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# Growth, Income Distribution, and Well-Being: Comparisons across Space and Time

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**Abstract**

In this paper we use several well-being measures that combine average income with a measure of inequality to undertake international, intertemporal, and global comparisons of well-being. The (as yet) tentative conclusions emerging form the analysis are that our well-being measures drastically change our impression of levels of well-being at the national and, more so, at the global level. They also significantly affect the ranking of countries, when compared to ranking based on real incomes. The impact on these measures on temporal trends in well-being are smaller on average, but significant for a number of countries where inequality changed considerably in past decades. These results appear not very sensitive to the somewhat problematic database on inequality upon which most of this analysis is based upon. The results suggest that the inclusion of inequality has an important impact on well-being comparisons and it is therefore of great importance to generate more consistent and intertemporally and internationally comparable measures of inequality that are necessary for such comparisons.

## 1. Introduction

Despite its well-known short-comings, GNP per capita is still the most widely used indicator for comparisons of well-being across countries; and the per capita growth rate is still the most common indicator of changes in well-being.[1] The exclusive reliance on this measure is largely due to pragmatic grounds. GNP (and GDP) are important measures of production possibility and business cycles, which ensure that great efforts are made to measure them timely, accurately, and according to internationally agreed standards. With these data readily available, it is tempting to rely on them for international and intertemporal comparisons of well-being. Moreover, it is argued by many that GNP per capita and growth of per capita income is still the best available proxy for changes in well-being as it is highly correlated with more complete or more broad-based measures of well-being (e.g. Dollar and Kray, 2000; Ravallion, 1996). Nevertheless, it continues to be the case that its neglect of income distribution is one of the most serious short-comings of GNP as an indicator of welfare. In particular, a broad range of philosophical approaches to the measurement of welfare (ranging from utilitarianism with some very reasonable assumptions about utility functions to Rawlsian reasoning or Sen's capabilities) would suggest that, ceteris paribus, high economic inequality reduces aggregate well-being. In fact, there exist a range of measures for well-being that make use of this insight and combine mean income with some measure of income inequality to arrive at better measures of welfare than average income alone (e.g. Atkinson, 1970; Sen, 1973; Dagum, 1990; Ahluwalia and Chenery, 1974).

At the same time, recent years have seen great advances being made in the generation of more accurate and comparable data on income inequality (e.g. Gottschalk and Smeeding, 1997; Deininger and Squire, 1996). Thus it seems natural to apply the well-being measures that combine GNP per capita and income distribution to these new data and investigate to what extent these measures will generate comparisons of well-being across space and time that are substantially different from pure per capita income comparisons. This exercise is

[1] There are other indicators, such as the Human Development Index and related measures, that have attempted to generate alternatives to this exclusive reliance on income, but they have been criticized for their choice of indicators, aggregation rules, and their neglect of distribution of the achievements considered (e.g. Srinivasan, 1994; Ravallion, 1996).

the purpose of this paper where we apply these measures to intertemporal, international, and global comparisons of well-being.

We find that the measures that include income inequality in the assessment of well-being have a significant influence on international comparisons of well-being. Several countries, including Brazil, Mexico, Chile, and the US have considerably lower levels of well-being and thus rankings in international comparisons of well-being than suggested by per capita income, while other countries, including Indonesia, Bangladesh, Denmark, and Canada have a much higher well-being rank than their income rank. For many countries, these findings are quite robust to using different data sources; for some, including some OECD countries, the international comparisons are substantially affected by the choice of data set. At the same time, we find that consideration of inequality has a comparatively minor impact on intertemporal comparisons of well-being as in most countries of the world, income distribution has remained fairly stable over the period of time considered here (esp. when compared to the much larger fluctuations in income growth, see also Lundberg and Squire, 1999). Only in a few countries (including Britain, the US, and the transition countries) does the consideration of inequality markedly change assessments of changes in well-being. Finally, we find that due to the extremely large global income inequality, global well-being is very much lower than it would be if incomes were more equally distributed. For the sample of countries that we consider in our assessment of global income inequality (which includes some 70% of the world's population but unfortunately excludes most poor African countries), changes in global well-being are larger than suggested by the income growth measure as inequality seems to have declined in our sample of countries, especially between 1980 and 1997.

It should be pointed out at the start that this paper presents tentative results of an exercise that, to some degree, is still speculative. On the theoretical side, we do not wish to propose definite measures of well-being. Instead, we merely wish to illustrate how reasonable ways of incorporating inequality in an assessment of well-being will change our impression of well-being across space and time. On the empirical front, our conclusions should be seen as equally tentative. While we have many more data on income inequality across space and time than we used to, the accuracy and comparability of many of them remains a huge problem (see, Atkinson and Brandolini, 1999; Deininger and Squire 1996). We have undertaken some sensitivity analyses using possibly better data available for some points in time in a limited number of countries.[2] None of this can substitute for long consistent time series of internationally standardized and comparable data which are at present not available. Our international comparisons of inequality are limited to a small number of countries in the early years we consider (1960, 1970) so that it is difficult to say much about temporal trends in inequality and well-being in many countries. And even for these countries we often only have very irregular data points on inequality so that we cannot really talk about consistent time series. Finally, our 'global' analysis neglects all African countries and some poor non-African countries and thus should be taken with a grain of salt. Despite these short-comings, we are nevertheless confident that this analysis generates a number of important and usable findings that should be fairly robust to most of the many data problems we encounter.

The paper is organized as follows: the next section discusses the theoretical issues involved in comparing well-being across space and time. Section 3 discusses the measures of well-being we use in this paper. Section 4 presents the data and our manipulations for this

[2] In the next draft, we plan to include several more sensitivity analyses to test the robustness of our results presented here.

analysis. Section 5 presents the results for the international analysis, section 6 for the intertemporal one, and section 7 for the 'global' analysis. Section 8 concludes.

## 2. The Theory of Well-Being and Real-Income Comparisons

Despite a long history, the theory of welfare judgements across space and time continues to be beset with conceptual and practical problems. Ever since it became evident that social choice theory was not yielding acceptable[3] procedures for making social welfare judgements, social welfare judgements have been based on axiomatic approaches to welfare measurement. Those are based on a conceptualization of what constitutes welfare and then the derivation of an indicator that, under certain stated assumptions, can adequately measure the chosen concept.

