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S. Subramanian

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Further enquiries to:
The Administrator
Chair in Public Finance
Victoria University of Wellington
PO Box 600
Wellington 6041
New Zealand

Phone: +64-4-463-9656
Email: cpf-info@vuw.ac.nz

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Measuring the 'Inclusiveness' of Growth in the Light of Optimal Anti-Poverty Budgetary Policy

Author Details:

S. Subramanian
(Independent Scholar; formerly, Madras Institute of Development Studies)
Email: ssubramanianecon@gmail.com

Abstract:

In assessing the 'incusiveness' of growth in per capita income over a period of time, it is customary to look for equality in inter-quantile rates of growth. An alternative approach would be to focus directly on the extent of inter-quantile equality (or want of it) in the distribution of the product of growth over the reference period. The first approach concentrates on *proportionate* additions to income, and the second on *absolute* additions. In this latter approach, it is possible to derive an equality-related hierarchy of 'benchmark' distributions in the terminal period of the growth process, and to compare the actual distribution that obtains with the benchmark distribution in order to get an idea of where the actual distribution is located in the spectrum of 'inclusiveness' described by the benchmark distributions. These benchmark distributions correspond to optimal solutions to an anti-poverty budget allocation problem which features in the literature on the measurement of poverty.

Key Words:

optimal anti-poverty policy; allocation rules; equal division rule; fair compromise rule; equi-proportionate rule; relative, absolute, and intermediate measures of inequality

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D31, D63, I32, O15

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MEASURING THE 'INCLUSIVENESS' OF GROWTH IN LIGHT OF OPTIMAL ANTI-POVERTY BUDGETARY POLICY

1. Introduction

This paper is concerned with the following question. Consider two points in time, 1 and 2, over which average income in a society has grown: when may we judge the growth in income to have been 'inclusive', and to what extent? The answer, presumably, would depend on a comparison of the actual period 2 income distribution with a postulated period 2 distribution which captures one's notion of what would just qualify for 'inclusiveness'. Call this the 'benchmark period 2 income distribution'. The prescribed benchmark distribution is then a crucial determinant of the extent to which the observed growth in per capita income may be judged to have been 'inclusive'.

The proposed benchmarks of varying levels of demandingness are derived in (qualified) analogy with, and by drawing on, the literature on optimal budgetary intervention for the alleviation of poverty through direct income transfers. The literature just referred to is concerned with devising rules for the poverty-minimizing transfer of income among the poor, given an anti-poverty budget of fixed size. How sensitive these rules are to allocational equity would depend upon the equity-sensitivity of the poverty measure that is sought to be minimized.

Analogous rules for the distribution of the product of growth can be derived in the context of the 'inclusive growth problem'. The problem here can be formulated as an 'as if' problem: one of imagining how the policy-maker, if she had the discretion, might allocate the income generated by the growth process across well-defined quantiles of a population. Alternative benchmark distributions of varying levels of demandingness in the matter of 'inclusiveness' can be postulated, and the actual terminal-year distribution can be compared with the benchmarks to obtain an assessment of how inclusive growth has actually been in relation to the selected benchmark.

The standard 'equi-proportionate growth' rule is found to be located fairly low down in a list of plausible allocation rules ordered by their 'inclusiveness'. In a general way, the paper makes a case for inter-temporal comparisons of *non*-relative measures of inequality, such as the intermediate Krtscha measure, in assessments of the 'inclusiveness' of growth.

The paper is organised as follows. Section 2 offers a quick review of solutions to the problem of optimal income transfers to the poor from an anti-poverty budget. Section 3 considers analogous 'benchmark' allocations of the product of growth across quantiles of a population, taking care to emphasize that the analogy is not to be interpreted as a literal transplantation of the poverty-alleviation problem to the inclusive growth problem. Section 4 provides an empirical illustration of the concerns of Section 3 by means of an example based on survey data on the distribution of consumption expenditure in rural India. Section 5 concludes.

2. Direct Income Transfers in Anti-Poverty Policy

The optimal anti-poverty budget allocation problem can be summarized in these terms. Given a budget of fixed size which is not sufficient to raise the entire poor population to the poverty line, and assuming no poor person is taxed, nor any poor person benefited beyond the poverty line income, how must the budget be allocated among the competing contenders for it, in order to minimize poverty? The answer, of course, would depend both on the objective function—here the poverty measure employed—and the constraints which together characterize the optimization problem under review. Some of the work in this field of enquiry is captured in the papers by Bourguignon and Fields (1990), Gangopadhyay and Subramanian (1992), and Subramanian (2006).

Without entering here into a detailed description of ground already covered elsewhere, here is a summary of alternative possible optimal solutions to the income-transfer problem. Begin by defining an 'equalitarian' transfer schedule as one in which the poorer of two poor persons never receives a smaller share of the anti-poverty budget. Then the most 'equalitarian' transfer schedule (typically dictated for a poverty measure which satisfies the Pigou-Dalton transfer criterion of registering a diminution when there is a rank-preserving progressive transfer of income among the poor) is a sort of 'lexical maximin', 'bottom-up', outcome in the Rawlsian spirit. In this solution, starting from the poorest of the poor, incomes are successively equalized until one reaches that marginal poor person with whom the budget is exhausted, so that the incomes of the poorest subset of individuals are all raised to a common level, while the rest of the (richer among the poor) population receive no transfer at all.

