

Yale University

EliScholar – A Digital Platform for Scholarly Publishing at Yale

Cowles Foundation Discussion Papers

Cowles Foundation

9-1-2006

Economic Development as Opportunity Equalization

John E. Roemer

Follow this and additional works at: <https://elischolar.library.yale.edu/cowles-discussion-paper-series>



Part of the [Economics Commons](#)

Recommended Citation

Roemer, John E., "Economic Development as Opportunity Equalization" (2006). *Cowles Foundation Discussion Papers*. 1875.

<https://elischolar.library.yale.edu/cowles-discussion-paper-series/1875>

This Discussion Paper is brought to you for free and open access by the Cowles Foundation at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Cowles Foundation Discussion Papers by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

ECONOMIC DEVELOPMENT AS OPPORTUNITY EQUALIZATION

By

John E. Roemer

September 2006

COWLES FOUNDATION DISCUSSION PAPER NO. 1583



**COWLES FOUNDATION FOR RESEARCH IN ECONOMICS
YALE UNIVERSITY
Box 208281
New Haven, Connecticut 06520-8281**

<http://cowles.econ.yale.edu/>

May 4, 2006

“Economic development as opportunity equalization”

by

John E. Roemer¹

Abstract.

The justification of using GNP per capita as a measure of economic development is utilitarian ethics plus an assumption that no needs are more urgent than others. Here, we advocate a measure of economic development based on the degree to which the society in question has equalized opportunities for the acquisition of income. In highly developed economies, inequality of opportunity accounts for less than 10% of total inequality, while in developing economies, it accounts for over 30%.

Keywords: equality of opportunity, economic development

JEL categories: O10, D63

¹ Department of Political Science, Yale University. I am grateful to Mario Chacón for research assistance, and to the Research Department of the World Bank for giving us access to the World Development Report 2006 data.

1. Introduction

There is a long tradition that measures the level of economic development of a country by its per capita income, and its rate of economic development as the rate of growth of per capita income. This tradition has been challenged by those who argue that income is an imperfect proxy for human capacities or the standard of living; among these challengers, Amartya Sen is perhaps the most prominent, and the human development index (HDI), computed, now, for many years and many countries by the UNDP and published in its annual Human Development Report, is the most popular alternative measure to the classical one.

I wish, also, to challenge the view that income per capita is the appropriate measure of economic development, but my challenge will be orthogonal to one just described. I will not argue, here, that income is a poor proxy for human flourishing, but rather, that income per capita is not the way to judge the level of development of a society. My argument will be that using per capita income as the measure of development flows from a particular, highly contentious philosophical view concerning how to measure social welfare, and that a more attractive philosophical view – that we should measure economic development by the extent to which a society equalizes opportunities – implies a different measure.

2. Utilitarianism and per capita income

As economists, our interest in economic development is corollary to our interest in progress in human welfare. We would not call an economy highly developed which

possessed a wonderful technology, but dumped its entire product into the sea, save for a pittance used to feed the labor force to keep production going. Thus our measure of economic development cannot be simply technological, but must be corollary to our conception of how sensibly to measure social welfare.

Taking income per capita as the measure of the level of development is most easily justified by two premises: (1) that our theory of social welfare is utilitarian – that is, that we seek to maximize the total or average welfare in a society, and (2) that the measure of individual welfare is proportional to the individual’s income. The first premise says that, if $u^i(x^i)$ is the welfare of individual i if he receives income x^i , then social welfare is given by $\sum u^i(x^i)$; the second premise says we choose $u^i(x) = ax$ for some positive number a . It follows that a society should attempt to maximize $a \sum x^i$, or

if the population size is constant, $\frac{1}{N} \sum_{i=1}^N x^i$, over all feasible distributions of income.

This is, of course, just income per capita.

Even given the first premise of utilitarianism, the second premise is questionable. If some human needs are more urgent than others, then it stands to reason that marginal utility should be a decreasing function of income. To reflect this, suppose we chose, instead, $u^i(x) = \log x$; then the utilitarian mandate would be to maximize $\sum \log x^i$, which is equivalent to maximizing the *product* of incomes, not their sum. Clearly, this choice of utility function puts a much greater emphasis on avoiding very small incomes than the first one. To wit, if *anyone* has a zero income, then social welfare under this construal is negative infinity, as small as it can possibly be, while in the first formulation, we might well end up recommending that some unproductive souls receive zero income.

So it is utilitarianism *plus* a contentious view that no needs are more urgent than other needs that generates ‘per capita income’ as the measure of economic development.

One might reply to this critique that *economic* development should be measured by the technological sophistication of the society, its capacity to turn inputs into outputs, and that it is up to society to figure out how to harness that development to advance human welfare. It was to disarm this challenge that I gave above the example of the slave-like society that dumps its product into the sea. I insist upon a distinction between technological and economic development. An *economy* is not just a machine for producing goods: it is a method of organizing production *and distribution* for the satisfaction of human wants.

3. Equality of opportunity

During the past forty years, political philosophy has turned sharply away from utilitarianism as a theory of justice, or as a measure of social welfare. That turn may be marked, most easily, by the publication of John Rawls’s (1971) magnum opus. Rawls proposed that we measure the welfare of a society by the ‘primary goods’ available to its worst-off member. For present purposes, it does no harm to interpret this as the income, or consumption, of its worst off member.

