A REASSESSMENT OF THE RELATIONSHIP BETWEEN INCOME INEQUALITY AND POVERTY

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ABSTRACT

The paper challenges the belief that income inequality causes poverty. The state data set instead of international database is used to investigate whether or not a rise in income equality causes an increase or decrease in poverty rate. The methodology suggested by Learner (1983) and Levine et al (1991) is used to test the robustness of income inequality coefficient estimates by specifying and altering a set of other conditioning variables which explain poverty. The study finds support for the hypothesis that income inequality may cause economic growth and hence reduce poverty.

INTRODUCTION

One of the goals of the American economic system is equity. Indeed, if there is one area in which the role of government has expanded more rapidly, it is in the realm of income and wealth redistribution. And still, nothing arouses more emotions than the issues related to equity. While there is no scientific and objective way to define equity, it is generally accepted that government should not consciously engage in macroeconomic policies which make the income and wealth distribution more unequal.

Arguments in favor of more equal income distribution include: Reduced tension and envy between classes, higher economic growth, better resource allocation, reduced concentration of political power, greater equality of opportunities in social, political and economic arena, and a more cohesive society. As expected, income distribution also affects the poverty rate. Opinions on this subject, however, are mixed: Some scholars think that the income inequality accentuates poverty (Persson and Tabellini, 1994), others (Williams 1999, Kray

2002) believe that the relationship between income inequality and poverty is inverse.

The purpose of this study is to investigate the empirical relationship between poverty and income inequality. The policy implications of the study are significant. If the inverse relationship between poverty rate and income inequality is supported by data, it could shed new light on the conservative view- point that shift in income in favor of the rich is not necessarily at the expense of the poor. Indeed a macroeconomic policy which redistributes wealth and income away from the rich may be counter- productive in that it would shrink the size of pie and hurt the very poor that the policy seeks to protect. Similarly, the study would further support the conservative doctrine that tax break for the rich is good for everybody including the poor.

The case for an inverse relationship between income inequality and poverty can be made based on historical evidence. During the period of Industrial Revolution in Britain, rising income inequality was followed by falling poverty rates. During this period the wage gap between the skilled and unskilled workers widened. Jeffrey Williams (1999), for example, reports that the real wages of blue-collar workers nearly doubled between 1819 and 1851, but during the same period, the number of people in abject poverty declined dramatically. Similarly, in the United States, during the period of railroad construction, the concentration of income and wealth increased sharply because of a dramatic increase in the wages of engineers and machinists, but during the same period the inflation adjusted wages of the unskilled workers also increased at the annual rate of 1.8 percent. During the seven -year periods, 1993- 2000, the U.S Census data shows that whereas the poverty rate declined from 14 percent to less than 10 percent, the percentage of income claimed by top fifth of households increased to 49.7 percent in 2000 from less than 49 percent in 1993. Indeed, during this period, the Pearson Correlation between income inequality and poverty is .867 and is significant at .001 level.

Similarly, at the global level, over the last 30 years, the income inequality has increased within and across countries (Barro, 2002). Curiously enough, during the same period the number of people living in poverty has also declined. However, the correlation between the poverty and income inequality rate begs more questions than it answers. First, correlation does not indicate causality. Second, the correlation could be sensitive to the selected time period. Third, it is difficult to say how robust the correlation would be if some other conditioning variables are included. Last but not the least, correlation suggested by the time series data may not be confirmed by cross-section data. These questions provide the road map for this paper. First, we

would investigate how and why the income inequality might cause a decrease in poverty rate. Second, we would use the Learner's sensitivity model to investigate if the sign and robustness of the correlation coefficient would change by inclusion of the other conditioning variables. Finally, we would use the cross-section data from states within the United States to confirm the relationship between poverty and income inequality.

The causal relationship between income distribution and poverty hinges on how economic growth is related to each of the two variables. In other words, it begs answers to two fundamental but related questions: Does the income inequality cause economic growth and does growth cause a reduction in poverty? Based on the cross-country evidence, Kray (2002) concluded that growth causes almost a proportional increase in income of the poor. However, there are a few exceptions also. For example, the poor in India did not benefit much notwithstanding a rapid increase in growth rate during the 1990's. However, Kray (2002) feels there is evidence to suggest that eventually growth rate does trickle down. Of course, the poor can gain more if conscious macroeconomic policies are designed to solve the problem of poverty. However, Jenkins and Knight (2002) argue based on their study of Nigeria that it is difficult to balance the macroeconomic policies that promote economic growth and reduce income inequality and poverty. The logic of their arguments can be summarized as follows: economic growth depends on, among other factors, accumulation of human capital, physical capital, inventions and innovations. The rate at which individuals accumulate physical and human capital and invent and innovate depends on the economic incentives. If the fiscal and regulatory policies and environment (including political institutions and rule of law) were such that a large part of the fruits of individual efforts are confiscated, individual would not initiate and/or participate in activities that promote economic growth. In as much as the incentives depend on retention of fruit of efforts, too much concern for distributional conflicts can produce economic policies that militate against the incentives for pro-growth activities.