A second solution, which is also 'equalitarian' but less so than the one just considered, is the 'proportionality rule', whereby each poor person receives a transfer that is proportional to the share of her shortfall from the poverty line in the aggregate poverty deficit. Under this rule no poor person (defined as one with an income less than the poverty line) is denied a positive share of the budget, though the magnitude of transfer varies inversely with the magnitude of poor incomes.

It is clear (in view of the earlier definition of an ‘equalitarian’ transfer schedule), that the least equalitarian of all equalitarian solutions is one in which each poor person receives an equal share of the budget. Call this the ‘equal division rule’. The equal division rule constitutes the dividing line between equalitarian and non-equalitarian rules of allocation.

A ‘moderately’ non-equalitarian allocation rule would be one in which one-half of the anti-poverty budget is distributed equally among the poor and one-half according to each poor person’s share in the income distribution of the poor. This is what, following Krtscha (1994), might be called a ‘fair compromise rule’ (which was invoked by Krtscha in the context of deriving an ‘intermediate’ measure of inequality, a consideration to which this paper will return at a later stage).

The most widely known non-equalitarian rule is constituted by the ‘top-down approach’, in which the headcount ratio of poverty is minimized through a sequence of income transfers, beginning with the richest of poor persons and working one’s way downward, until as many poor people are raised to the poverty line as is compatible with the size of the budget. The poorest of the poor are completely left out of the reckoning in this solution.

A dilution of the ‘fair compromise’ measure is one which has not generally been considered in the anti-poverty literature but has, to anticipate, found wide analogous application in the ‘inclusive growth’ literature. This is what might be called the ‘equi-proportionate rule’, which requires that, if g is the rate of growth of the average income of the poor from the pre-transfer to the post-transfer income distribution, then each poor person should receive a transfer that represents a g per cent increase over her initial (pre-transfer) income. This, of course, is the same thing as saying that the budget should be allocated in proportion to each poor person’s share in the initial income distribution of the poor.

In what follows, analogous period 2 ‘benchmark’ distributions are postulated for the ‘inclusive growth’ problem. For each benchmark distribution, there is a corresponding ‘benchmark’ Gini coefficient of inequality which can be compared with the Gini coefficient for the actual period 2 income distribution as a means of assessing the inclusiveness or otherwise of the growth in average income that has taken place. Section 3 of the paper will draw considerably on Jayaraj and Subramanian (2012).

3. Benchmark Distributions for the Inclusive Growth Problem

3.1 Preliminaries

There are two periods to consider, period 1 and period 2, over which growth is assumed to take place. The mean (arithmetic average) of the period 1 income distribution is designated μ^1, and that of the period 2 distribution, μ^2. In everything that follows, it will be assumed that positive growth has occurred over the interval from period 1 to period 2, that is, that $\mu^2 > \mu^1$. The population size in period 1 (respectively, period 2) is n^1 (respectively, n^2). The population in each period is divided into K quantiles, which are arranged in non-descending order of mean quantile income, so that if μ_i^t is the mean income of quantile i in period t, then $\mu_i^t \le \mu_{i+1}^t$, $t = 1,2;\ i = 1,...,K-1$. The period-specific income distributions, $\mathbf{D}^1$ and $\mathbf{D}^2$ respectively, are written as ordered quantile-specific mean incomes in each relevant period: $\mathbf{D}^1 = (\mu_1^1,...,\mu_i^1,...,\mu_K^1)$ and $\mathbf{D}^2 = (\mu_1^2,...,\mu_i^2,...,\mu_K^2)$. It will be assumed throughout—this is an assumption of convenience—that the extent of growth between periods 1 and 2 is never so large as to cause the period 2 mean income to exceed the mean income of the richest decile in period 1, that is, it will be taken that $\mu_K^1 \ge \mu^2$.

The product of growth that is (hypothetically) available for allocation among the quantiles of the population, after ensuring that it is of a size large enough that all quantiles in period 2 receive at least their respective period 1 mean incomes, is $\Delta \equiv n^2(\mu^2 - \mu^1)$. It should be stressed that the benchmark allocation rules considered in this paper are all '*Pareto-respecting*', in the sense that each quantile in period 2 receives at least its period 1 mean income. (Of course, the *actual* period 2 distribution may or may not be Pareto-respecting.) The quantity Δ can be seen to correspond to the budget of fixed size that is available for distribution in the anti-poverty income-transfer problem considered in Section 2. The question addressed in this section is: are there 'benchmark' patterns of period 2 income distribution, of varying degrees of 'equalitarianism', which—or some of which—might correspond to the sorts of anti-poverty budgetary allocation schedules considered in Section 2? The restriction to 'Pareto-respecting' benchmark allocations echoes the requirement, in the anti-poverty problem, that no poor person is taxed.

Before proceeding further, a couple of definitions/formulae are in order.