In fairly short order, Rawls’s proposal was challenged from two different directions. Sen (1981) argued that Rawls was wrong to be concerned with the *goods* people received: better, he said, to be concerned with how well people could function with those goods. So, to make a long story short, Sen’s proposal was that social welfare should be measured by the capacity to function of its worst-off members (those for

whom that capacity was smallest). The second challenge came from Ronald Dworkin (1981), who argued that Rawls had ignored the issue of personal responsibility. The goods a person receives (think of these being income, for short) are a consequence in part of personal choices for which, ethically, it is appropriate to hold the individual responsible. Inequalities which result from such well-informed choices are not morally bad. Dworkin advocated what he called ‘equality of resources,’ a doctrine in which individuals are compensated for paucity of resources assigned by the natural lottery (including, importantly, the resources supplied by the individual’s family), but not for the consequences of choices that flow from the individual’s well-considered, adult preferences. Exactly how to define what distributions of income and wealth satisfy this criterion is a tricky business, about which much has been written in the last 25 years. (For a partial summary, see Roemer (1996).)

In 1989, two philosophers, Richard Arneson and G.A. Cohen, reacted to Dworkin’s proposal: they proposed that, although his criticism of Rawls was cogent, his remedy was not quite right. Arneson proposed that the right approach was to *equalize opportunities for welfare*.

Space constraints prevent me from reporting more fully on this active period in political philosophy. In the remainder of this section, I will describe how I attempted (1996, 1998) to apply the insights from the philosophical debate to construct an algorithm with which one could compute what policy, in a given situation, equalizes opportunities in a society for the acquisition of some desirable state, or kind of advantage. I will then apply this approach to economic development.

There is a population, and we are concerned with evaluating, from an ethical viewpoint, the distribution of some kind of *advantage* in it: that advantage could be income, educational achievement, health status, wage-earning capacity, or even welfare, if we could construct a measure of it. Advantage is an outcome, thought to be of value, by the society or agency which is carrying out the analysis. Let me specialize to the case where advantage is something objective – like income or educational achievement – as this will avoid knotty problems of individual and idiosyncratic conceptions of welfare. It is a useful abstraction to think of the advantage that an individual ends up acquiring or achieving as a function of his or her *circumstances* and *effort*, where circumstances are environmental factors, either social or biological, and effort comprises the set of actions that we view to be under the control of the individual. In addition to circumstances and effort, the advantage level a person achieves will be a function of the *policy* that the agency or country adopts. Thus, to summarize, we may write the level of advantage acquired by the person as a function $u(c, e, \varphi)$ where c is a vector of circumstances, e is a vector of efforts or choices by the person, and φ is the policy, chosen from set of feasible policies Φ . I assume that the function u is universal across the population, although that could be modified.

For purposes of analysis, it is usually necessary to partition the population in question into a fairly small set of *types* or groups, where a type is a set of individuals all of whom have the same circumstances. For example, we may choose the single circumstance of parental educational level, and then partition the population into three or four types, defined by the level of their parents' education.

Suppose, for specificity, that u is wage-earning capacity; we are concerned how individuals from different family backgrounds acquire that capacity. The policies, in this case, might be different choices of how to distribute educational finance monies in the society – in poor societies, one might be particularly concerned with the allocation of educational finance between primary and more advanced schooling, where increasing the investment in primary schooling might help most the most disadvantaged type. Associated with any policy there will ensue a distribution of efforts in each type. If the types are denoted $1, 2, \dots, T$, and if we simplify by assuming that effort can be summarized by a number, then we may denote the distribution function of effort in type t if the policy is φ by F_{φ}^t -- a cumulative distribution function on the non-negative real numbers.

The philosophical idea behind equality of opportunity, as it emerged from the literature I mentioned above, is that individuals should not be held responsible for their circumstances, but it is morally acceptable to hold them responsible for their effort. Effort, however, is a complex thing, and the question arises as to how to measure it. The approach I have taken is as follows. First, effort should be measured relative to the effort of other individuals in one's own type. Thus, suppose we think of effort, in the wage-earning capacity example, as the number of years of schooling the individual chooses to acquire. There is surely personal choice involved in this: but that choice is also influenced by circumstances. Thus the *distribution of effort* is itself a circumstance, it is a characteristic of the type. In measuring an individual's effort, we should attempt to sterilize out that aspect of effort that is attributable to circumstance. A simple way of doing so is to identify an individual's degree of effort with the *quantile* which he or she

occupies on the distribution of advantage of his or her type. Thus, if A and B occupy quantiles 0.5 and 0.7, respectively, on the distribution of wage-earning capacity of the type to which they both belong, then we say B has applied higher effort. This requires only that it be the case that greater effort leads to a higher level of the advantage in question, holding circumstances fixed. (This assumption is not innocuous – it rules out ‘luck’ as a cause of advantage.) Perhaps more contentiously, we say that if A and C both occupy the 0.5 quantile on the distribution of wage-earning capacities of the *different* types to which they belong, then we assert they have exerted the same *degree* of effort.

We now say: Equality of opportunity for the acquisition of advantage of the kind u measures has been achieved if, at every level of effort, the levels of advantage *across types* are the same. In other words, given the discussion above, if the cumulative distribution functions of advantage across types are identical. More generally we say that a policy φ_1 equalizes opportunities for advantage more than policy φ_2 if the distribution functions of advantage across types are ‘closer’ under φ_1 than under φ_2 . I will not discuss how we measure the distance between advantage distribution functions (for that, see Roemer [1998]); there are a number of possibilities.

In other words, equality of opportunity is a state in which the only differences in advantage are due to effort, and not to circumstance.

Now, to be more precise, we are not simply concerned with *equalizing* distribution functions but rather with equalizing them at the highest possible level. To avoid a discourse on what it means to equalize a set of distribution functions, let us simply summarize such a function by its mean. This leads immediately to the concept of maximin: that is, an opportunity egalitarian should seek to maximize the mean advantage

level of that type with the lowest such mean. Thus, if the mean level of advantage in type t under policy φ is denoted $\mu_t(\varphi)$ then the optimization problem is :

$$\max_{\varphi \in \Phi} \min_{1 \leq t \leq T} \mu_t(\varphi). \quad (1)$$

Let us call the value of this program μ^* ; it is obviously a function of the set of policies we have identified as feasible, and the set of circumstances chosen, which determine the types.