Applying such measures to comparisons across space and time generate additional problems. Those are discussed in detail in Sen (1982, 1984) and will only be summarized here. In particular, the theory of welfare comparisons is based on situational comparisons, i.e. whether a person would hypothetically prefer situation A to B. This comparison thus takes place at the same time and is done by the same person. The reality of intertemporal or international welfare comparisons, however, addresses a different question. Intertemporal comparisons have to contend with the problem that the persons are not evaluating the welfare of two situations simultaneously, but sequentially. This may generate problems if overall perceptions of welfare or tastes have changed over time (in addition to the problem that not all the people are alive in both periods). Comparisons across space, as done in inter-country comparisons, are even more difficult as now the persons differ whose welfare is being compared.[4] In addition, the comparison could be made using the price (or other welfare weight) vectors of either country, which would not necessarily generate the same result. In addition to this theoretical problem, the comparability of prices throws up an additional problem, namely of the appropriate exchange rate for international comparisons. Until recently, most real income comparisons were based on official exchange rates despite the knowledge that they are often distorted as a result of speculation, currency restrictions, and that they imply a systematic underevaluation of the non-traded sector in poorer countries. In recent years, the ICP Project has generated purchasing power parity estimates of GDP and GNP based on international prices that try to address these particular short-comings.[5]

Thus there are some important conceptual questions that relate to such comparisons. Only if one places restrictions on intertemporal changes and international differences in preferences, can these comparisons yield meaningful outcomes. Given the ubiquity of such comparisons, it appears that most analysts are willing to make such assumptions.

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[3] Acceptable is meant in the sense of obeying minimal requirements such as the four conditions stated by Arrow in his famous impossibility result (Arrow, 1963). See also Sen (1973, 1999) for a discussion.

[4] One could try to do translate an international comparison into a situational comparison, i.e. asking the British whether they would prefer to live in Britain this year or in France this year. This throws up considerable problems, however, as it is unclear which British person should compare themselves with which French person, nor whose welfare function should be used. For a discussion of those issues, see Sen (1982, 1984).

[5] While these data generated by these methods are widely used, they are not beyond question. In particular, the resulting adjusted per capita incomes are sensitive to the choice of 'international prices' which is closer to the prices prevailing in rich countries (Berry, Bourguignon, and Morrison, 1991). Moreover, as section 5 reveals, PPP adjustments can differ in their outcomes as the differences between the World Bank estimates and the Penn World Tables demonstrate.

The most commonly used indicator for welfare comparisons across space and time is real per capita income.[6] It can be derived from utilitarian welfare economics using three sets of assumptions. One set would demand everyone to have identical unchanging cardinal utility functions where income (or consumption)[7] enters the utility function linearly (e.g. in the simplest form, every unit of consumption generates one unit of utility). Another could allow for more realistic concave utility functions, but would still require identical utility functions and require in addition that everyone is earning the per capita income and thus consumes the mean commodity bundle (Sen, 1984). A third set is based on Samuelson (1947) and takes an 'individualistic approach' to welfare measurement. Under this approach, we recover social welfare from individual welfare based on revealed preferences using the Pareto principle. If preferences are complete, convex, and monotonically increasing, if each person's welfare only depends on their purchases (i.e. no externalities and public goods), if there are no market imperfections on the buyer's side, and if each person is rational in the sense that her choices reflect her welfare ranking, then the ratio of market prices should equal the ratio of intra-personal weights (marginal rates of substitution) attached to these goods. These assumptions are not sufficient, however, to ensure that the market prices say anything about the valuation of a good going to two different people, as this requires interpersonal comparisons. To be able to make such interpersonal comparisons which is essential for all real income comparisons, we need to assume in addition that the income distribution is 'optimal' to 'keep the ethical worth of each person's marginal dollar equal' (Samuelson, 1947:21).

All three sets of assumptions are beset with problems. While many aspects of the various sets of assumptions appear unrealistic, the need to explicitly ignore the distribution of income in a welfare comparison appears particularly unpalatable in all three sets of assumptions. Ignoring income distribution through the assumption of linear utility functions, through the assumption of everyone having the same income, or through the assumption of income distribution being 'optimal' from a welfare point of view is all equally problematic. In fact, both theoretical considerations (e.g. declining marginal utility of income derived from convex preferences) as well as empirical observations (e.g. about risk aversion and insurance) clearly suggest that the existing distribution of incomes is not 'optimal' from a social welfare point of view, or that utility functions are linear in income or consumption. Instead, these theoretical and empirical considerations point to concave utility functions, i.e. that inequality reduces aggregate welfare as the marginal utility of income among the poor is much higher than among the rich.[8]

Non-utilitarian views of welfare would also suggest income inequality reduces aggregate well-being. For example, Sen's capabilitity approach (Sen, 1987) which calls for a maximization of people's capability to function (e.g. the capability to be healthy, well-nourished, adequately housed, etc.) also exhibits declining marginal returns in the income

[6] There are well-known omissions of GNP as a measure of value created in the economy. These issues will not be discussed further here.

[7] We abstract from the difficulties associated with the treatment of saving in an indicator of welfare. See for example, the paper by Osberg and Sharpe (2000) to be presented at this conference.

[8] This is inherent also in the approach by Graaf (1957) and Sen (1982) who treat the same good going to two different people as two different goods and thus explicitly do away with the distinction between size and distribution of income as the 'welfare depends on them both'. (Sen, 1982).

space.[9] Similarly, application of Rawlsian principles would also suggest that welfare is higher in societies where inequality is lower (Rawls, 1971).[10]

One approach to improve upon the welfare content of real income comparisons is therefore to jettison this neglect of income distribution and incorporate the notion of declining marginal welfare returns of income. Each of the measures proposed in the next section does precisely this in slightly different ways.