Definition 1. μ^* is the common level of average quantile income to which the average incomes of the M poorest period 1 quantiles must be raised, while retaining the average incomes of the remaining $(K-M)$ quantiles at their respective period 1 levels, such that the average income of the resulting distribution is μ^2. That is, μ^* and M are defined such that

(1) $$(1/K)\left[M\mu^* + \sum_{i=M+1}^{K}\mu_i^1\right] = \mu^2.$$

Definition 2. S is a distinguished quantile such that if the average incomes of the S poorest quantiles are retained at their respective period 1 levels, and the average incomes of the remaining $(K-S)$ quantiles are raised to the average income of the richest period 1 quantile, then the mean income of the resulting distribution is the actual period 2 mean income. That is, S satisfies the following equation:

(2) $$(1/K)\left[\sum_{i=1}^{S}\mu_i^1 + (K-S)\mu_K^1\right] = \mu^2.$$

3.2 Some Benchmark Period 2 Distributions

The most 'equalitarian' period 2 distribution from the classs of Pareto-respecting distributions—call it $\mathbf{D}^{2a}$ --is clearly the one that mimics the 'bottom-up' Rawlsian solution to the optimal anti-poverty income-transfer problem considered in Section 2. This period 2 distribution is given by:

Distribution 2a:

(3) $$\mu_i^{2a} = \mu^*, \forall i = 1,\ldots,M;$$

$$= \mu_i^1, \forall i = M+1,\ldots,K,$$

where M and μ^* are as specified in Definition 1 and Equation (1).

A less equalitarian distribution is the one yielded as an analogue of the 'proportionality solution' to the anti-poverty problem. While transfers in the anti-poverty problem are proportional to shortfalls from the poverty line, the relevant shortfalls in the income-growth problem are taken to be the quantile-specific shortfalls of each quantile's mean income from the *richest* quantile's mean income. Specifically, if d_i^1 is the shortfall of the average income of the *i*th poorest quantile from the richest quantile's average income in period 1, and if s_i is the quantity $d_i^1 / \sum_{j=1}^{K} d_j^1$ for all $i = 1,...,K$, then the prescription would be to raise the *i*th poorest quantile's period 1 income in proportion to s_i. The resulting period 2 distribution is described by

Distribution 2b:

(4) $$\mu_i^{2b} = \mu_i^1 + \left(\frac{\mu_K^1 - \mu_i^1}{\mu_K^1 - \mu^1} \right) \left(\mu^2 - \mu^1 \right), \forall i = 1,...,K.$$

The 'equal-division' prescription is the least equalitarian of the class of equalitarian Pareto-respecting period 2 distributions, and is obtained by simply adding an equal division of the product of growth to each quantile's period 1 average income, to yield

Distribution 2c

(5) $$\mu_i^{2c} = \mu_i^1 + \mu^2 - \mu^1, \forall i = 1,...,K.$$

As noted earlier, the equal-division rule marks a boundary between equalitarian and non-equalitarian rules, if an equalitarian rule is interpreted as one that never allocates a smaller share of the product of growth to the poorer of two quantiles. A 'moderately' non-equalitarian rule would be the 'fair compromise' or Krtscha rule, according to which one-half of the product of growth is distributed equally among the quantiles, and one-half in proportion to each quantile's income-share in the period 1 income distribution. This yields the period 2 distribution described below:

Distribution 2d:

(6) $$\mu_i^{2d} = (1/2) \left[\mu_i^1 (1 + \frac{\mu^2}{\mu^1}) + (\mu^2 - \mu^1) \right], \forall i = 1,...,K.$$

More inequalitarian than the fair-compromise rule is the analogue of the 'top-down', 'headcount-minimizing' transfer schedule that was considered in the anti-poverty budgetary problem of Section 2. The idea here would be to raise as many of the richest quantiles as possible to the period 1 average income of the richest quantile, while allocating nothing to the poorest quantiles. The resulting period 2 distribution is:

Distribution 2e:

(7) $\mu_i^{2e} = \mu_i^1, \forall i = 1,...,S;$

$= \mu_K^1, \forall i = S+1,...,K,$

where S is as specified in Definition 2 and Equation (2).

The next distribution—Distribution 2f—is the one that would arise from all period 1 quantile mean incomes being raised by the rate at which average income has grown from period 1 to period 2. Note that it is difficult, a priori, to tell whether Distribution 2f would be more or less unequal than Distribution 2e. The income shares of the poorer quantiles would be lower in Distribution 2f, while the income shares of the richer quantiles would be lower in Distribution 2e. The 'equi-proportionate' allocation rule would result in the following period 2 distribution:

Distribution 2f:

(8) $\mu_i^{2f} = \left(\frac{\mu^2}{\mu^1}\right)\mu_i^{1,}, \forall i = 1,...,K.$

A final allocation rule, which must be regarded as the most inequalitarian of possible Pareto-respecting rules, is a 'maximax' rule, in which the entire product of growth is allocated to the richest quantile, while leaving all the poorer quantiles to their respective period 1 average incomes. The resulting period 2 distribution, Distribution 2g, is described below.

*Distribution 2*g:

(9) $\mu_i^{2g} = \mu_i^1, \forall i = 1,...,K-1;$

$= K\mu^2 - \sum_{i=1}^{K-1}\mu_i^1$ for $i = K$.

3.3 Assessing the Inclusiveness of Growth Against the Benchmarks

Assessing the inclusiveness or otherwise of growth would consist in comparing the actual period 2 income distribution with one's preferred period 2 benchmark distribution. The comparison can be in terms of the relevant Lorenz curves or/and the associated Gini coefficients of inequality. As stated earlier, the benchmark allocation rules described in Section 3.2 are specific, distinguished members of the class of ‘Pareto-respecting’ rules.