In the example I have given, I chose the level of parental education as the unique circumstance – in fact there may be many other circumstances, such as natural talent, race, caste, sex, perhaps region of the country, perhaps urban vs. rural, and so on². So, much of the inequality *within types* that we observe, if parental education is taken to be the unique circumstance, will in fact also be due to (other) circumstances. In other words, because in practice we always choose a small set of circumstances, and then identify the residual difference in advantage within types as due to effort, we are underestimating the degree of inequality of opportunity. In the limit, if we thought of each individual as a type of his own, as we would if we took the view that no choice a person makes is under his own control, but all choices are due to circumstances, then we would attribute all the inequality in a society to circumstances. The equal-opportunity objective would then reduce to equality of outcome. In practice, however, we are always concerned with measuring inequality of opportunity due to a small and discrete set of circumstances, and so much of the inequality that we measure will be attributed to inequality of effort, and hence will not be morally disturbing.

² I say ‘perhaps,’ because one could say urban versus rural is a personal choice, and hence does not qualify as a circumstance.

4. Measuring economic development

The theory of equal opportunity presented above is my attempt to apply the most current ideas in political philosophy to the measure of social welfare. These ideas, I must emphasize, do not simply inhabit the ivory towers of universities: equality of opportunity is an idea with massive popular appeal. Indeed, the political institution of democracy and the economic institution of the market are often justified by reference to their capacities to engender equality of opportunity. The metaphors of ‘leveling the playing field’ and ‘starting-gate equality’ are popular summaries of equality of opportunity: the troughs in the playing field to be filled in by social policy are the disadvantages that some face as the result of circumstances beyond their control.

If we take the equal-opportunity ethic, rather than the utilitarian ethic, as the one that should motivate our measure of social welfare, then we should measure the level of economic development of a society by the value of the program in equation (1) above. Two questions must be answered in order to do so: How should we partition the society into types, and what should we take as the measure of advantage?

Here, I must mention the 2006 World Development Report, issued by the World Bank, entitled “Equity and development.” This report attempts to do exactly what I have described. It takes equality-of-opportunity as the appropriate guiding ethic, and measures in many ways the extent to which developing countries are succeeding to equalize opportunities, roughly, according to the measure I have here proposed.

For my purposes here, it will suffice to take the level of advantage of an individual as his or her income (for I said I would not here challenge that choice, narrow

as it may be) , and to define the typology of society with respect to the education of one's parents. In this case, then the value of program (1) above, which is our measure of the extent to which opportunities have been equalized, and hence our measure of economic development, is the average level of income of those whose parents were of the lowest educational stratum³. Likewise, the rate of economic development is the rate at which the average income of those whose parents were of the lowest educational stratum increases.

For my proposal to be interesting, it must be the case that the rate of economic development we would measure for countries would differ according to these two measures: the rate of growth of per capita income of the most disadvantaged type, and the average rate of growth of per capita income. My research assistant used household survey data for a number of developing countries, obtained from the World Bank, to compute annualized rates of growth of household income (or consumption) for each of three or four types, defined by the number of years of education of the household head. Results for several countries are presented below. (See charts at the end of the paper.)

It is beyond this paper's scope to study the patterns in these graphs: what is relevant is simply that there is a great deal of heterogeneity in the income growth experience of the different types. Therefore, if we choose to measure economic development as the rate of increase of the equal-opportunity objective function, which is to say the rate of growth of income (or some measure of well-being) of the most disadvantaged type, we will in general tell a quite different story from the one told by focusing upon the growth rate of mean income.

³ I am assuming that mean income is lowest for this type, which is a true statement for all market economies.

I conclude this section with a second point. One can ask: How much inequality is due to inequality *of opportunity*? This question can be posed in a precise way. Inequality of opportunity is the inequality *between* the different distribution functions of income of the various types, as opposed to the inequality *within* these distributions, which is attributed to differential effort. The 2006 WDR makes this calculation for several countries: for developing countries, the answer is that between 15 and 30 percent of total inequality is due to inequality of opportunity. I have made this calculation for eleven advanced democracies : for Sweden, Denmark, Norway and the Netherlands, less than 1% of income inequality is due to inequality of opportunity, where I partition the male workers into three types, based upon the educational level of the worker's parent⁴. The countries in my sample with the largest degree of inequality of opportunity, so measured, are Italy (6.9% of total inequality) and Spain (7.4%)⁵. Indeed, in Figure 2, I present the distribution functions of pre-fisc income for these three types for Denmark and Spain, and we see the dramatic nature of the difference. We may cautiously conjecture from these calculations that economic development is a process of reducing the extent to which inequality is due to inequality of opportunity.

Of course, there are several caveats to this observation. One is that, for the advanced democracies, an individual's type is defined by the educational level of his *parent*, while for the developing countries examined in the 2006 WDR, and indeed in my charts presented in Figure 1, type is define by the *individual's* level of education.

⁴ My calculation is made differently from the World Bank's. I disaggregate the coefficient of variation of a population distribution function into two parts – that part due to inequality of opportunity and that part due to intra-type inequality. The technique is described in Roemer [2006].

⁵ The data used for this calculation are from panel data sets of the various countries; they are described in detail in Roemer et al (2003).

Clearly, the latter approach is imperfect – because an individual’s level of education is in part a voluntary choice, while the parent’s level of education is indeed a circumstance for the individual in question. We do not, however, have sufficiently good survey data for the developing countries, at this time, to define type in the correct way. It follows that some of the inequality we call inequality of opportunity for the developing countries, is really due to differential effort.

