
	-2.03	1.89	2.22	-2.00	1.11	0.90	-2.10	-0.16	-0.39	-2.68		
<u>Black Market Activity</u>	1.01	-0.20	-0.70	0.83	-454	-679	-1563	-253	-376	-844		
	4.24	-3.38	-4.19	4.30	-7.27	-8.69	-5.08	-5.75	-6.64	-3.98		
<u>Political Rights</u>	0.35	-0.06	-0.24	0.32	23	52	403	11.3	27.3	203		
	1.29	-0.95	-1.27	1.42	0.79	1.25	2.20	0.69	0.97	1.52		
<u>Civil Liberties</u>	0.11	-0.03	-0.07	0.09	126	206	564	49.6	86.6	227		
	0.52	-0.55	-0.46	0.54	4.09	4.77	3.00	2.73	2.92	1.63		
<u>Press Freedom</u>	0.01	0.00	-0.01	0.01	7.6	13.8	42.0	3.12	5.94	15.7		
	0.61	-0.43	-0.54	0.71	2.75	3.59	2.44	2.10	2.15	1.15		
<u>Education</u>	-0.25	0.05	0.17	-0.21	147	211	550	64.1	92.8	253		
	-2.29	1.76	2.23	-2.37	8.78	8.76	5.38	6.21	5.46	3.28		
<u>International Trade</u>	6.55	-1.67	-4.67	4.94	-1151	-1800	-4234	-958	-1437	-2927		
	2.25	-2.23	-2.35	2.16	-1.95	-2.25	-1.07	-2.23	-2.28	-0.96		
<u>British Colony</u>	0.01	0.04	0.00	0.07	-1252	-1690	-3723	-539	-703	-1811		
	0.00	0.11	0.00	0.05	-6.09	-6.25	-2.86	-3.51	-3.05	-1.78		
<u>French Colony</u>	-0.10	0.01	-0.05	-0.07	-680	-1106	-4447	-269	-471	-2407		
	-0.06	0.03	-0.04	-0.05	-1.82	-2.06	-2.23	-1.50	-1.56	-1.77		
<u>Spanish Colony</u>	5.05	-1.24	-3.51	3.92	-601	-847	-1179	-388	-513	-176		
	5.11	-5.62	-5.19	4.76	-3.97	-3.58	-1.24	-4.43	-3.29	-0.24		
<u>Intercept</u>	61.35	0.54	16.44	62.78	-2386	-1856	13216	525	1890	18333		
	8.86	0.32	3.43	11.29	-2.03	-1.14	1.99	0.64	1.53	3.60		
<u>Adjusted R-Square</u>	0.554	0.500	0.559	0.554	0.900	0.920	0.828	0.815	0.829	0.652		

¹⁸ The coefficient of GNI/Capita is multiplied by 10³.