The ‘bottom-up’ allocation rule is the most equalitarian of the Pareto-respecting equalitarian rules, while the ‘equal-division’ rule is the least equalitarian of such rules, with the ‘proportionality’ rule falling in-between. The ‘fair compromise’ rule, the ‘top-down’ rule, the ‘equi-proportionate’ rule and the ‘maximax’ rule are all increasingly inequalitarian rules—inequalitarian in the sense that they do not respect the principle that the poorer of two quantiles should not receive a smaller share of the product of growth. If the Gini coefficient for the actual period 2 distribution is less (greater) than the Gini coefficient for a chosen benchmark distribution, then one can infer that growth has been inclusive (non-inclusive) *with respect to the chosen benchmark*, with the difference between the two Ginis serving as a measure of how inclusive or non-inclusive growth has been. Judgements on inclusiveness must thus be mediated by considerations of both the sign and the magnitude of the deviation of the actual from the benchmark Gini, and the stringency of the benchmark distribution.

Table 1 sets out the designations for the various actual and benchmark distributions that would be involved in assessing the inclusiveness of growth. Brief evaluative descriptions of the benchmark distributions are also provided in terms of reference to a hierarchy of ‘inclusiveness’: the evaluation is in relative terms, which permits, for example, the description of an absolutely inequalitarian rule such as the ‘fair compromise’ rule as a ‘moderately inclusive rule’.

Table 1: Actual and Benchmark Distributions and their Associated Indicators of Inequality

Distribution	Shorthand Notation for Distribution	Evaluative Description of Benchmark Distribution	Associated Lorenz Curve	Associated Gini Coefficient
Actual Distributions				
Period 1	$\mathbf{D}^1$	--	L^1	G^1
Period 2	$\mathbf{D}^2$	--	L^2	G^2
Benchmark Period 2 Distributions				
Bottom-Up /Maximin	$\mathbf{D}^{2a}$	Extremely Inclusive	L^{2a}	G^{2a}
Proportionality	$\mathbf{D}^{2b}$	Very Inclusive	L^{2b}	G^{2b}
Equal Division	$\mathbf{D}^{2c}$	Inclusive	L^{2c}	G^{2c}
Fair Compromise	$\mathbf{D}^{2d}$	Moderately Inclusive	L^{2d}	G^{2d}
Top-Down	$\mathbf{D}^{2e}$	Conservatively Inclusive	L^{2e}	G^{2e}
Equi-Proportionate	$\mathbf{D}^{2f}$	Barely Inclusive	L^{2f}	G^{2f}
Maximax	$\mathbf{D}^{2g}$	Severely Non-Inclusive	L^{2g}	G^{2g}

It is worth noting that evaluations of the inclusiveness of growth are often performed with respect to the 'equi-proportionate' rule. Operationally, this consists in comparing the Gini coefficients of the distributions in the base and terminal years: G^1 (which of course is the same as G^{2f}) and G^2. This is true, for instance, of assessments of inclusive growth in the Indian context, with reference to the distribution of consumer expenditure, in the work of Ahluwalia (2011), Bhalla (2011) and Srinivasan (2013). Thus, employing the Lorenz-Gini framework of inequality comparison, we have: 'Rising inequality has been an issue in many industrialised countries and also emerging market countries such as China… Available data … show that there was a modest increase in inequality [as measured by the Gini coefficient] in urban areas, though no similar trend can be discerned in the rural areas' (Ahluwalia, 2011; p. 91); '….[One of the] readily acceptable features of what should be considered inclusive growth [is] … the objective of equality in growth i.e. that the growth is shared equally by all the population. Related to this objective is the desirability of growth being equal to or perhaps even higher for the poorer sections of the population. … Equal growth rates will mean that whatever growth occurs, it was inclusive. … If there was a disturbing increase in the Gini, then there would be a *prima facie* case of inclusive growth not being present' (Bhalla, 2011; pp. 3,8); and 'In the decade of the 2000s it has been claimed that in India and many other developed and developing countries inequality has been on the rise. …[I]n the decade 2000-2010 the Lorenz curves did not change very much… No statistically significant difference between the two Lorenz curves is seen in either rural or urban areas. Although a statistical test of the hypothesis that the Ginis of the eight years were the same could be done, even without doing so it is clear from the confidence intervals that they are the same…' (Srinivasan, 2013; pp. 18,19.)

The notion of 'pro-poor growth', while it is distinct from that of generally 'inclusive (or inequality-reducing) growth', is also informed by an inter-temporal comparison of quantile-specific growth rates. One approach to assessing pro-poor growth, as advanced by Ravallion and Chen (2003), involves the use of a device they call the 'growth incidence curve (GIC)', which is the graph of quantile-specific growth rates plotted against the income quantiles arranged in ascending order. Ravallion and Chen advance a measure of pro-poorness which is the average of the quantile-specific growth rates upto the quantile marking off the poverty line: this quantity is just the relevant area under the GIC, and also measures the extent to which (a suitably normalized version of) the Watts (1968) poverty index is reduced. In this framework, as long as the average of the growth rates of poor incomes is positive, growth must be deemed to be pro-poor; and it also does not matter to an assessment of pro-poorness whether growth is relatively more concentrated among the poorer or among the richer of the poor population, so long as both lead to the same average growth rate.