Before turning to this issue, however, it may be useful to consider one explicit objection to the incorporation of distributional issues in an assessment of well-being. In particular, it may be argued that redistributions reduce the long-term growth potential of an economy so that there may be a trade-off between higher well-being associated with lower inequality today and lower well-being associated with the subsequently reduced economic growth. While such dynamic considerations go beyond the scope of this analysis and would, in any case, require the inclusion of other dynamic issues (e.g. the role of savings and of depreciation of human, natural, and physical capital in long-term well-being of nations)[11], there is a growing consensus that this trade-off between distribution and growth does not, in fact, exist. In fact, if anything, the debate has recently shifted in the opposite direction suggesting that initial inequality *lowers* subsequent growth prospects rather than increases them (e.g. Deininger and Squire, 1997; Alesina and Rodrick, 1994; Clarke, 1995; Persson and Tabellini, 1994; Klasen, 1999). While these findings are still tentative and subject to some debate[12], they suggest that the older claim, that high inequality is necessary for growth, seems not be born out by the facts (see also Klasen, 1994).

## 3. The Well-Being Measures Used

In this section we describe some measures that jointly consider per capita income and its distribution and therefore avoid the particularly problematic neglect of income distribution in a consideration of welfare. Most are well-known in the inequality literature although not all of them have been used explicitly for aggregate welfare comparisons. All share the feature that they can be summarized by the following formula:

$$W = \mu(1 - I) \quad \text{where: } 0 \leq I \leq 1$$

Welfare is a function of mean income $\mu$, reduced by a measure of inequality I. Thus inequality adjusts mean income downward to reflect the welfare loss associated with the (unequal) distribution of that mean income. We will consider several measures because the different measures not only differ in the intensity of the 'welfare penalty' they impose but also (implicitly) differ in the penalty they impose for different types of inequality.

[9] For example, there appears to be a concave relationship between income and life expectancy, and income and educational achievement. For a discussion, see Klasen (1994).

[10] In the lexicographic version of the maximin principle, only the position of the worst off is relevant; if one generalizes a bit, one would get a more continuous declining marginal valuation of income. Similarly, Hirsch's views on the social limits to growth also imply declining aggregate well-being as a result of inequality. For details see Hirsch (1977) and Klasen (1994).

[11] One might also want to consider longevity in conjunction with income and income inequality to measure for how long people are able to enjoy the incomes they enjoy. For a discussion, see Berry, Bourguignon, and Morrison, 1991.

[12] See, for example, Lundberg and Squire (1999) who regard growth and income inequality as jointly determined rather than one causing the other; they also find that inequality is particularly bad for income growth among the poor, while it has a different effect for income growth among the rich.

The first measure considered is proposed by Sen (1982) and incorporates inequality through the Gini coefficient. This Sen measure can be stated as:

$\mathbf{S = \mu(1 - G)}$ where $\mu$ is the mean income and $G$ is the Gini coefficient.

The Sen measure can be derived by replacing Samuelson's problematic 'optimal distribution' assumption by the assumption of 'rank order weighting' (Sen, 1973). Individual incomes will be weighted according to their rank in the income distribution (with the richest receiving rank 1 and thus the lowest weight for their income). It can also be derived from a utility function where individuals consider not only their own incomes, but the entire income distribution, with particular emphasis on the number of people with incomes below or above one's own (Dagum, 1990). Thus preferences are assumed to be interdependent which accords well with recent empirical findings (e.g. Easterlin, 1995; Banerjee, 1997).

A variant of this measure was proposed by Dagum (1990):

$$\mathbf{D = \frac{\mu(1 - G)}{1 + G} = \mu(1 - \frac{2G}{1 + G})}.$$

Clearly, the Dagum measure is a more extreme version of the Sen measure as it imposes a higher penalty for inequality as the denominator imposes an additional penalty for inequality. The Dagum measure can also be based on interdependent preferences and additionally implies that people receive a further welfare penalty from the people ahead of them in their income distribution which also appears to be a reasonable assumption.[13]

In addition, we consider two versions of the Atkinson welfare measure. The Atkinson measure was developed as an indicator of inequality that explicitly considers the welfare loss associated with inequality in the measure (Atkinson, 1970). But one can equally well just use the way the welfare loss is calculated, the equally distributed equivalent income (EDEA), as the welfare measure itself.[14] This equally distributed equivalent income is the amount of income that, if distributed equally, would yield the same welfare as the actual mean income and its present (unequal) distribution (Deaton, 1997). The general form of this measure is[15]:

$$A2 = EDEA2 = \left[ \frac{1}{N} \sum_{i=1}^{N} x_i^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

This measure depends crucially on the exponent ε, the aversion to inequality factor. The higher ε, the higher penalty for inequality. We consider two cases, ε=2 (A2), and ε=1 (A1). In the latter case, the general form of the Atkinson measure is not defined and for this case the measure changes to:

$$\mathbf{\ln(A1) = \ln(EDEA1) = \frac{1}{N} \sum_{i=1}^{N} \ln(x_i)}$$

[13] See Dagum (1990) for a derivation and justification of this measure.

[14] This has been done, for example, by UNDP in deriving the gender-related development index (UNDP, 1995). For a discussion, see Bardhan and Klasen (1999).

[15] Also, this measure satisfies the general form of the well-being measure W=μ(1-I) where I= 1-A/μ. See Atkinson (1970).

The Atkinson measures can be derived from social welfare functions that are additively separable functions of individual incomes. Thus they are based on individualistic utility functions where people only care about their own incomes. Inequality reduces welfare in this formulation as the utility functions considered are concave for all ε greater than 0. All the measures exhibit constant relative risk aversion. The ε=1 has the additional property of being based on a constant elasticity utility function, suggesting that a percentage increase in income is valued the same regardless of its recipient. Such an assumption has quite a lot of intuitive appeal (see below). While clearly ε=2 penalizes inequality more than ε=1 and is thus based on declining elasticity of income, the underlying assumption, that at twice the level of income, a percentage increase in income is valued half as much as at the lower level of income which also appears to be within the range of reasonable assumptions (see Deaton, 1997 and UNDP, 1995). Such penalties of inequality are still consistent with findings from the micro literature on utility and risk. Most of the non-utilitarian theories suggested above would, in fact, likely require considerably higher inequality aversion.[16] While the Atkinson measures are typically based on individual incomes, our *N* refers to the five income quintiles, the only information we have available for the analysis.