5. Equity versus growth

Many would call a concern with equality of opportunity a concern with equity, to be contrasted with a concern with growth, where growth is the rate of increase of per capita income. Indeed, the aforementioned 2006 World Development Report uses this nomenclature. Such commentators are often concerned with the *trade-off* between equity and growth. Perhaps increasing equity (equality of opportunity) will require reducing the rate of growth; or perhaps, fortuitously, increasing equity is consistent with increasing the rate of growth.

I stand against this formulation, because, I believe, it follows from ethical confusion. Let me review. I have argued:

A. Economic development should be construed as the growth of social welfare, not simply technological development;

B. Equality of opportunity is the right conception of social welfare, not utilitarianism;

Therefore,

C. The level of economic development is the extent to which those of the most disadvantaged circumstances have achieved states of high value (e.g., income), and the rate of economic development is the rate at which that extent increases.

This formulation does not permit a concern with the rate of increase of *average* income as such.

Now one could say, “I am part utilitarian and part opportunity egalitarian; so I am concerned with both per capita income and with the income of the most disadvantaged type.” Well, yes, one could say that: but it is a rather clumsy ethical view. One might, more cogently, advocate an ethic that lies *between* utilitarianism and opportunity egalitarianism, as follows. Using the notation of section 4, let $\mu_t(\varphi)$ be the average income of type t at the policy φ ; then one should solve:

$$\max_{\varphi \in \Phi} \left(\sum_{t=1}^r f_t (\mu_t(\varphi))^r \right)^{1/r},$$

where f_t is the fraction of society belonging to type t , and r is some number between negative infinity and one. If $r=1$, this reduces to utilitarianism, and if $r = -\infty$ it reduces to program (1), that is, equality of opportunity. As r decreases, we have an increasing concern with inequality of opportunity. This might well be an acceptable ethical view, although I will not pursue it further here. Clearly, each choice of r implies a way of measuring economic development.

Even if one advocates measuring economic development in the way implied by an opportunity egalitarian ethic, the question of what comprises the best strategy to equalize opportunities is an open one. Neo-liberals argue that free markets will maximize growth of per capita income, and that that kind of growth is *also* the best way to

maximize the growth of income of the most disadvantaged types. The ‘equity with growth’ school, represented, for example, by the 2006 WDR report, and by Pranab Bardhan, Samuel Bowles and Herbert Gintis (2000), among others, argues that a direct concern with improving the lot of the most disadvantaged will increase *growth* the fastest. Their argument is based, in large part, on market imperfections that prevent the most disadvantaged from exploiting their talents fully.

It is not my concern here to evaluate the merits of these opposing schools. My point, rather, is to say that we require ethical clarity. In particular, one does not have to justify an equal-opportunity conception of economic development by arguing that it will increase growth (of per capita income). The equal-opportunity ethic stands on its own as a conception of social welfare. And utilitarians do not have to justify their concern with growth in per capita income by arguing there will be trickle-down and, consequently, increased equity. If you are a utilitarian, then trickle-down is irrelevant: average income (or welfare) is what counts. The fact that such debates take place is a symptom of an obscure ethical position. It is, as well, a symptom of a kind of opportunism: if one is a utilitarian, then one should stick to one’s guns; and likewise, if one is an opportunity egalitarian.

I present an example from an empirical calculation, to show that my point is not academic. In Betts and Roemer (2006), we study educational finance policies that would equalize opportunities for the acquisition of wage-earning capacity, among young American men. Suppose we have partitioned this population into four types, based on circumstances beyond their control. We take an educational finance policy to be an assignment of educational investments per capita to each of these types, with a budget

constraint on total investment. Thus, a policy is a vector (I_1, I_2, I_3, I_4) such that I_j is invested in each child of type j , and $\sum f_j I_j = \bar{I}$ where \bar{I} is the per capita social budget of educational finance, and f_j is the fraction of type j in the population. We compute the optimal (equal opportunity) policy under various typologies, that is, the policy that maximizes the average wage-earning capacity of the type with the lowest such capacity. If we use a typology that partitions young men into four types based solely upon the educational level of their parents, then we compute that the equal-opportunity policy will actually *increase* the average wage. Thus, ‘equity’ goes along with ‘growth.’ However, if we use a typology that treats as circumstances both parental education and race (black or white), then the equal-opportunity policy will *reduce* the average wage. In this case, there is a growth-price for achieving equal opportunity.

Now this result may suggest that the second policy would be politically more difficult to achieve than the first one – if what happens to the average also reflects what happens to the majority – but it does not, ipso facto, mean the second policy is ethically wrong. A concern with equalizing opportunities and a concern with per capita income (or wage) growth come from different ethical views. If one is concerned with political feasibility, then, I suggest, the right approach is to maximize one’s social welfare function subject to the constraint that the policy chosen be politically feasible. Under a somewhat naïve and simple model of politics, that constraint would say that a majority should be better off under the proposed policy than under the status quo.

My final example of this section is China, whose growth rate over the last 26 years has been a miraculous 9.4% per annum. Indeed, the state of being in absolute poverty now afflicts just 2.8% of the population, in contrast to the prior figure of 31%.

There is, however, great concern in China about the widening gap between rural and urban incomes. There seems to be almost universal agreement, among Chinese social scientists and the general population, that the growing gap is ethically wrong, even though the average income of rural dwellers is rising quite rapidly. Indeed, many economic policy discussions in China at present are concerned with this problem. There is agreement that maximizing the rate of growth (which, presumably, China has done) is not the way to maximize the rate of growth of the worst-off class – in this case, the rural population—*and* that it would be ethically better to sacrifice some average growth if that were the price of narrowing the gap between urban and rural. It may be that the tens of thousands of rural demonstrations (against land seizures, corruption, and inequality) in the past few years have forced this new consciousness. For an enlightening survey of the heterogeneous Chinese growth experience, disaggregated by province, see UNDP (2005).