**Figure 1. Percentages of Income Earned by Poorest vs. Richest Quintile
113 countries, 1990s**



**Figure 2. Log Income per Capita Earned by Poorest vs. Richest Quintile
113 countries, 1990s**

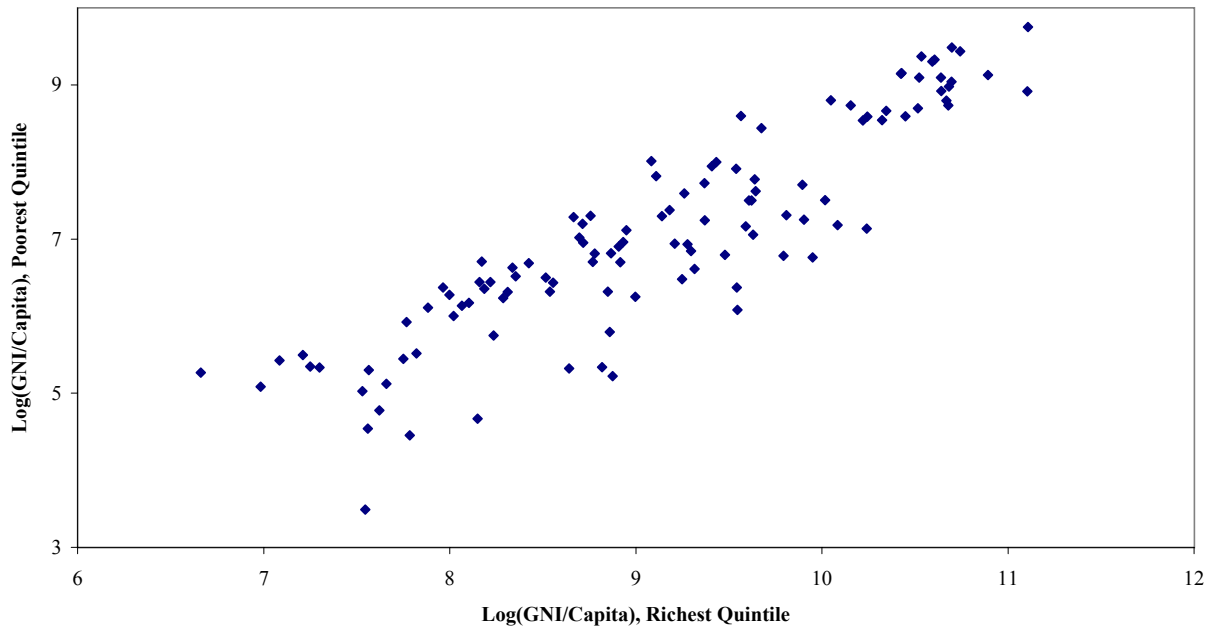


Figure 3. Gini vs. GNI/Capita
113 countries, 1990s