Following Keynes (1957), some economists argue that individual saving rate is sensitive to income level and, therefore, an increase in income inequality would increase individual saving rate. Indeed, based on the Keynesian presumptive relationship between the level of income and individual rate of saving, Barro (1999) posits "a redistribution of resources from rich to poor tends to lower the aggregate rate of saving in an economy". Accordingly, in a closed economy, cetris paribus, greater income inequality would encourage more savings, investment and hence economic growth.

Unequal distribution of assets in an economy may also have a favorable effect on economic growth through the credit markets. Creditors incur substantial set-up costs and, therefore, may favor entities and individuals with a large concentration of assets. Greenwood and Jovanovich (1990) and Piketty (1997) argue that the more imperfect the credit market is and the more lax the bankruptcy laws are, the greater the predilection of creditors for individuals with large asset base.

Persson and Tabellini (1994), however, argue that pro-income inequality policies do not by itself generate economic growth and that income inequality instead of being conducive is, in fact, harmful to economic growth. Their study is predicated on both historical panel data and post war cross-section data from 38 growth episodes. The coefficient of income equality is negative and statistically significant even when other conditional variables are changed.

Alesine and Perotti (1994) and Benhabib and Rustichini (1996) contend that glaring and rampant income and wealth inequality is a breeding ground for socio-political unrest and, therefore, tends to divert scarce resources to activities, which are inimical to economic growth.

Croix and Doepke (2003) findings support the Persson and Tabellini conclusion. Croix and Deopke hypothesize that the fertility rates are income sensitive; poor parents tend to have more children than the rich. Since poor parents have more children, they tend to expend less money on education per child. The educational differential among the children of the rich and poor affects the accumulation of human capital and hence has an unfavorable effect on economic growth. If one assumes that the fertility differential and hence education levels are income sensitive, as income inequality increases the weight assigned to families with lower average education would increase. This will adversely affect the accumulation of human capital and hence economic growth.

However, the recent data does not support Persson - Taelline and Croix - Doepke conclusion. The experience of the United States clearly indicates that in the 1990's, the so called New Economy period, the wage increase of managers and CEO's far exceeded the wage increase for workers and judged by any standard or measure the rich became richer. But did the poor become poorer? During the same period, the country experienced an inordinate growth rate and a poverty rate plummeted to its lowest level recorded in the history of this country. The percentage of poor declined steadily from 13.5 percent to 9.6 percent. It is difficult to generalize, however. The two decades between 1973 and 1993 have witnessed a widening gap between rich and poor, low growth rate and increase in number of

people in poverty. The period between 1960 and 1973 was marked by a steady decline in income inequality, rising growth rate and declining poverty rate. Needless to say, the debate regarding the income distributional effects on economic growth and poverty are still unsettled. Barro (1999) after a comprehensive review of literature concludes, "the theoretical ambiguities do, in a sense, accord with empirical findings, which tend not to be robust".

From a theoretical standpoint why would rising income inequality cause a decline in poverty rates? There seems to be three distinct reasons: First, spurt in technological change always create new fortunes and at the same time improve the wages and living conditions of those who are at the bottom of income scale. This was true during the Industrial Revolution in Britain and railroad construction and recent computer and Internet revolution in the United States. Second, higher skill levels required by new technology creates a demand for both more technical and advanced education. An increase in the quantity and quality of education creates a wider disparity among the skilled and unskilled workers and contributes to greater income inequality. However, a better educated labor force also causes a decline in poverty. The poverty rate among college educated persons is barely 3.2 percent compared to 9.2 percent among those who have high school education. Third, massive influx of immigrants also contributes to a decline in poverty and more wage disparity. The immigrants generally (particularly Asians) have greater differences in education level (and hence in income) compared to native population.