The *China Human Development Report 2005* (UNDP[2005]) presents income data for China disaggregated into 31 regions. One of the report's emphases is, of course, regional inequality and inequity. Using the technique I described earlier, I computed the fraction of income inequality in China which is due to the inequality of opportunity associated with living in the 31 different regions. It is 35.6%. (This is a similar magnitude to the fraction of inequality to inequality of opportunity that the World Bank computed for Brazil.) Because we view the inequality between regions as serious in China, this should help us calibrate what it means for inequality of opportunity to be

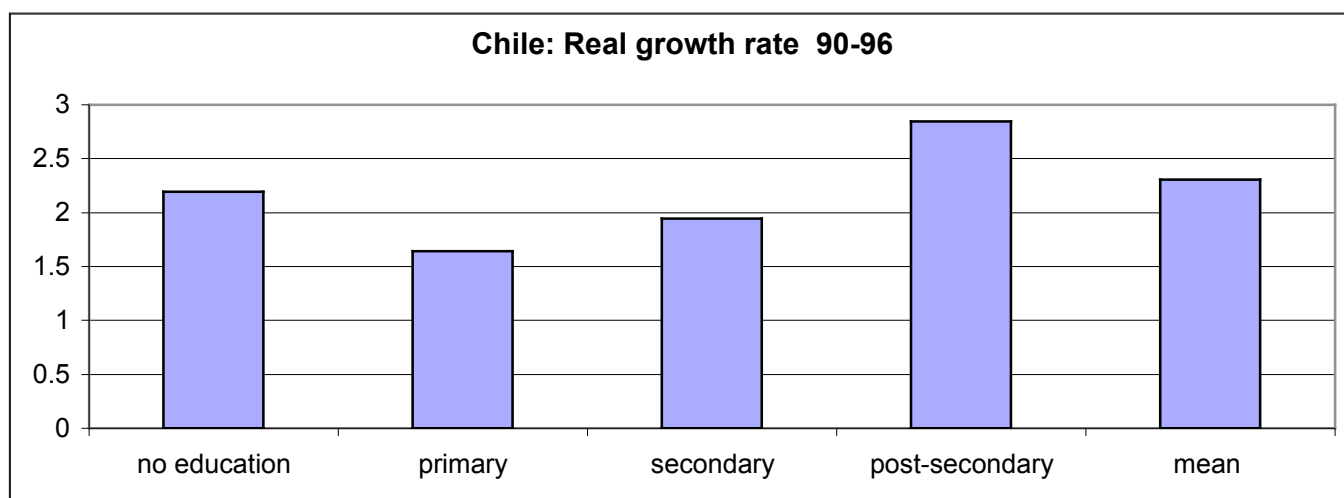
extreme: it means that about one-third of total inequality should be due to inequality of opportunity⁶.

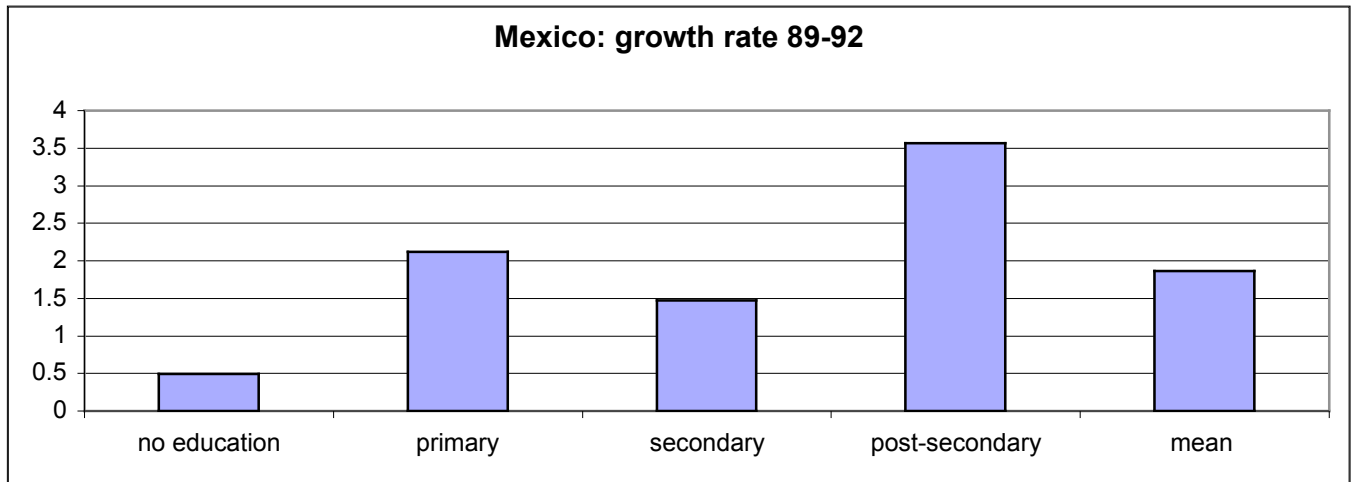
6. Conclusion

My central claim is that economic development should be construed as a social rather than technological concept: economic development occurs when a society becomes 'better off.' If one signs on to this view, then one must face the question of defining what it means for a society to become better off. The measure of per capita income and its rate of growth are justified either by a purely technological concern, or a social one based upon utilitarianism, a view of social welfare endorsed by only a small minority of political philosophers (whose business it is to think about such things) today. I have proposed that, instead, we measure economic development as the rate at which opportunities for income acquisition become equalized in a society. Under quite weak assumptions, and the theory presented above, this means that we focus upon the rate of income growth of individuals with the most disadvantaged circumstances.