A third set of measures were proposed by Ahluwalia and Chenery (1974) which proposed measures that combine income growth with redistribution. In particular, they proposed a measure which they called a population-weighted or equal-weighted growth rate which is simply the arithmetic average of the growth rates of each individual (or quintile). Instead of treating a dollar increase the same regardless of its recipient, this measure treats a percentage increase the same, thus also allowing for declining marginal utility of income and exhibiting what Ahluwalia and Chenery called the 'one person, one vote' principle of growth measurement. It turns out that this measure is a small number approximation of the Atkinson ε=1 measure, which also weights a percentage increase the same regardless of its recipient.[17] Thus we will not report it separately here. But the similarity between this measure and the Atkinson measure gives another quite nice justification for the Atkinson measure.

Similarly, their second growth measure, the welfare or poverty-weighted growth rate (which gives greater weight to income increases of the poor than the rich) is a discrete approximation of a version of the Atkinson with ε>1. Our A2 measure will therefore yield very similar results.

Before turning to the data and the results, it is important to briefly discuss the most important differences between the measures.[18] Apart from the penalty applied to inequality, the two Gini-based measures differ quite fundamentally from the two Atkinson measures (and thus the Ahluwalia and Chenery measures) in ways that are important to consider. First, the two sets of measures respond differently to equal-sized income transfers at different points in the income distribution. While all measures are consistent with the Dalton principle of transfers[19], the Atkinson measures obey what has been called

[16] A strict interpretation of Rawls lexicographic maximin principle would require ε to be infinite (see also Atkinson, 1970).

[17] It can be shown that the growth in the Atkinson ε=1 measure is simply the geometric mean of the growth rates of individuals (or quintiles, depending on the unit of disaggregation), while the population or equal weights measure is the arithmetic mean of the growth rates. For small numbers, one is an approximation of the other. See Klasen (1994) for a discussion and application of the Ahluwalia and Chenery measures.

[18] For a more extensive discussion of these issues, refer to Atkinson (1970), Blackorby and Donaldson (1978) and Dagum (1990).

[19] The Dalton principle of transfers states that an inequality measure must be reduced by a transfer from a richer person to a poorer person without changing their position in the income ranking.

'transfer sensitivity', which means that an equal sized transfer will have a larger impact on inequality (and thus on welfare) if it happens among the poorer sections of the income distribution than if it happens among richer sections. Most would agree that this is a desirable property. In contrast, the largest impact of an equal sized transfer using the Gini coefficient will be among the mode of the income distribution, i.e. among middle income groups as these transfers will have the largest impact on the rank of the people affected by the transfer and thus the weights attached to their incomes (see Atkinson, 1970; Blackorby and Donaldson, 1978). While there is some justification for this (if income comparisons with others are very important, clearly shifts in income which have a large impact on the ranking should be weighed heavily), most analysts see this as a rather undesirably property of the Gini-based measures (e.g. Atkinson, 1970). Second, the Atkinson measures are sub-group consistent and thus imply that any increase in the income of a subgroup (or a reduction in inequality of that subgroup) will, ceteris paribus, raise aggregate welfare. In contrast, an increase of income accruing to the richest could actually lower aggregate welfare in the Gini-based measures as the increase in mean income can be more than off-set by the increase in inequality.[20] Some see this as an argument in favor of the Gini-based measures (e.g. Sen, 1997, Dagum, 1990), others see subgroup consistency as a valuable property. For our purposes it will suffice to note that the Gini-based measures penalize inequality more if middle income groups are hurt the most, while the Atkinson measure will penalize more if the poorest are hurt the most by it. Which measure is ultimately a better indicator of welfare is left for the reader to decide.

We will use this measures in three different ways. First, we will simply see how much the incorporation of inequality reduces our impression of aggregate well-being. We will therefore present data on how much well-being is reduced in a country at a point in time by the amount of inequality that is present. This can be achieved by simply presenting the ratio of inequality-adjusted income to per capita income. Second, we will examine to what extent the incorporation of inequality changes the ranking of countries. Third, we will study to what extent the inclusion of inequality in the well-being measure will affect our impression of changes in well-being in selected countries. These three applications will be used for the cross-country analysis and the intertemporal analysis. For the analysis of global well-being, we only make use of the first and third application as we naturally cannot compare world well-being to well-being in another world.

## 4. The Data

For most of the analysis, we rely on three different data cross-country data sets. Income data come from the Penn World Table, mark 5.6 (PWT, see Summers and Heston, 1991), and the World Bank's World Development Indicators, (WDI, see World Bank, 1999). These two datasets provide us with annual information on income per capita for more than 160 countries for the period 1950-1997. Information about income distribution is not that exhaustive. The well-known Deininger and Squire dataset (1996), which provides information about Gini coefficients and quintiles shares for more than 100 countries, was the main source used. Despite its short-comings, it is essentially still the only comprehensive data source that can be used for the type of analysis we consider here. In this first draft, we rely on the unadjusted 'accept' series although we know that some problems have been associated with the database in general, and the 'accept' subset in

[20] See Dagum (1990) for examples. This difference only appears if inequality is much more extreme than the types of inequality existing in today's world.

particular (Atkinson and Brandolini, 1999).[21] In a later draft, we will compare results from various adjustments and different data selection strategies as proposed by Deininger and Squire (1996), Li at al (1998), Lundberg and Squire (1999) and Atkinson and Brandolini (1999). We have added observations from an updated version of this dataset (Deininger and Squire, 1998). Gini coefficients and quintile information for the years 1996-97 mainly come from the Word Income Inequality Database (WIID, see Wider, 1999), a more recent compilation of several data sources (including the Deininger-Squire data set, data from the Luxembourg Income Study (LIS), and other data sources). We only consider observations from countries where we have both the Gini coefficient and quintile shares to calculate all our well-being measures.

The analysis of the data takes place in different steps. For the years 1960, 1970, 1980, 1990 we have used GNP per capita from the WDI based on official exchange rates and compare that to GDP per capita, adjusted for purchasing power and expressed in international prices from the PWT.[22] For 1997 we used GNP per capita expressed in current international dollars taken from WDI, as the PWT estimates for those years are not yet available. All the well-being measures are then calculated based on the PPP adjusted per capita incomes.