METHODS

In what follows, we use the methodology suggested by Learner (1983) and Levine et al (1991) to test the robustness of income inequality coefficient estimates by specifying and altering a set of other conditioning variables which explain poverty. It is assumed that the income inequality coefficient is statistically robust if it's *a priori* sign and statistical significance are insensitive to alternations in the conditioning set of variables.

The initial regression model includes the following:

$$(1) \qquad P_i = a + b_1 U_i + b_2 Y_i + b_3 W_i + E_i$$

Where P_i is the poverty rate, U_i is unemployment rate, Y_i is per capita income, W_i is the percentage of woman head of household in state$_i$ and E_i is error term.

Next, the robustness of the income inequality coefficient was tested by adding and altering a set of generally accepted variables in poverty literature. Equation 2 represents a general model that includes the following:

(2) $P_i = aS+b_1I+b_2 P+E$

Where P_i is the poverty rate; S stands for a set of variables, which are generally included in most empirical studies on the determinant of poverty. These variables include U_i is unemployment rate, Y_i is per capita income, W_i is the percentage of woman head of household in state$_i$ (see equation 1). "I" represents the variable of interest, in this case, a measure of inequality represented by the income gap between the richest 20 percent and the poorest 20 percent of the population in state$_i$ and "P" represents a pool of other potential variables, which are identified by researchers on poverty. The list of "P" variables include the following: percentage of population over 65(over65), the percentage of population employed in agriculture (AE), percentage of population employed in manufacturing (ME), and fertility rate (F) and "E" represents the error term. Most studies on poverty also include "education," because poverty and education are inversely related. However, since income and education are highly correlated, we excluded education variable in our model.

The cross- section data from 50 states within United States was used to retest the hypothesis that the incidence of poverty is inversely related to the income inequality. Our predilection for state data instead of the international data is based on the established fact that "that the international data are marred by incomplete coverage, biases and errors of measurement (Srinivasan,1994, Fields 1989, Barro 1999). In the same vein Janvey and Sadouler (1995) lament that 'in general, the levels of poverty and inequality remain difficult to compare across countries because they often correspond to different concepts".

The cross-section data for 50 states are derived from the Institute of Economic Policy study entitled, Pulling Apart: State by State Analysis of Income Trends: State Specific Fact Sheets, and historical poverty and income inequality tables from the Census Bureau.

We prefer income gap to Geni Coefficient as a measure of income equality for the following reasons: (1) it is at best misleading to try and capture the whole income distribution represented by the Lorenz curve by one number- the value of Geni

coefficient); (2) the Geni coefficient is more sensitive to changes in income distribution in the middle than to changes in income distribution at the either end; (3) distribution of income described by the Geni coefficient is ordinal rather than cardinal. Admittedly, the cardinal distribution has its own problems. The cardinal measure presumes that any change in inequality resulting from transfer between two individuals depends not on their rank in income distribution, but on their income shares.

However, our preference for income gap over Geni Coefficient may not matter because Barro (1999) cross -country study of 76 countries reveals that Geni value is " particularly highly correlated" with the highest quintile share in income.

ANALYSIS AND RESULTS

A multiple regression equation was formulated (see equation 1) to assess the relationship between the above referenced poverty determinants and percentage of people in poverty in each state.

$$(1) \qquad P_i = a + b_1 U_i + b_2 Y_i + b_3 W_i + E_i$$

A priori one would expect that:

$b_1 > 0$. While there are working poor, the poverty rates are directly related to the level of unemployment.

$b_2 > 0$. The incidence of poverty tends to be higher among those states that have low per capita income. Poorer the state, the more the number of people who are likely to be poor.

$b_3 < 0$. Feminization of poverty is well established. Disproportionate numbers of families with women head of the households tend to be poor.

Other conditioning variables are:

Percentage of people employed in agriculture (AE) > 0. More poor people live in the rural than in urban areas and their primary employment tends to be in agriculture than in manufacturing sector.

Percentage of people employed in manufacturing (ME) < 0. Since wage rate in manufacturing tends to be higher than that of the agricultural sector, an increased employment in manufacturing sector would reduce the percentage of poor people.

Fertility rates (F) < 0. If one assumes that the fertility differential and hence education levels are income sensitive, as income inequality increases the weight assigned to families with lower average education would increase. This will adversely affect the accumulation of human capital and hence poverty rate.

Table 1 shows that 48.1 percent of the variation in the average rate of growth of per capita real GDP is explained by the variables included in the model 1. The F- test indicates that the equation is statistically significant at .05 level. Signs of all the variables are what were expected a priori. The critical t-values indicate that all the explanatory variables are statistically significant at .05 level.