The response in the literature to the Ravallion-Chen approach to measuring pro-poorness has been usefully and compactly summarised in Lambert (2009; pp. 1,2):

> According to a line of study that began with Kakwani and Pernia (2000), pro-poorness requires that the incomes of the poor grow faster than those of the rich; see also Kakwani et al. (2004). Ravallion and Chen (2003) take a different approach, arguing that growth is pro-poor if it involves poverty reduction for some choice of poverty

> index… Because of its focus on relative gains, the first interpretation is referred to as a relative approach to assessing the pro-poorness of economic growth, while the second is considered an absolute approach. Osmani (2005) argues for a recalibrated absolute approach, whereby economic growth is considered pro-poor if it achieves an absolute reduction in poverty *greater than would occur in a benchmark case* [emphasis in original]….Distributional neutrality is becoming generally adopted as the benchmark.

Lambert's remarks were anticipated earlier in in a Department for International Development briefing on pro-poor growth (DFID, 2004), wherein we have: 'The **relative** definition of pro-poor growth compares changes in the incomes of the poor with changes in the incomes of people who are not poor. *Growth is 'pro-poor' if the incomes of poor people grow faster than those of the population as a whole*' [emphasis in original].

In discussing the relation between inclusive and pro-poor growth, Rauniyar and Kanbur (2010) say: '…we might say that inclusive growth is necessarily pro-poor, but non-inclusive growth (in the sense of inequality increasing with growth) is not necessarily anti-poor, provided it is not "too" non-inclusive… However, making *the same rate of growth* more inclusive (inequality falling more or not rising so much) must make that growth more pro-poor' [emphasis added]. In the special case in which the distribution of income is modelled as a lognormal one, Lambert (2009; p.7) has demonstrated that there is a specific sense in which '[i]n a lognormal world, there is no difference between pro-poor growth and [relative] inequality-reducing growth!'

The 'shared prosperity' measure advanced by the World Bank focuses on the rate of growth of the average income of the poorest 40 per cent of a population: the intended interpretation seems to be that growth is inclusive if this growth rate is positive, and that a shared prosperity 'premium' is available whenever the rate of growth of the poorest 40 per cent compares favourably with the rate of growth of the overall average income. Thus, 'Shared prosperity focuses on the poorest 40 percent of the population in each economy (the bottom 40) and is defined as the annualized growth rate of their mean household per capita income or their consumption. The shared prosperity premium is the difference between this and the annualized growth rate for the whole population. Shared prosperity and the shared prosperity premium are important indicators of inclusion and well-being in any economy and correlate with reductions in poverty and inequality' (World Bank, 2020).

The foregoing suggests that while the 'equi-proportionate' rule appears to be a popular benchmark for assessing the 'inclusiveness' and 'pro-poorness' notions of growth, the rule, as reflected in Table 1, is actually a good way down in the hierarchy of levels of inclusiveness, and is, in fact, described as 'barely inclusive' in the Table. Needless to say, this is a matter of value-judgement—but that is not so much the point as the observation that certain value-judgements appear to have been routinely accepted in the measurement literature as constituting natural correlates of the meaning of such notions as equality and inclusiveness.

3.4 Some Necessary Caveats

In discussing standard analyses of income-mobility, Creedy and Gemmel (2017; p.1) make the following important point:

> One approach to mobility measurement, proposed by Ravallion and Chen (2003), uses cross-sectional data for two periods, rather than longitudinal information about individuals, to produce a 'growth incidence curve' (GIC). This plots the growth rate, between two periods, of each quantile or percentile of the distribution in the initial period. It can easily display relative growth differences, by subtracting the overall income growth, and can be used to examine whether or not income growth is said to be 'pro-poor'. A distinction needs to be drawn between such a curve, which is based on the growth of quantiles rather than of individual incomes, and one which uses longitudinal data.

The authors' observation may be taken to refer to the distinction between exercises in 'comparative statistics' and exercises involving more properly 'dynamic comparisons', examples of which would be the work of Bouguignon (2011), Jenkins and Van Kerm (2016), and Creedy and Gemmel (2017). It is important to mention this distinction, because the present paper belongs to the first category of exercises. As such, there is a risk of overstating the analogy, employed in this paper, between solutions to the optimal anti-poverty problem and benchmark distributions in the inclusive growth problem. The two problems are simply not the same, though they may be seen to possess some structural similarities that can be usefully exploited. In particular, in dealing with the growth issue, we are not dealing with 'before and after' versions of a distribution involving the same set of persons, the two distributions being separated by an intervention of a tax or transfer variety. The idea therefore cannot be to seek a one-to-one correspondence between the anti-poverty budget allocation problem and a problem involving the allocation of the product of growth across the quantiles of a distribution. The intended object is the limited one of illustration by analogy, on the understanding that the analogy is suggestive, without being exact.

This being the case, it must be explicitly noted that the 'inclusive growth' problem as it has been addressed in this paper deals with populations of different sizes and different people; it does not take account of inter-temporal mobility across quantiles; and it ignores the intraquantile distribution of incomes. In principle, one way of mitigating – without in any way eliminating – the difficulties involved might be to make the quantiles as small as possible, e.g. to deal with percentiles instead of, say, quintiles or deciles. But the fact remains that the problem is one of performing inequality comparisons across variable populations, requiring one to fall back on the customary justification for such comparisons in terms of the anonymity and replication invariance axioms of inequality measurement.