Due to the fact that especially for early years data on income distribution are rare, we had to make some adjustments. In case there is no Gini coefficient or quintile share for the specific point in time, we used the nearest available data for our calculations. Although we did these adjustments our samples of countries for which we can calculate all measures are still quite limited. Table 1 shows the different years of available data on income distribution we have chosen for the years 1960-1990. The greatest concessions we had to make are for less developed countries like Pakistan and Chile in 1960, or for Indonesia and Singapore in 1970. But also for developed countries like Finland in 1960 and 1970, or Belgium and Italy in 1970 major amendments have been necessary. For 1997, we use the latest available income distribution estimate which in a few cases date as far back as 1990, but mostly stem from 1993 to 1996.[23]

In our sensitivity analyses, we replace the Deininger and Squire data with either consistent national series or estimates from two sets of estimates from the internationally more comparable Luxembourg Income Study (LIS) database which differ in the definition of income and reference unit.[24] This way we get a sense of the possible margins of error inherent in using the Deininger and Squire data, which is somewhat heterogeneous in the choice of reference unit and income definition.

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[21] They include primarily the choice of reference unit (individual versus households) and income concept (expenditure, gross or net income). For a discussion, see Atkinson and Brandolini (1999).

[22] In the next draft, we will adjust the GDP figures from the PWT to GNP figures. This is unlikely to change the results for most countries.

[23] In all cases, we use the exact year for the income estimate under the (implicit) assumption that changes in income distribution between adjacent years are typically smaller than changes in mean income. Given positive average real income growth present in almost all countries which would bias income comparisons from different years, this assumption appears reasonable.

[24] For Britain, we rely on the IFS series (Goodman and Webb, 1994) which is based on disposable income per adult equivalent before the consideration of housing costs, and for the US on the updates of the Deininger and Squire dataset which now report data based on individual disposable income (rather than household (in fact, family) gross income. The two LIS estimates we use are drawn from the WIID and from Gottschalk and Smeeding (1997). The former uses gross income per household while the latter uses disposable income per equivalent person and in addition truncates the estimates through bottom and top coding. Gottschalk and Smeeding (1999) present a third set of estimates based on the LIS which differ slightly from their earlier estimates. We will consider them in further sensitivity analyses.

For the intertemporal comparisons in a single country, we rely in some cases on the Deininger and Squire dataset provided we can ensure that the definition of income and reference unit did not change over time. For Britain, we rely on the consistent before housing cost IFS series; for the US, we use the CPS data on money income for families (to remain consistent with the analysis presented in Klasen, 1994).[25] For the transition countries, we rely on the data produced by Milanovic (1998) which include one observation per country prior to the onset of transition (1988 or 1989) and one from the middle of the transition process (1993-95).

For calculation of global well-being and changes thereof between 1970 and 1997, we used a subsample which consists of 33 countries that represent nearly 70 percent of the world population in 1970. Unfortunately, the fast growing African countries are not part of this sample and therefore the share of world population represented by our dataset is declining to 61 percent in 1997.[26] We calculated average income per quintile for each country, then sorted them in ascending order to generate global income quintiles, and then calculated average incomes of these world quintiles based on the population-weighted country quintiles contained in each world quintile.[27] We thus arrive at average income per "world quintile" which we then used to calculate the Atkinson measure for $\varepsilon=1$ and $\varepsilon=2$. Up until 1990, the income data are based on the PWT, thereafter they are based on WDI. To ensure that we reduce the error associated with the change in data set, we also report income data from the WDI for 1990 and use them to calculate changes in income between 1990 an 1997.[28]

## 5. International Analysis

Table 2 presents the analysis for 1960 based on the six measures used. The first two measures are per capita income, using exchange rates and PPP, respectively. The next two are the Sen and the Atkinson measure with $\varepsilon=1$, exhibiting a comparatively 'mild' well-being penalty for inequality. The last two are the Dagum and Atkinson $\varepsilon=2$ measures with a more heavy implied well-being penalty for inequality. The analysis is restricted to only 20 countries. Since they cover a wide spectrum of incomes, big changes in ranks can only happen when there are very drastic differences between the measures.

Well-being, as estimated by our measures, falls drastically when considering inequality. Using the Sen or Atkinson $\varepsilon=1$ measure, well-being falls by about 15-45% and by up to 70% (in Brazil and Mexico) in the Dagum and Atkinson ($\varepsilon=2$) measure. Existing inequality thus leads to fairly major reduction in well-being in all the countries considered.

As expected from the discussion of inequality measures above, there are some differences in the extent of 'penalty' for inequality, depending on the measure used. This is to be expected as the Gini-based measures give more emphasis to inequality in the middle

[25] In 1993, the CPS series changed the way it top-coded certain income categories which lead to a substantial increase in measured inequality (Atkinson and Brandolini, 1999). To ensure some consistency across this experienced change, the incomes of the top two quintiles (and the Gini coefficient) were assumed to have the same absolute increase between 1992 and 1993 as they experienced between 1991 and 1992. The data beyond 1993 then simply add the absolute changes to these corrected figures.

[26] In order to include populous China in our sample we made one more adjustment by using the income share per quintile in 1980 already for the year 1970.

[27] When a country quintile straddles the line between two world quintiles, we allocated the country quintile proportionately to ensure that the world quintiles contain equal population numbers.

[28] To deal with the fact that the WDI income estimates are in current dollars, we deflate them using the US GDP deflator.

income groups, while the Atkinson measure places more weight on inequality among the poorest groups. For example, Pakistan gets penalized less by the Atkinson ($\varepsilon$=2) measure than the Sen measure, while the reverse is the case for the Philippines. The reason is that in the Philippines the poorest do particularly badly and thus get a heavy penalty, while in Pakistan the poorest have a comparatively high income share compared to middle income groups, which in the Gini measure attracts the higher penalty.

