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Poverty and the Kuznets Hypothesis: A Cross Country Analysis

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Abstract
This paper uses cross country regression analysis to investigate the relationship between poverty and per capita income for a large set of developing countries to see whether there is a Kuznets style relationship similar to that between income inequality and per capita income. The results show, in contrast to the relationship between income inequality and per capita income, that there is an inverted Kuznets relationship between poverty and per capita income.

Keywords: Poverty, Income Inequality, Per Capita Income, Kuznets Hypothesis.

Introduction

The Kuznets U shaped relationship has a long-standing tradition in development economics in which it is assumed that when at first a country starts on the development path moving from being a relatively poor country to a relatively rich country, increases in income increase income inequality, but, after a certain threshold level of development is attained, further increases in income decrease income inequality. It seems only natural to speculate that, if a Kuznets U style relationship exists between income inequality and income, that a similar U shaped relationship might also exist between poverty and income.

Cross country poverty research has been hampered by the quality and availability of poverty data. Although poverty data across countries in the past has not been the best, a promising new data set offering an index of poverty across countries has recently been developed by the University of Oxford (University of Oxford 2011).

The purpose of this paper is to use the new Oxford poverty index, the Multidimensional Poverty Index, to look at the relationship between poverty and income to see whether or not a Kuznets U style relationship exists between poverty and income, and, if it does not, to try to identify the type of relationship that does exist.

The paper is divided in five parts. The first section provides a quick look at some of the previous work favoring the Kuznets hypothesis. It also highlights some of the work on poverty and its determinants. The second section discusses a single equation model of the relationship between poverty and income. The little model allows for quick diagnosis of the potential forms the relationship might assume. The third section outlines the variables that are used in the empirical analysis and makes known their sources. The fourth section provides the

results of cross country regressions of poverty on income, and identifies the form of the relationship between poverty and income that the cross country data supports. In addition, under the assumption that the Kuznets U style relationship holds between income inequality and income, it provides some speculation on the potential reasoning and the potential underlying economic sense of the type of relationship between poverty and income that is favored by the data. The fifth and final section concludes.

I. Brief Literature Background

Two areas of direct relevance to the investigation of this paper are the cross country empirical research on the Kuznets curve and the cross country work looking at the determinants of poverty.

The Kuznets U shaped relationship was first put forth by Simon Kuznets, in which he explained the shape of the relationship between income inequality and income on the basis of factors associated with the shift of resources from agriculture to industry with economic development (Kuznets 1955).

Although even up to the present time the existence of the Kuznets U relationship is still somewhat controversial, there are quite a few recent empirical studies that tend to verify its validity. While Barro feels that other factors besides income our important with regard to income inequality, he finds support, in his empirics, using a panel data set of countries over four different years, for the existence of a Kuznets U shaped relationship between income inequality and income (Barro 2000). Similarly, Thornton, employing a panel consisting of ninety six countries, also finds quantitative confirmation for the Kuznets relationship (Thornton 2001).

With regard to explaining poverty, there are a whole multitude of variables that have been investigated.

Using data from the Luxembourg income study, Moller and four coauthors, construct an unbalanced data panel consisting of fourteen highly developed democracies from 1970 to 1997 to look at the potential effect of a large number of different explanatory variables on poverty (Moller et al. 2003). Their analysis considers both pre tax poverty, and the reduction in poverty moving from pre tax to post tax as dependent variables. In terms of pre tax poverty, their results show that greater unemployment leads to greater poverty, but higher levels of industrial employment and greater wage coordination lead to reduced poverty. In terms of poverty reduction, they find that the size of the welfare state, left political orientation, and greater child and family allowances are favorable for poverty reduction, but that greater veto points in the constitutional structure of government is unfavorable for poverty reduction.

Lately there has been quite a lot of work examining the potential effect of financial development and the quality of financial institutions on poverty. Beck, Demirgue-Kunt, and Levine find, in their regression analysis of up to seventy two countries, that financial development, measured as credit issued by financial intermediaries to the private sector over GDP, working both through faster growth and reductions in income inequality, reduces both relative poverty as measured by the average annual growth of the poorest quintile from 1960 through 2005, and absolute poverty as measured by the average annual growth in the proportion of the population living on less than a dollar a day between 1960 to 2005 (Beck, Demirgue-Kunt, and Levine 2006).