The issues involved are foundational, and while the consequential limitations of analysis must be acknowledged, it is not clear that they can be satisfactorily addressed in a paper of the present type—unless, in looking for longitudinal changes, one confines the phenomenon of growth to the population that constitutes the intersection of the populations in the base and terminal years: this would argue the availability of panel data, and also the worthwhileness of a partial analysis of the growth phenomenon. Alternatively, one would need more than data on just the shape of the cumulative distribution function: one would have to have data on who has what income in each time period. But quite apart from this, the sort of analysis done in the paper is on all fours with the analysis commonly encountered in what may be referred to as 'the pro-poor growth world', that is to say, a world in which one can draw growth-incidence curves, which also deal with fractiles, and ignore inter-temporal movements across fractiles and intra-fractile distributions. It is within this commonly constituted framework that the paper seeks to differentiate the notion of 'inclusiveness', in terms of postulating benchmarks, from the usual criterion of equi-proportionate growth.

The next section deals with an illustrative empirical application of some of the ideas discussed in the preceding sections to an assessment of the experience of growth (in consumption expenditure) in India.

4. The 'Inclusiveness' of Rural India's Consumption Expenditure Growth

While there are no systematic official data on income-distribution in India, such data are available for consumption expenditure from the periodic 'Tables with Notes on Consumption Expenditure' brought out by the National Sample Surveys (NSS) of the Central Statistical Organization (CSO). In what follows, the year 1970-71 is taken as the base year, and 2009-10 as the terminal year. (While the latest year for which official NSS data are available is 2011-12, the present exercise employs 2009-10 as the terminal year simply because of the convenience to be had from employing previously processed data for 2009-10, available in

Jayaraj and Subramanian, 2012: the exercise in this section is essentially illustrative in nature). The analysis is confined to rural India. The Consumer Price Index of Agricultural Labourers (CPIAL) has been used to express all nominal consumption expenditure values at base (1960-61) prices. Average real per capita consumption in rural India increased from Rs.18.99 in 1970-71 to Rs.31.29 in 2009-10, implying an annual compound rate of growth, over the 29-year period under consideration, of 1.74 per cent . For specificity, the population has been divided into deciles: employing the relevant NSS data and the World Bank's POVCALNET software, mean consumption expenditure levels for each decile can be computed, and these decile-wise distributional data are presented in Table 2. Employing the relevant expressions set out in Equations (3)-(8) of Section 3.2, Table 2 also presents the decile-specific 2009-10 benchmark distributions designated 2a-2f in Section 3.2. The final row of Table 2 sets out the Gini coefficients of inequality for each of the decile distributions in the Table.

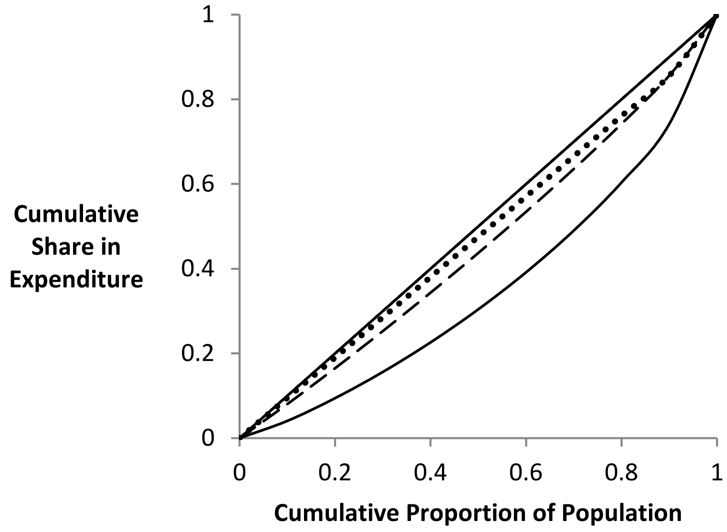
Table 2: Distributions of Decile-Specific Mean Consumption Expenditure (in Rupees at 1960-61 Prices) for Rural India, 1970-71 and 2009-10, and Benchmark 2009-10 Distributions

	1970-71: D^1	**2009-10: D^2**	**2009-10 Benchmark D^{2a}**	**2009-10 Benchmark D^{2b}**	**2009-10 Benchmark D^{2c}**	**2009-10 Benchmark D^{2d}**	**2009-10 Benchmark D^{2e}**	**2009-10 Benchmark D^{2f}**	**2009-10 Benchmark D^{2g}**
	7.36	12.72	29.77	25.17	19.66	15.89	7.36	12.12	7.36
	9.88	16.77	29.77	26.50	22.18	19.22	9.88	16.26	9.88
	11.70	19.35	29.77	27.45	24.00	21.63	11.70	19.26	11.70
	13.46	21.82	29.77	28.37	25.76	23.96	12.46	22.16	13.46
	15.32	24.41	29.77	29.34	27.62	26.42	45.03	25.22	15.32
	17.37	27.32	29.77	30.41	29.67	29.13	45.03	28.59	17.37
	19.78	30.83	29.77	31.67	32.08	32.32	45.03	32.56	19.78
	22.85	35.52	29.77	33.28	35.15	36.38	45.03	37.61	22.85
	27.48	43.16	29.77	35.69	39.78	42.67	45.03	45.56	27.48
	44.67	80.75	44.67	44.67	56.97	64.75	45.03	73.53	167.40
Mean	**18.99**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**
Gini	**.2823**	**.3002**	**.0441**	**.0996**	**.1714**	**.2327**	**.2711**	**.2823**	**.5248**

Source: The figures in columns 1 and 2 are from Table 2a of Jayaraj and Subramanian (2012), which are computations derived from National Sample Survey, (Round 25, Report No. 231): *Tables with Notes on Consumer Expenditure* for the year 1970-71, and National Sample Survey, (Round 66, Report No. 538): *Level and Pattern of Consumer Expenditure 2009-10* for the year 2009-10. Consumption expenditure levels are expressed in constant (1960-61) prices, employing the Consumer Price Index of Agricultural Labourers. The Gini coefficients in the final row of the Table have been computed by the usual 'trapezoidal approximation' method.