Next, we include in our model the "I" (interest) variable i.e. the income gap between the richest fifth and the poorest fifth of population—a cardinal measure of income inequality (see model 2). It is noteworthy that all the vital statistics show an improvement: R^2 jumps from .481 to .641, F statistic increases from 14.498 to 20.490 and is statistically significant at 0.05 and 0.01 levels. Income gap- a measure of income inequality- is inversely related to poverty rate and is statistically significant at 0.05 level.

Next, we test the robustness of income inequality coefficient by adding and altering a set of generally accepted variables in poverty literature. The equation 2 stipulates a general model:

$$(2) \qquad P_i = aS+b_1I+b_2 P+E$$

Based on the above equation, six (6) regression models are presented (see Table 1). Whereas the regression Model 1 includes only "S" variables; model 2 adds "I" interest variable to model 1, and models 3 through 6 include all the variables included in model 2 plus possible combinations of "P" variables. Based on these regression models, the highest and the lowest coefficient values of the interest variable "I" (income inequality), which cannot be rejected at the 0.05 significance level are identified. If the statistical significance and the sign of the coefficient of income inequality measured by income gap remains in tact at the extreme bounds, and is not sensitive to the inclusion of a combination of "P" variables, it can be stated with confidence that income inequality variable coefficient is robust. A perusal of the regression models 3 through 6 indicates that neither the sign nor the statistical significance of the income inequality coefficient is affected by addition of a set of conditioning variables. It is, indeed, interesting to note that whereas other variables

were proven to be fragile (see for example, the variable WmHH), the income inequality coeffcient maintained its robustness when conditioning variable were changed.

Table 1

	Variable	Coeffcient	t	R^2	F	White Test F- Prob
Model 1	Unemp(U)	.410	3.658	.481	14.498	.6714*
	Income percapita(Y)	-.452	- 4.004			
	WmHH	.263	2.387			
Model 2	Unemp(U)	.241	2.432	.641	20.490	.5999
	Income percapita(Y)	-.451	- 4.004			
	WmHH	.263	2.387			
	Income gap	-.503	- 4.523			
Model 3	Unemp(U)	.227	2.097	.651	13.698	.8567
	Income percapita(Y)	-.474	- 4.763			
	WmHH	.023	.213			
	Income gap	-.503	- 4.523			
	GDP growth rate	-.114	1.145			
Model 4	Unemp(U)	.227	1.842	.754	13.158	.8005
	Income percapita(Y)	-.397	- 3.547			
	WmHH	.190	1 .713			
	Income gap	-.503	- 4.523			
	Perct Emp Agri	-.166	1.707			
	Perct Emp Manu	.549	.595			

Table 1

	Variable	Coeffcient	t	R^2	F	White Test F- Prob
Model 5	Unemp(U)	.167	1.671	.754	13.158	.5071
	Income percapita(Y)	-.498	- 5.466			
	WmHH	.137	2.344			
	Income gap	-.399	-3.842			
	Fertility rate	-.020	.234			
Model 6	Unemp(U)	.249	2.332	.641	16.063	.5835
	Income percapita(Y)	-.447	- 4.608			
	WmHH	.021	.194			
	Income gap	-.497	-3.304			
	Over 65	.032	.223			

* Variables included in all the models and taken together.

In an extreme bound analysis multicollinearity could conceivably inflate the range of coefficients. However, the correlation matrix (see Table 2) shows that multicollinearity is not a problem. Admittedly, even if the income inequality coefficient is robust, the regression analysis at best indicates an associative relationship it does not conclusively prove that income inequality is the cause of variance in poverty. However, there is an intuitive reason that income inequality is the cause and not the effect of reduction in poverty. Our measure of income inequality is predated (1999) compared to the poverty rate data (2003). It is, therefore, logical to argue that the poverty rate in 2003 could not have affected the income distribution three years before. Cross-section data is often subject to heteroscedasticity. The White test not only test for heteroscedasticity, but also for model misspecification. The null hypothesis presumes that the errors are both homoskedastic and independent of the regressors and that the linear specification of the model is correct. The test statistic would be significant if these conditions are fulfilled. On the other hand, a non-significant test statistic indicates that none of the three conditions are violated. Table 1 (see the last column) attests that our presumption regarding the three conditions is correct.