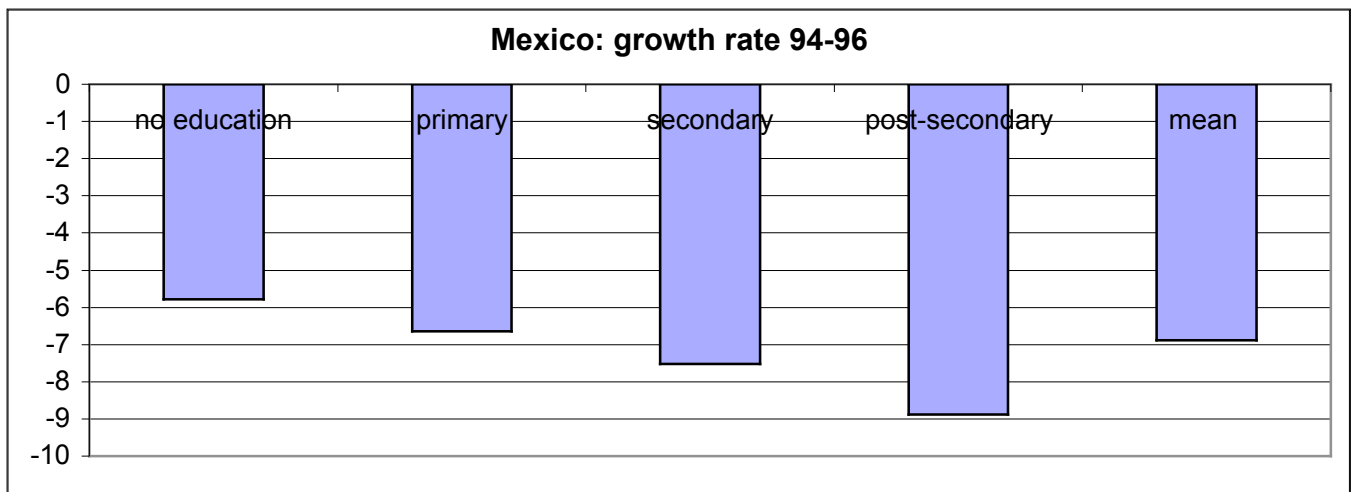
⁶ My computation was necessarily circuitous, because of the data available. UNDP [2005] enabled me to compute the 31 regional GDPs, the population fractions of the 31 regions, and hence the variance in these regional mean incomes. The Gini coefficient of Chinese income in 2002 was 0.45. I next assumed that the size distribution of income is lognormally distributed in China. Given Chinese mean income and the Chinese Gini, I could then calculate the variance in income nationally. With these data, I could attribute the fraction of total income to regional inequality of opportunity, using the method of Roemer (2006). Of course, the precision of the calculation depends upon the assumption of lognormality for the Chinese income distribution; I don't know how good that assumption is.

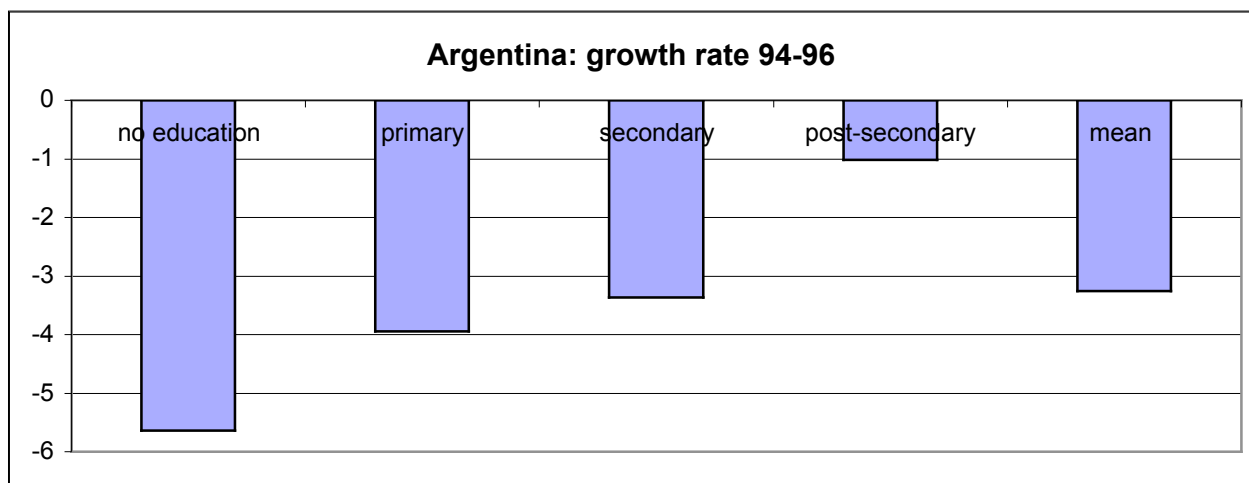
Figure 1 consists of the charts below.