Dollar and Kraay look to see whether globalization is favorable for poverty reduction in their empirical analysis, and conclude that greater openness is a positive force for both economic growth and for poverty reduction in poor countries (Dollar and Kraay 2004).

Researchers have also studied the effect on poverty of economic structure in terms of the size of firms. Beck, Demirgue-Kunt, and Levine, looking at a sample of forty five countries, conclude that the relative importance of small and medium firms in manufacturing in the economy, as measured by the share of small and medium firms in total manufacturing, has no influence on poverty (Beck, Demirgue-Kunt, and Levine 2005).

Some of the sociological literature has been devoted considerable time to exploring the potential impact of the size and characteristics of the welfare state on poverty. Brady finds that spending on public health and increased social security transfers lowers poverty (Brady 2005). Backman, comparing sixteen countries over the period 1980 through 2000, finds that social insurance variables are highly relevant for explaining poverty across countries, but that structural factors such as female labour force participation and the proportion of families with children are the more relevant factors for explaining the course of poverty within countries over time (Backman 2008).

II. The Model

The model, consisting of a single equation, is given as follows, and labeled as equation one.
(1) $\mathbf{P} = a + b\mathbf{Y} + c\mathbf{Y}^2$
In the equation, **P** is poverty, and **Y** stands for income. The model merely states that poverty depends linearly on income and income squared.
The signs of and the magnitudes of the coefficients are crucial with regard to the relationship between poverty and income, and for testing for the existence of a Kuznets U style relationship between poverty and income. If the coefficient on income, b, and the coefficient of income squared, c, equals zero, then there is no relationship at all between poverty and income, and , if the coefficient on income, b, differs from zero, but coefficient on income squared, c, equals zero, then poverty only depends on income, but not on income squared. If the coefficient on income (b) is positive and the coefficient on income squared (c) is negative, then a standard Kuznets U style relationship between poverty and income exists. If, on the other hand, the coefficient on income is negative (b) and the coefficient on income squared (c) is positive, then an inverted Kuznets style relationship is present.

III. The Variables

The measure of poverty employed in this study is the new index of poverty entitled the Multidimensional Poverty Index (MPI) developed by researchers at the University of Oxford (University of Oxford 2011). In 2011, the index is available for one hundred and four developing countries. As its name implies, the index not only takes into account living conditions in its construction, but other dimensions, education and health, as well. The index varies from zero to one with higher values indicating greater poverty. Of the one hundred and four developing countries for 2011, Niger had the highest poverty score for the MPI with a value of .642.
The income measure, the measure of the level of economic development, is real GDP per capita in constant 2000 U.S. dollars for the year 2005.The gauge of the degree of trade openness is the percentage of the sum of exports to imports to GDP for the year 2005, and the average years of schooling for the year 2000 attempts to capture the quality of the workforce in terms of educational human capital. In the empirical sector, the three variables are identified, respectively, by the variable names REALGDPPC2005, TRADETOGDP, AND AVGSCHOOLING2000. The data source for all three variables is the World Bank (World Bank 2011).

IV. The Empirical Findings

Table I shows the results of cross country regressions of the measure of poverty, the Multidimensional Poverty Index, on real income per capita and on real income per capita squared, and on real income per capita and real income per capita squared taking into consideration a couple of control variables. All of the regressions in the table are estimated using ordinary least squares.

Table I
Cross Country Regressions of Poverty on Income Per Capita and Income Per Capita Squared

	(1)	(2)	(3)
CONSTANT	.2767 (13.75) *	.3823 (10.42) *	.5707 (16.08) *
REALGDPPC2005	-.000073 (-6.97) *	-.000068 (-6.70) *	-.0001 (-5.92) *
$REALGDPPC2005^2$	.0000000028 (5.08) *	.0000000027 (5.24) *	.000000013 (5.12) *
TRADETOGDP		-.0013 (-3.48) *	-.0008 (-2.59) **
AVGSCHOOLING2000			-.0361 (-4.72) *
RSQ	.351	.415	.797
N	104	101	54

The table is set up with the first column listing the potential explanatory variables and each of the remaining three columns giving the results of a single regression equation. The equations are numbered in the first row. Each cell in the body of the table shows the estimated coefficient of a variable entering an equation (the top value) and its individual t-statistic (underneath in parenthesis). The second to last row provides the r squared value (RSQ) for each regression, and the very last row the number of countries entering each regression. A single asterisk under the individual t-statistic indicates that a variable is significant the one percent level of significance or better, while a double asterisk indicates that it is significant at the five percent level of significance or better.