In 1960, no assessment of inequality can dislodge the US from the highest rank in all measures, and nothing can prevent Pakistan from being at the bottom of the list for all indicators. Nevertheless, there are a range of interesting changes. First, there is a considerable difference between the ranks using exchange rate and PPP, suggesting the presence of over- and undervalued exchange rates. As expected, the discrepancy is larger among poorer countries, related to the undervaluation of the non-traded sectors. Second, there are a number of interesting rank reversals when inequality is progressively being considered. For example, Bangladesh and the Philippines trade places between the pure income and the broader well-being measures. In the two income measures the Philippines are 3 and 1 rank ahead; in the last two columns, Bangladesh is two and three ranks ahead.[29] A similar reversal occurs, somewhat surprisingly, between Britain and Sweden. Sweden is ahead in the pure income measures, while Britain is ahead in measures that consider distribution; in fact, it occupies the second highest spot in this list. This suggests that the very low inequality in Sweden was not already present in the 1960s, and the rise of Britain reminds us that Britain was among the more equal countries in Europe in 1960.[30]

Table 3 shows our rankings for 37 countries in 1970. The list now includes many more developing countries, and a few more industrialized ones as well. Again there are large differences between exchange rate based estimates of real incomes and PPP estimates, with the discrepancy being largest among poorer countries. Considering inequality continues to reduce well-being drastically. Once again, Brazil loses most: Well-being using the Dagum measure is 73% below the level it would be if its per capita income were equally distributed! The US remains on top in all measures except the exchange rate adjusted income per capita measure, arguably the least reliable indicator of well-being. At the bottom India and Indonesia vie for the worst spot. Some more dramatic reversals in rank occur. Panama falls from number 17 in the exchange rate list to number 4 in Atkinson ($\varepsilon$=2) measure. Conversely, Bangladesh rises from 15 ranks below to 4 ranks above Panama once inequality is considered. Unequal Brazil trades places with more equal Korea, and now Sweden gains when inequality is being considered, while Britain's fall in the income rank cannot be compensated by its still comparatively low inequality.

Table 4 examines 44 countries for 1980. We now have one more indicator, current PPP adjusted income per capita from the World Bank, which we place alongside our data from the Penn World Tables. The comparison suggests that the PPP adjustment is subject to a considerable margin of error. China, India, Pakistan, Bangladesh, Indonesia, and the Eastern European countries look a lot richer in the PPP adjustment from the Penn World Tables than in the adjustment done by the World Bank while the reverse appears to be the

[29] Brazil is another country that also falls considerably, once PPP and inequality is considered.

[30] Gottschalk and Smeeding (1999) also find report fairly high income inequality in Sweden in the 1960s. In the LIS, Sweden is found to be considerably more equal than Britain. Since the LIS does not go back that far, it is hard to tell whether the reported higher inequality in the 1960s is due to measurement error or true effects. See also Atkinson and Brandolini (1999).

case for most Latin American countries.[31] Several rank changes happen as a result of these differences in the PPP adjustments.

The inequality-adjusted measures continue to be much lower than the income measure suggesting that inequality continues to have a big impact on well-being. Brazil and Chile continue to suffer from the largest reductions in well-being which are also now larger than previously, suggesting not only high but worsening inequality. Due to rising inequality and catch-up growth, the US loses its top spot to Canada in the Atkinson ($\varepsilon$=2) measure.[32] Britain still rises in the ranks when inequality is considered but less so than previously. Unequal Brazil and more equal Costa Rica now trade places; Brazil is 4 ranks ahead in PWT PPP income, and Costa Rice is 2 two 4 places ahead in the inequality-adjusted measures. Bangladesh, on the other hand, no longer improves its position as much as before.[33]

Table 5 examines the per capita income and well-being in 38 countries in 1990.[34] The differences between the PWT and the World Bank PPP adjustments remain considerable, but consistent in the sense that the differences in assessment in 1990 are largely the same as for 1980.[35] Well-being continues to be much lower than before; the reduction appears to be as large as in previous decades suggesting no general worsening (or improvement) in income distribution.

Regarding rank reversals, Brazil, the world's most unequal country, gets surpassed in the Atkinson measure ($\varepsilon$ =2) by Indonesia, a country twelve ranks below in the income ranking with less than half its PPP per capita income. That is to say, Brazil could generate the same level of well-being with only half the income, if that income was as evenly distributed as it is Indonesia.[36] High inequality in Panama now assures that this country lands in the bottom position in the Atkinson ($\varepsilon$=2) measure.

At the other end of the spectrum, the US only retains the top spot in the PPP-adjusted income measures. Once inequality is considered, it is surpassed by Canada and, in the Atkinson measure, by Sweden, Finland, and Belgium. This fall in ranks of the US is mostly due to rising inequality there, compared to the other countries (rather than differences in average income growth). Clearly, people in the US are paying a price in terms of well-being due to the higher inequality there and other countries do not suffer from the same problem (see Klasen, 1994 and also below). Also in Britain, higher inequality ensures that Britain rises by very little if inequality is considered (see below).

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[31] Please note that the World Bank data refer to current international dollars in 1980, while the PWT to 1985 international dollars. Thus we would expect the World Bank estimates to be some 20-25% lower than the PWT estimates. Please also note that the PWT estimates are based on GDP, while the World Bank estimates refer to GNP. This is unlikely to cause the substantial difference between the estimates, but in further work we will transform the PWT data to GNP figures.

[32] The US loses particularly in the Atkinson measure as the poorest are particularly badly off in the US. See also Gottschalk and Smeeding (1999).

[33] This is due to somewhat higher observed inequality in 1980, which falls again in the late 1980s and early 1990s. To what extent this data point is an aberration, is difficult to tell.

[34] The number of countries with Gini coefficients and quintile data drops and thus reduces the sample included.

[35] We would now expect the current World Bank estimates to be some 15-20% higher than the constant 1985 estimates.

[36] A small part of this difference may be due to the fact that the Indonesia data are based on expecnditures, while the Brazilian data are based on income. But since expenditure data in Brazil yield very similar inequality levels, this difference is unlikely to contribute much to these rank reversals.