The Lorenz curves for each of the distributions $\mathbf{D}^1, \mathbf{D}^2, \mathbf{D}^{2a}, \mathbf{D}^{2b}, \mathbf{D}^{2c}, \mathbf{D}^{2d}, D^{2e}, \mathbf{D}^{2f}$ and $\mathbf{D}^{2g}$ featured in the Table are drawn in Figures 1-4: all of the curves could have been accommodated in a single figure, but at the cost of some confusing, and avoidable, crowding.

Figure 1: Lorenz Curves of Distributions 2a, 2b, and 2

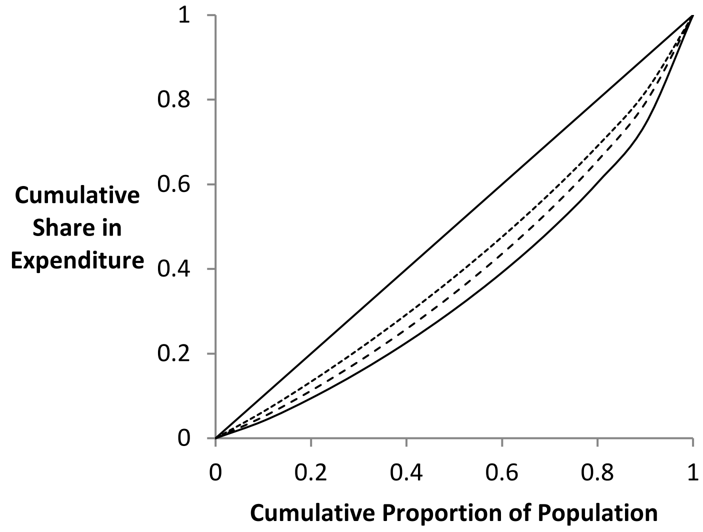


…….. Distribution 2a; - - - -Distribution 2b; ______ Distribution 2

Note: 2a and 2b Lorenz-dominate 2

Figure based on data in Table 2.

Figure 2: Lorenz Curves of Distributions 2c, 2d and 2

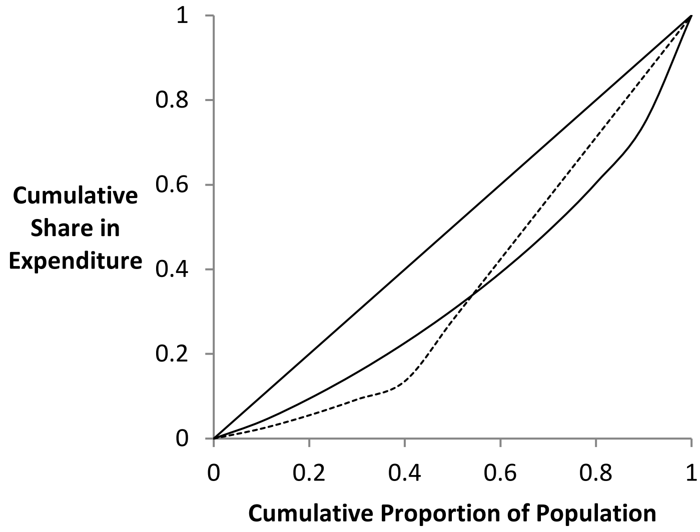


…….. Distribution 2c; - - - - - Distribution 2d; ______ Distribution 2

Note: 2c and 2d Lorenz-dominate 2.

Figure based on data in Table 2.

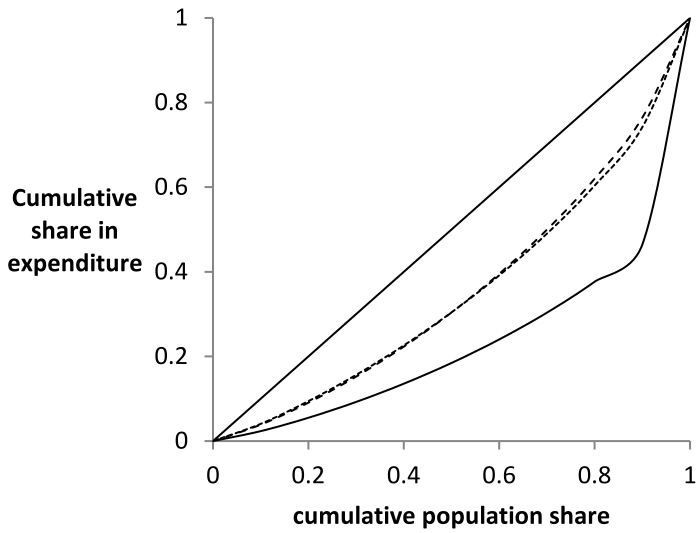
Figure 3: Lorenz Curves of Distributions 2e and 2



- - - - - Distribution 2e; ______ Distribution 2

Note: The Lorenz Curve of 2e intersects the Loren Curve of 2 from below
Figure based on data in Table 2.