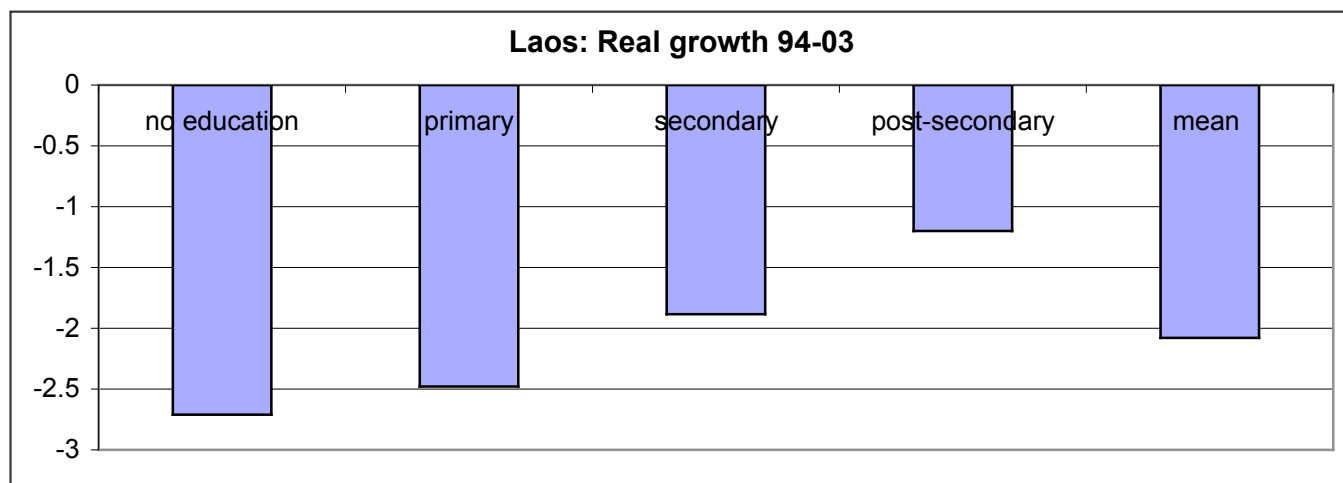
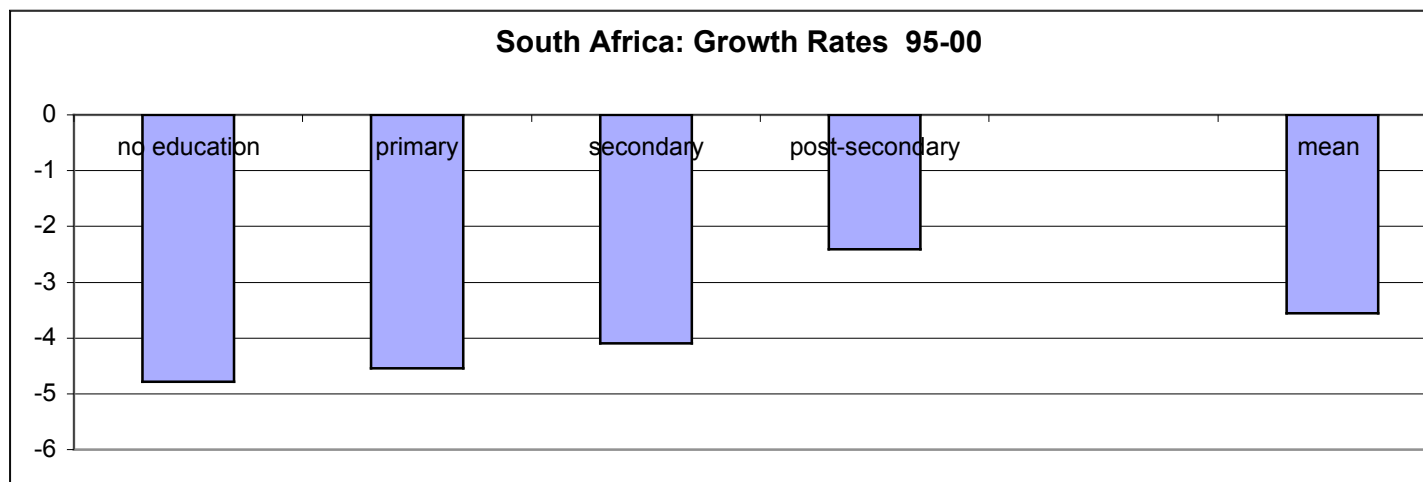


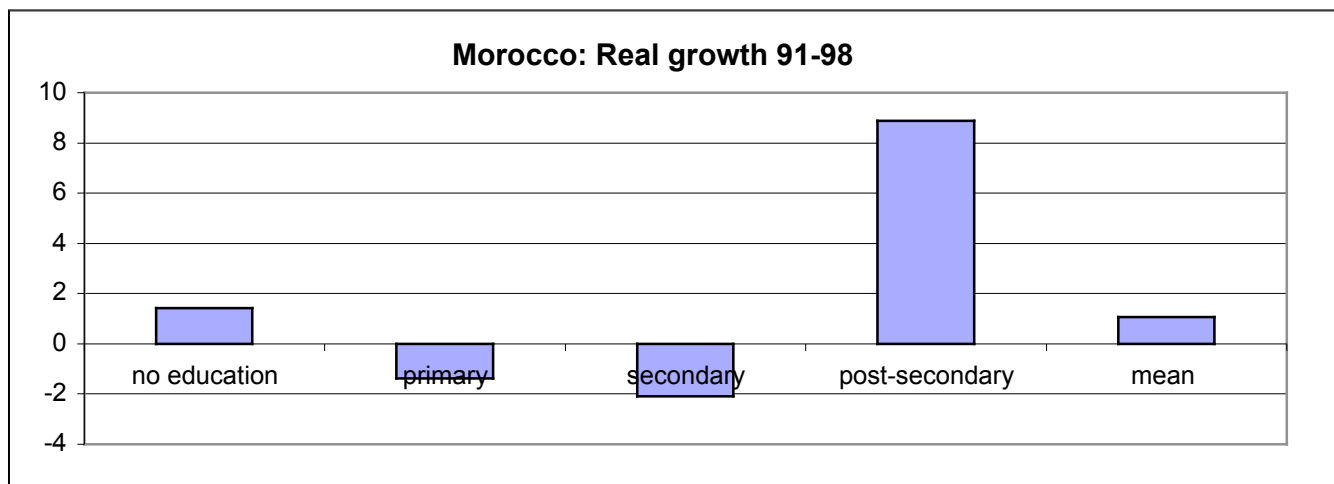
..





..





..