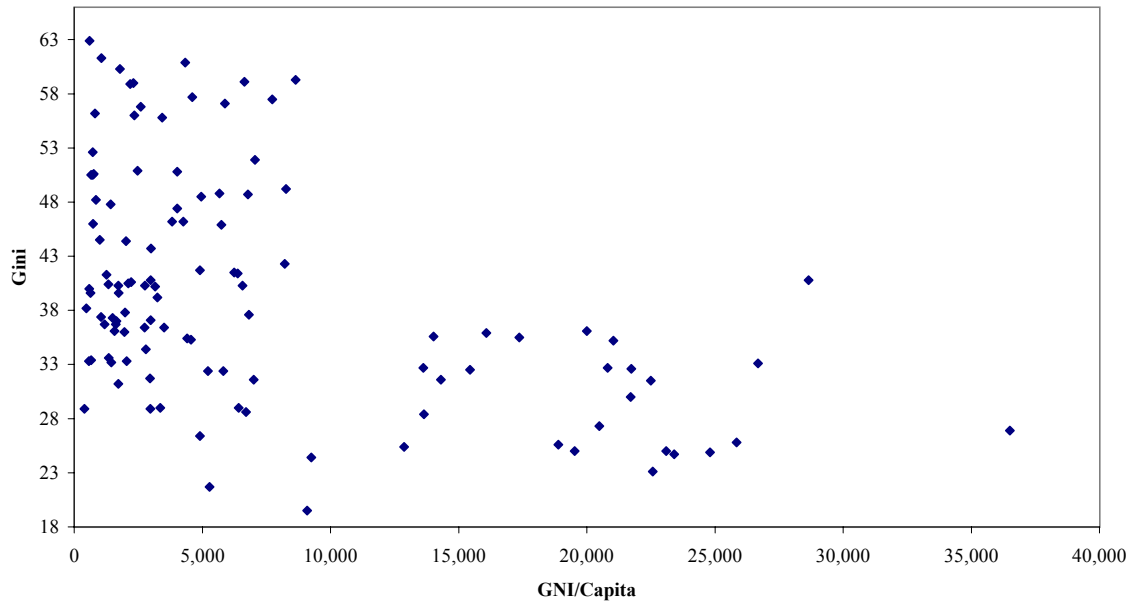


Figure 4. Gini vs. Log(GNI/Capita)
113 countries, 1990s

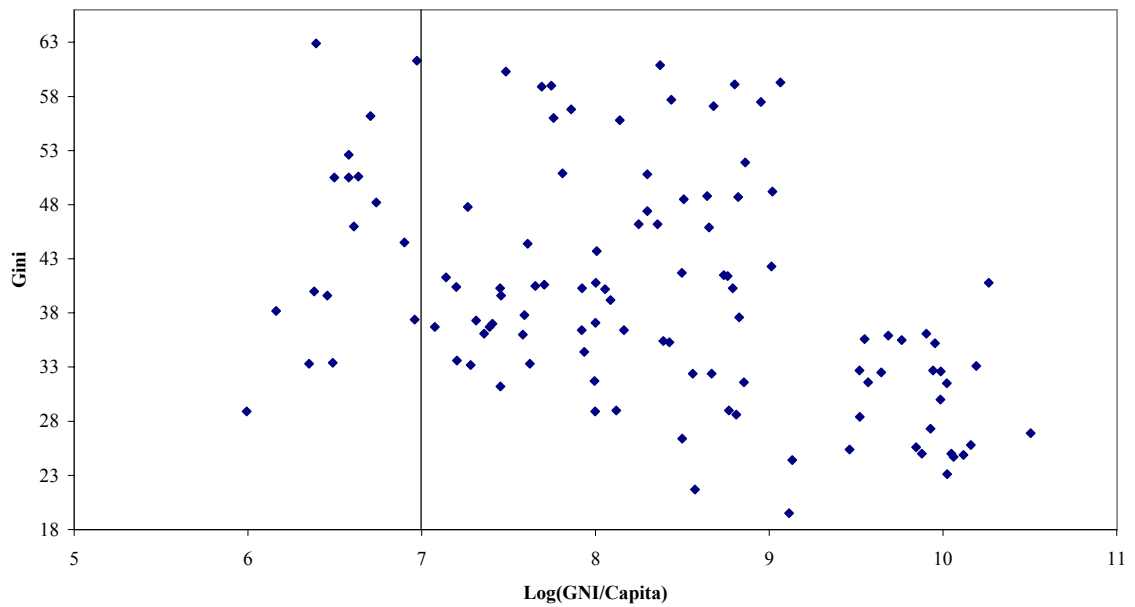


Figure 5. Gini vs. Percentage Earned by Richest Quintile
113 countries, 1990s

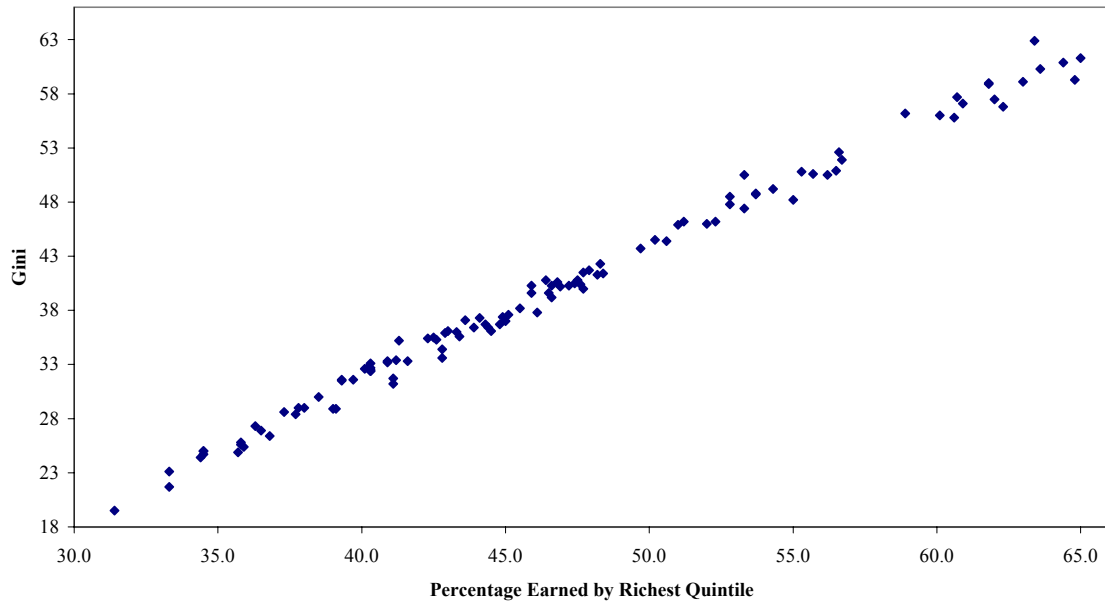