Figure 4: Lorenz Curves of Distributions 2f, 2g and 2



- - - - - Distribution 2f; …….. Distribution 2; ______ Distribution 2g

Note: The Lorenz Curves of Distributions 2f and 2 lie very close together: the former intersects the latter from below just after the fifth decile. Distribution 2 comfortably Lorenz-dominates 2f.
Figure based on data in Table 2.

The Gini coefficients presented in Table 2 and the Lorenz curves featured in Figures 1-4 do not require much commentary. Each of the benchmark distributions derived from the maximin, the proportionality, the equal division, and the fair compromise allocation rules Lorenz-dominates the Lorenz curve for the actual period 2 distribution; and while the Lorenz curves for the benchmark distributions yielded by the top-down and the equi-proportionate rules intersect the Lorenz curve for the period 2 distribution, the Gini coefficients for the 2e and 2f distributions are still lower than for the period 2 distribution—which (comfortably) Lorenz-dominates only the Lorenz curve for the distribution corresponding to the polar inequalitarian maximax rule. Discounting this last case of extreme exclusion, if the growth of consumption expenditure in rural India over the period 1970-71 to 2009-10 has been 'inclusive', it has been so—and that too, very narrowly—only with respect to the undemanding requirement of inclusiveness implied by the 'barely inclusive' equi-proportionate allocation rule. Such a direct comparison of the base and terminal year Ginis seems to be at the basis of the apparently widely-held professional view that growth of average per capita consumption expenditure in rural India has not been alarmingly non-inclusive.

5. Conclusion

This paper has been concerned to advance the view that one way of assessing the inclusiveness or otherwise of the growth in average per capita income in a society would be to draw on the insights yielded by the literature on optimal budgetary intervention aimed at alleviating poverty through direct income transfers. The anti-poverty problem is one of allocating a budget of fixed size among competing contenders for it among the poor. The optimal solution to the problem would depend, among other things, on how 'equality-sensitive' is the measure of poverty that is sought to be minimized. An analogous problem—the analogy being subject to the qualifications discussed in Section 3.4—arises in the 'inclusive growth' context if the question is addressed of how equitably the product of the growth of income over a given time period ought to be allocated—in contrast to how it actually *is* distributed—across fixed quantiles of the population. This would enable the derivation of a hierarchy of allocation rules according to the equitability of their outcomes, and a comparison of how fairly or otherwise the product of growth has actually been distributed in relation to the chosen benchmark distribution. The allocation rule that seems to be (implicitly) most widely favoured is the 'equi-proportionate' rule, which sees growth as being equitable if all quantiles of a population experience an equal rate of increase in their respective incomes. This rule, however, turns out to occupy a rather low position in the hierarchy of equitable allocation rules considered in this paper.

In the end, the issue boils down to something like the following. To take a simple and common-sense view of the problem, it seems to be reasonable, from a 'comparative statics' view of the matter, to assess the 'inclusiveness' of growth over a given time period by comparing the extent of inequality of the income distribution in the base year with inequality in the terminal year.

The question is: what sort of measure of inequality should one employ? The favoured answer seems to be: a relative measure of inequality, that is to say, a measure (like the Gini coefficient) which satisfies the scale-invariance property, namely the requirement that inequality must be deemed to remain unchanged if all incomes in a distribution are raised by the same proportion. The ethical basis of this judgement has long been questioned, by, among others, Dalton (1920), Kolm (1976a,b), Moyes (1983), and Amiel and Cowell (1999). An *absolute* measure of inequality is one that satisfies Kolm's (1976a,b) translation-invariance property, namely the requirement that inequality must be deemed to remain unchanged if all incomes in a distribution are raised by the same absolute *amount*. The present paper's concern with assessing growth-inclusiveness in terms of the distribution of the *absolute product* of growth, rather than in terms of *rates* of growth, explains why the 'equi-proportionate' rule merits being called a 'barely inclusive' one from one perspective.

Both scale- and translation-invariant inequality measures may be judged to uphold 'extreme' values. There is, then, a case for the employment, at least, of *intermediate* measures of inequality, namely measures which display an increase in value when all incomes in a distribution are raised by the same proportion, and a diminution when all incomes are raised by the same amount. An eminently reasonable intermediate index of inequality is the one advanced by Krtscha (1994). Judgements on the global experience of the inclusiveness of growth have been shown to be widely divergent, depending on whether inequality is measured in relative or non-relative terms, as demonstrated in the work of, among others, Atkinson and Brandolini (2010) and Bosmans, Decanq and Decoster (2014). Similar findings are reported in country-level studies, such as in those for Spain by Del Rio and Ruiz-Castillo (2001), and for India by Jayaraj and Subramanian (2015).

Having said this, it would be fair to suggest that the dominant convention in the literature is still to assess the equitability of growth by comparison of wholly relative measures of inequality over time. It is the contention of this paper that such conservative approaches to the measurement of 'equality' and 'inclusiveness' can inhibit the implementation of corrective policy which would require, in the first instance, the *diagnosis* of a problem for it to be addressed.

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About the Author

S. Subramanian is an Independent Scholar; formerly, Madras Institute of Development Studies.
Email: ssubramanianecon@gmail.com