Figure 2a Cumulative distribution functions of income, three types of male worker, Denmark, early 1990's.

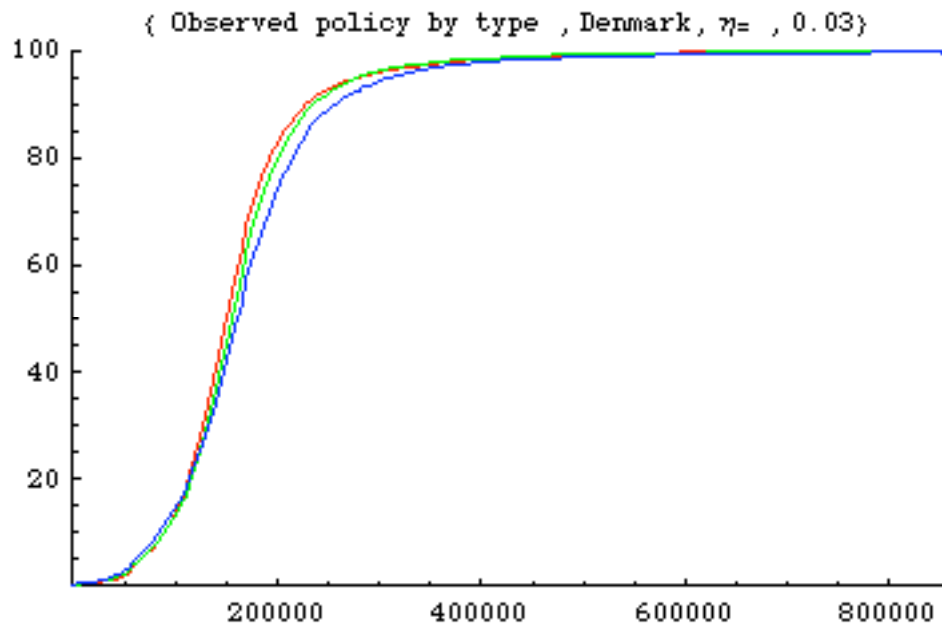
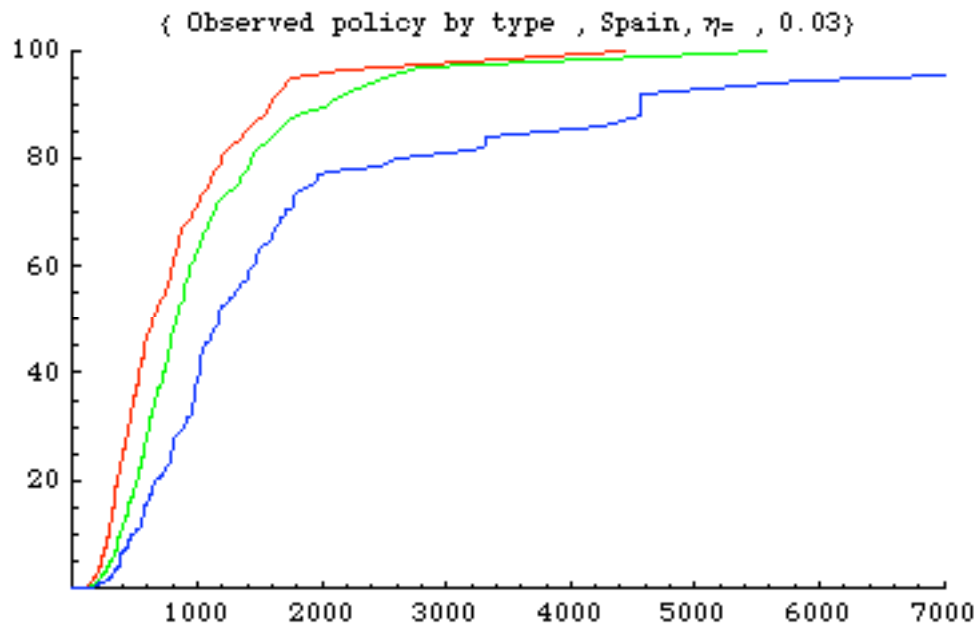


Figure 2b Cumulative distribution functions of income, three types of male worker, Spain, early 1990s



..

References

Bardhan, P., S. Bowles, and H. Gintis, 2000. "Wealth inequality, wealth constraints and economic performance," in A. Atkinson and F. Bourguignon, *Handbook of income distribution*, Elsevier Press

Betts, J. and J. Roemer, 2006. "Equalizing Opportunity for Racial and Socioeconomic Groups in the United States through Educational Finance Reform," in L. Woessmann and P. Peterson (eds.), *Schools and the equal opportunity problem*, MIT Press

Dworkin, R. 1981. "What is equality? Part two: Equality of resources," *Philosophy & Public Affairs* 10, 283-345

Rawls, J. 1971. *A theory of justice*, Harvard University Press

Roemer, J. 1996. *Theories of distributive justice*, Harvard University Press

Roemer, J. 1998. *Equality of opportunity*, Harvard University Press

Roemer, J. , R. Aaberge , U. Colombino , J. Fritzell , S. Jenkins , I. Marx , M. Page , E. Pommer , J. Ruiz-Castillo, M.J. San Segundo , T. Tranaes , G.Wagner , and I. Zubiri, 2003. "To what extent do fiscal regimes equalize opportunities for income acquisition among citizens?" *Journal of Public Economics*

Roemer, J. 2006. "Decomposing inequality"

Sen, A. 1981. "Equality of what?" in S. McMurrin (ed) *The Tanner Lectures in Human Values* , Salt Lake City: University of Utah Press

United Nations Development Programme, 2005. *China's Human Development Report, 2005*,

<http://www.undp.org.cn/modules.php?op=modload&name=News&file=article&topic=40&sid=228>

World Bank, 2006. "Equity and development"