Table 6 shows the well-being measures for 77 countries in 1997. Now the only PPP measure available is from the World Bank and the inequality adjustments are now based on that measure so that changes in ranks between previous years and 1997 can also be due to the change in database (from PWT to WDI), particularly in those countries where the PPP adjustments differed greatly between the two sources. At the bottom end, we now find mostly African countries who have low incomes and sizeable income inequality. The rank reversal between Brazil and Indonesia remains, except that Indonesia's higher income assures that the ranks are already reversed in the Dagum measure and Indonesia surpasses Brazil by several ranks in the Atkinson measure. At the top end, Luxembourg now leads the pack with unusually high incomes and comparatively small income inequality. Rising inequality is ensuring that the US is falling further behind.

It is hard to summarize the many particular findings from this discussion. But a few points are worth noting. First, real income comparisons based on official exchange rates give a very misleading impression of well-being. At the same time, there are considerable discrepancies between the two sets of available PPP estimates. Second, consideration of inequality has a large impact on well-being. Well-being falls by 15-70% once we consider inequality. Third, large differences in inequality between countries lead to very large changes in rank. Brazil's drop in rank is the most dramatic illustration of this. Fourth, changes in inequality have an important impact in some countries, most notably the US and Britain. This is nicely illustrated in Figure 1 which examines standardized ranks (rank divided by total number in sample in each year) for the US and Canada between 1970 and 1997. Rising inequality in the US ensures that they slowly reduce their relative position once inequality is considered. Fifth, the combination of growth and levels and changes in inequality together can lead to very large differences in changes in well-being. The comparison between Indonesia and Brazil is instructive here (see Figure 2). Indonesia combines comparatively low inequality with high growth, Brazil has more moderate growth and high inequality. Despite being poorer than Brazil, Indonesia is already surpassing Brazil in some well-being measures in 1990 and adds to this lead in 1997.

To assess to what extent these findings are due to peculiarities of the Deininger and Squire dataset, we examine to what extent the rankings are affected by replacing the data with information from other sources. We present some examples of such a sensitivity analysis.

First, we replaced the income distribution data for Britain by Gini coefficients produced by the IFS. The results are presented in Table 7. It can be seen that the ranking of the UK does not change drastically although the Gini coefficients for 1990 and 1997 are significantly different. Some of the differences between the Gini coefficients are clearly due to changes in definitions. The coefficients for the years 1960-1990 are based on net income and person equivalent[37], but for 1997 it is computed from gross income on household level. Despite this obvious inconsistency, the impact on the rank is surprisingly modest.

Secondly, we used data for the US from the Deininger and Squire 1998 dataset, which in contrast to the previous version of this dataset are no longer based on family income but on individual income (calculated based on households rather than families and on net rather than gross income)**.** Table 8 reports that the higher inequality in that measure leads to drops in the ranking especially by the measures which penalizes higher dispersion of income stronger. This does not change, but only reinforces the finding of the sharp decline of the US in the ranking, once inequality is considered.

[37] The effective number of members in a household is assumed to be the square root of the actual number (Deininger and Squire, 1996).

In a third sensitivity test we used data on income distribution from the Luxembourg Income Study drawn from the WIID database for various countries and replaced them simultaneously. Those are based on household gross income. Results are presented in Table 9. For 1970 we examined Canada, Britain, and the US and due to the higher Gini coefficients in the LIS, all three countries are dropping in rank when using the Dagum measure. In 1980 the LIS data report a much higher Gini coefficient for The Netherlands as the DS 1996 and therefore it drops by five and eight places in the ranking according to the Sen and Dagum measure, respectively. On the other hand, Australia gains by using this dataset and improves its position by four places at both measures. In 1990 the picture does not change that drastically. Britain, The Netherlands, Norway and Sweden are loosing ranks mainly by applying the Dagum measure. Italy is the only country which now gains by using the LIS data in this period of time. With the exception of the Netherlands, the change in rankings are fairly minor. Nevertheless, for well-being comparisons among OECD countries, these small changes do matter.

Finally, we used adjusted data on inequality from Gottschalk and Smeeding, 1997 for our sensitivity analysis. They calculated Gini coefficients which are based on equivalent disposable income and 'are based on incomes which are bottom coded at one percent of disposable income and top coded at ten times the median income' (Gottschalk and Smeeding, 1997:661), to correct consistently for measurement error.[38] The Gini coefficients tend to be smaller, suggesting that the inequality reducing effect of switching from gross to net and the truncation at top and bottom more than outweighs the inequality enhancing effect of switching from households to individuals. Table 10 shows, that France improves its position in 1980 due to lower inequality. In 1990, Australia, Norway, Belgium, and Denmark are doing better using the adjusted Gini indexes compared to Deininger and Squire (1996). Countries like the US and Finland drop ranks although the reported Gini coefficients are also lower. This happens because other countries gain even more by applying those data on income distribution. Canada is another example of not being able to improve its position although lower inequality but it does not drop in the ranking.

These first sensitivity analyses suggest that few of the basic results on the large absolute impact of inequality and the change in ranks as a result of it reported are meaningfully affected by switching data sets. However, quite a number of individual rankings are affected so that analyses that focus on these smaller differences, particularly among OECD countries, should use more consistent data sources rather than rely on the rather heterogeneous Deininger and Squire information.

## 6. Comparisons Across Time

The discussion in section 5 has already suggested that in some countries inequality has changed considerably. At the same time, it appears that there is also a great deal of stability in inequality measures which has also been found by Deininger and Squire (1997).[39] Most countries either seem to improve or worsen in rank at a point in time when inequality is considered, with this relationship not changing much over time. In this section we examine this question a bit more closely.