Figure 6. Gini vs. GNI/Capita of the Richest Quintile
113 countries, 1990s

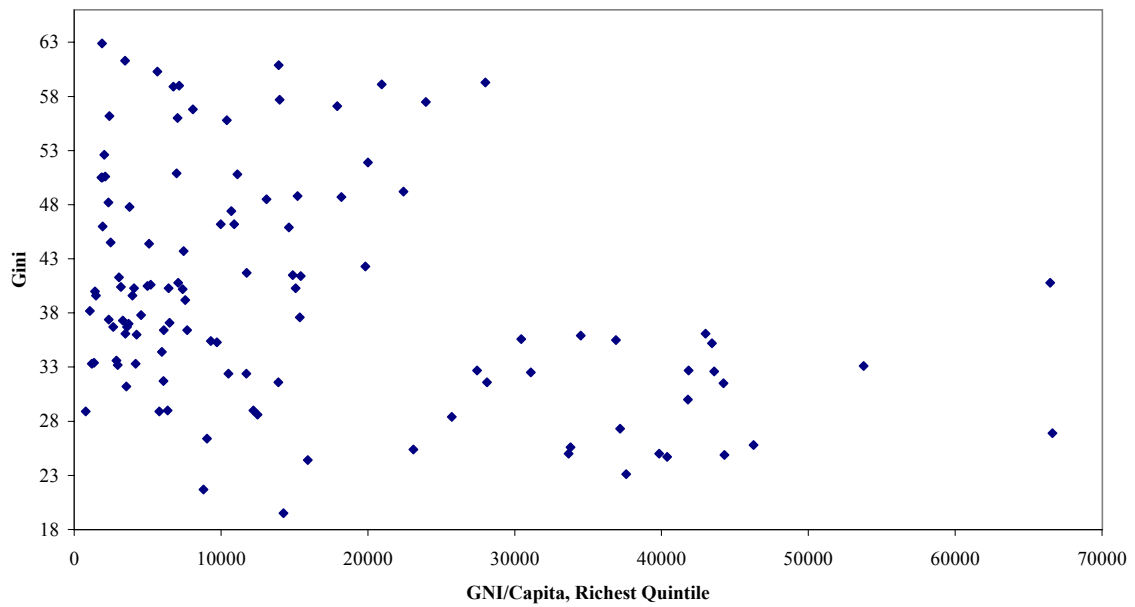


Figure 7. Poor and Rich Incomes and Gini vs. Average Income

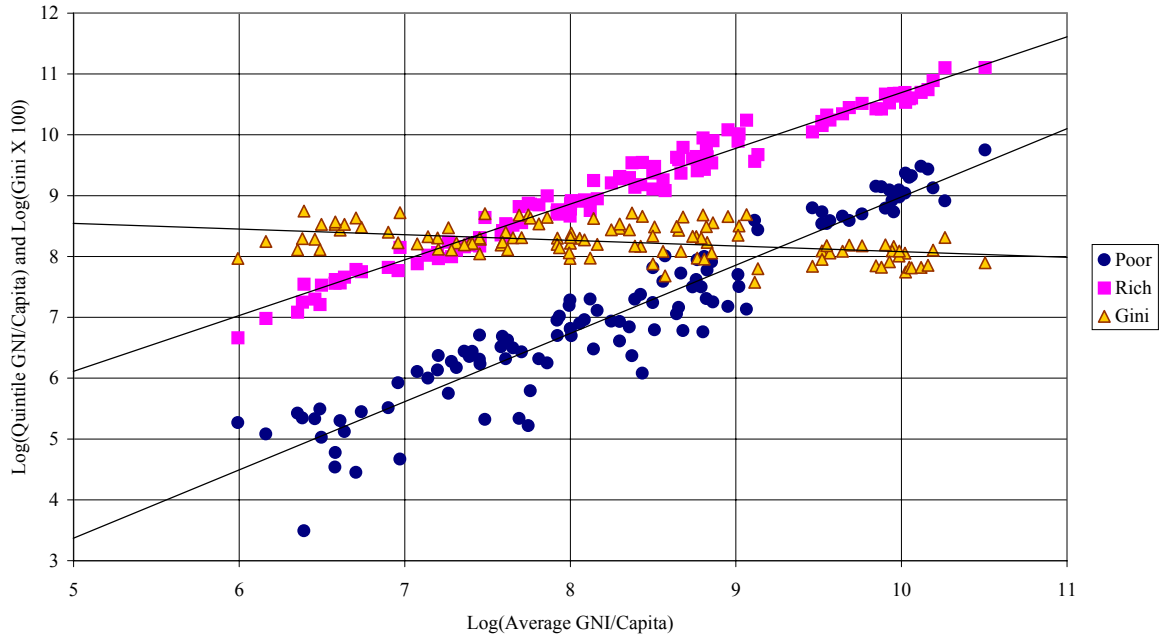


Figure 8. GNI/Capita, Poorest Quintile, and Government Spending