The table has three equations. The first shows poverty solely on income per capita (REALGDPPC2005) and on income per capita squared ($REALGDPPC2005^2$), while the other two equations look at the relationship between poverty and income per capita and income per capita squared adjusting for a couple of control variables, the extent of trade openness (TRADETOGDP), and the amount of human capital in the form of years of schooling (AVGSCHOOLING2000).

The results do not support a U shaped Kuznets relationship between poverty and income, but rather, they lend strong support to the notion that there is an inverted Kuznets relationship between poverty and income per capita as development proceeds. The coefficient on per capita income is negative and significant at the one percent level of significance or better in the three equations, and, at the same time, the coefficient on per capita income squared is positive and significant at the one percent level or better in each of the three equations. Looking at the first equation shows that income per capita and income per capita squared explain over thirty five percent of the variation in the Multidimensional Poverty Index in a sample of one hundred and four developing countries.

The two control variables also behave rather nicely. Both greater trade openness, and, higher human capital in the population in the form of greater average years of schooling, is estimated to lead to a reduction of poverty. Trade openness is significant at the one percent level of significance or better in equation two, and at the five percent level of significance or better in equation three, while schooling is significant at the one percent level of significance or better in the only equation it appears, equation three.

Can a typical U shaped style relationship between income inequality and income combined with an inverted U shaped style relationship between poverty and income be explained?
Perhaps, at first, with the transition from agriculture to industry in a developing country, inequality between the middle and upper classes increases as profitable opportunities in simple manufacturing industries are being exploited by entrepreneurs but laborers in manufacturing as of yet are little organized to demand a larger share of the manufacturing pie. At the same time, at this point, poverty decreases as it is relatively easy for impoverished workers in agriculture to move into the unskilled, nonunionized manufacturing jobs that are becoming available.
As development proceeds, however, the workers in manufactures become more organized, demanding higher wages, and, at the same time, and, maybe partially because of this, there is a shift of investment to more sophisticated manufacturing industries that require greater worker skills. Because of the greater manufacturing job skill requirement, and, additionally, because of the increased organizational strength of existing laborers in industry, it becomes more difficult for poor unskilled agriculture workers to move into industrial jobs so that, at this stage of development, poverty rises. At the same time, inequality between the upper and middle classes falls due to the increased organizational strength of workers causing overall inequality in the economy to fall.

Conclusion

There has been a lot of empirical support for the Kuznets hypothesis. The Kuznets Hypothesis maintains that as a country develops, at first, with increases in income, income inequality rises, but, subsequently, with further increases in income, income inequality falls. It seems only natural to imagine, perhaps even take as an unquestioned presupposition, that, given the Kuznets hypothesis holds for income inequality, that it will also hold, in like fashion, for poverty. This turns out *not to be* the case.
The findings of the paper indicate that contrary to what one might expect on the basis of a Kuznets hypothesis with regard to income inequality, that as a country progresses on the path from being poorer to being richer, at first, with increases in per capita income, poverty falls, but, then, with subsequent increases in income, poverty rises. In other words, the findings show that, with advancing economic development, there is an inverted or reversed Kuznets hypothesis for poverty.
It is not logically impossible for the Kuznets hypothesis to hold for income inequality, and, at the same time, for an inverted Kuznets relationship to hold for poverty. It is certainly possible for there to be an increase in income inequality coupled with a reduction in poverty associated with an increase in per capita income, or for there to be a fall in income inequality accompanied by a rise in poverty due to an increase in per capita income. The theoretical reasons for income inequality having a Kuznets relationship, and, simultaneously, poverty have an inverted Kuznets relationship are quite another matter. Providing potential theoretical explanations for this observed set of relationships is a real potential fruitful area for future research.

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