Table 2: Pearson Correlation

	WHH	FERT	OVER 65	AE	ME	PER CAPITA INC	IN GAP	GROWTH RATE	UNEMP
WHH	1.00	.198	.264	-.045	.091	.014	.453	.021	0.60
FERT	.198	1.00	.482	.063	.046	.401	.222	.580	.247
OVER 65	.264	.482	1.00	-.070	.266	.281	.261	.037	.262
AE	-.045	-.063	-.070	1.00	.068	-.325	.016	-.148	-.093
ME	.091	-.046	.166	-.068	1.00	.042	-.302	.014	.205
PER CAP INC	-.014	.401	.281	-.325	-.205	1.00	.163	-.114	.467
IN GAP	.453	.222	.261	.016	-.302	.163	1.00	-.113	.413
GROWTH RATE	.021	.196	.264	-.045	.148	.114	.113	1.00	0.60
UNEMP	-.060	.247	.252	-.093	-.205	.467	.413	-.183	1.00

The results of this paper are consistent with Burro's (1999) surprise findings that that income inequality is positively related to economic growth in rich countries and negatively related to economic growth of poor countries.

SUMMARY AND CONCLUSIONS

International data yields dubious relationship among income equality, economic growth and poverty. We use state cross-section data because poverty and income inequality "remain difficult to compare across countries and sometimes across years within a country" (Janvey and Sadoulet, 1995).The study finds support for the hypothesis that income equality may cause economic growth and hence reduce poverty. The coefficient of income inequality as an explanatory variable maintained its robustness (negative sign and statistical significance at its extreme bounds) even when it was combined with other conditioning variables. Further research would require an empirical investigation of the path(s) by which the income distribution affects the poverty level.

REFERENCES

Alesina, A & R Perotti, (1994). Distribution Politics and Economic Growth. *Quarterly Journal of Economics*, 109, 465-490.

Barro, Robert J, (2002). The U.N is Dead Wrong on Poverty and Income Inequality. *Business Week*, May 6, 24

Barro, Robert J. (1999). Inequality and Growth in Panel Countries. Paper presented at a conference at the American Enterprise Institute, June 1999. 7

Benhabib,J & A Rustichini. (1996). Social Conflict and Economic Growth" *Journal of Economic Growth,*1(1), 129-146

Croix, David De La & Matthia Doepke, (2003). Inequality and Growth: Why Differential Fertility Matters. *American Economic Review*, 93(40, 1091-1113.

Fields, Gary. (1989). Changes in Poverty and Income Inequality in Developing Countries. *World Bank Research Observer*. 4(2). July, 900 -913

Fields, Gary. (2001). *A New Look at the Developing World.* New York: MIT Press.

Greenwood, J & B Jovanovic. (1990). Financial Development, Growth and the Distribution of Income. *Journal of Political Economy*. 98(5), 1076-1107

Janvry, Alain & Elizabeth Sadoulet. (1999). Poverty, Equity, and Social Welfare in Latin America: Determinants of Change Over Growth Spells. Issues and Discussion Paper 6, International Labor Office Geneva, 6

Jenkins, Carolyn & John Knight.(2002). *The Economic Decline of Zimbabwe: Neither Growth Nor Equity*. New York. Palgrave Press.

Keynes, John Maynard. (1957). *The General Theory of Employment, Interest and Money*. London: Macmillan and Co. Ltd.,.97

Kray, Aart. (2002). Growth is Good for the Poor. *Journal of Economic Growth*. 7, 193-225.

Learner, Edward E. (1983). Let's Take the Con Out of Econometrics. *American Economic Review*. March, 73, 31-43.

Levine, Edward & David Renet. (1991). Cross-Country Studies of Growth and Policy: Some Methodological Conceptual and Statistical Problems. *World Bank Papers Series*, Number 608, 175-186.

Persson, Torston 7 Guido Tabellini. (1994). Is Inequality Harmful to Economic Growth. *American Economic Review*. 84(3), 600-621.

Piketty, T. (1997). The Dynamics of the Wealth Distribution and Interest Rates with Credit Rationing. *Review of Economic Studies*. 64.

Srinivasan, T.N. (1994). Human Development: A New Paradigm or Reinvention of the Wheel? Paper and Proceedings, *American Economic Review*. 81(1), .238-243

Williamson, Jeffrey & Phillipps Aghion,.(19990. *Growth, Inequality and Globalization: Theory, History and Policy.* New York and Cambridge. Cambridge University Press.

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