A first impression can be gleaned from Table 11 which shows average Gini coefficients from the 1960s to the 1990s. What emerges is a great deal of stability. The average Gini does not appear to have changed a lot (see also Deininger and Squire, 1997; Lundberg and

[38] See also Gottschalk and Smeeding (1999) for further discussion of these issues.
[39] See also Lundberg and Squire (1999)

Squire, 1999). This average could, however, mask some variation. Therefore we specify three fixed and random effects regressions to examine this question closer. In the first, we want to see whether, controlling for country-specific fixed effects, there are temporal trends in inequality. Table 12 shows the results from the fixed and random effects regression.[40] While it supports the general impression of great stability in the Gini coefficient, it seems to suggest some slight reductions in the average Gini from 1960 until 1990, after which it appears to have worsened again. The results are significant, but not very large in magnitude.[41]

The third fixed effects regression is testing for an intertemporal Kuznets Curve, i.e. the suggestion that as countries go through the process of development, inequality first worsens and then improves again. The results are quite clear here. There is not even the smallest hint for such an inverse U relationship that would hold systematically across all countries (see also Deininger and Squire, 1997, Lundberg and Squire, 1999). Thus, in average, there do not seem to be systematic trends in income distribution that relate either to temporal trends or to trends in income. It does not appear that inequality within countries is rising or falling systematically. For our assessment of well-being, this is a significant finding since it basically tells us that assessments of changes in well-being will not change very much for most countries if we switch from an income growth rate to a measure that measures changes in the combination of income and its distribution. Figure 3 plots two typical examples. While Brazil and Indonesia differ greatly in their income distribution, the income distribution did not change a lot over the past 40 years so that there are comparatively small differences between an income growth rate and the growth rate of our distribution-adjusted income measures. At the same time, this general stability masks some apparent rises and declines in inequality in those countries. For example, in Brazil inequality appears to have become notably more unequal between 1961 and 1980 and 1988 and 1995, while it became more equal in the period in-between. Thus one should not interpret longer-term stability as the absence of any developments in sub-periods (see also Atkinson and Brandolini, 1999). China and Finland are two other examples where changes in inequality differed in different time periods. Finland is particularly notable for the fact that inequality appears to have declined considerably in the 1980s leading to higher changes in well-being once inequality is considered.

It appears that the processes that led to increases in inequality in some rich countries (notably the US and Britain) are not global processes or even processes that affect all industrialized countries the same (see also Gottschalk and Smeeding, 1999).[42] Despite some rhetoric to the contrary, all rich countries do not appear to be condemned by global forces or other processes to face ever-rising inequality. Although a careful investigation of this issue goes beyond the scope of this paper, the differences in experience suggest that the role of economic policy in generating and combating income inequality is quite considerable (see also Atkinson, 1997; Aghion and Williamson, 1998).

Despite this general rule, there are some notable exceptions and it is important to emphasize that in some countries assessment of income growth seriously bias our view of

[40] The Hausman test suggests that random effects would be preferable to use, although the results do not differ much.

[41] They could be due to composition effects so that further analysis is warranted before firm conclusions are reached.

[42] Based on the LIS, Gottschalk and Smeeding (1999) find that in the majority of OECD countries, there was some increase in inequality in the 1980s. The timing and the extent differed greatly, however, and it was far from being a universal phenomenon.

changes in well-being. In particular, we will study Britain, the US, and the transition countries of Eastern Europe during the initial transition phase. The impact of inequality on changes in well-being in the US was already studied in Klasen (1994). Here the analysis is extended to 1998 and some other measures are considered in addition. Figure 4 shows the basic results. During the 1950s and the 1960s, high annual growth was accompanied by falling inequality which ensures that increases in well-being were considerably above the income growth rate. In contrast, in the 1970s, 1980s, and 1990s, low to moderate income growth was accompanied by sharply rising inequality so that well-being grew by negligible amounts. In fact, it shrank in the 1980s, depending on which measure we used.

Since economic growth has picked up recently and unemployment is at a 30 years low, one may wonder how well-being is changing in the so-called 'new economy.' Figure 5 gives a first impression. While income growth since 1993 has been only slightly below the high growth rates of the 1960s, inequality continues to worsen (at a slower pace) in the 1990s. This time, it is more due to greater income increases among the rich, rather than deteriorations among the poor which was the case in the 1980s. This rising inequality means that well-being in the 'New Economy' is growing considerably more slowly than in the much-maligned 1960s where high growth was accompanied by falling inequality.

The story for Britain looks much the same (Figure 3). Based on the inequality series produced by the Institute for Fiscal Studies, in the 1960s and the 1970s, moderate income growth was accompanied by falling inequality thus leading to sharper increases in well-being. In the 1980s, moderate income growth translated into stagnation of well-being once the sharply rising inequality is accounted for (see also Atkinson, 1997).

Finally, the transition countries demonstrate the impact of inequality on changes in well-being. Based on the data generated by Milanovic (1998), the transition country show shocking declines in well-being according to our measures. Per capita income losses in the first few years (from 1987-89 to 1993-95) amount to between 10% in the Czech Republic and Poland to some 55% in Ukraine. Milanovic demonstrates that these income losses for most countries are higher and more persistent than the Great Depression in the Western capitalist world. To make matters far worse, income inequality increased sharply during the transition. In few years, most Eastern European countries switched from having the lowest inequality in the world to having average to high inequality levels (see Milanovic, 1998). Figure 6 shows the dramatic impact of rising inequality on well-being. For example, the already severe income losses in Russia of some 25% translate, combined with the rising inequality, to well-being losses of 40-60%, depending on the measure chosen. Similarly dramatic differences between income losses and well-being losses exist in the Ukraine, Bulgaria, Czech Republic, Estonia, and Kyrgyz Republic, while somewhat smaller differences exist in most other countries. It is notable, however, that inequality did not rise in Slovakia, and rose only moderately in Poland, the country with the smallest income losses and arguably the fastest transition.

Thus the economic misery that has accompanied the transition appears much deeper once the rising inequality is factored in. In seven countries, well-being has fallen by over 40%. It is small wonder then that many Eastern European countries suffer from a great deal of economic and social instability, and that satisfaction rates are by far the lowest observed anywhere in the world (Inglehardt, 1997).[43]

[43] The World Values Survey has collected data on self-reported satisfaction. In transition countries, the share of the population reporting to be very happy is by far the lowest of all countries studied and never exceeds

## 7. Global Well-Being and Inequality

As is well-known, global inequality is more of a result of inequality between nations than inequality within nations (Anand, 1993; Berry et al. 1991). The richest 20% of the world consume some 70-80% of world income (depending on the calculation and the included countries), leaving some 2-3% to the poorest 20%, which is far larger than the discrepancy between the rich and poor in any one country. As a result, we would expect that consideration of this inequality between nations should have a considerable impact on our measures of well-being. Figure 7, based on 'our world' which captures some 70% of the population in 1970 (only 61% in 1997) and leaves out many of the poorest countries, shows that it does indeed. Using the Atkinson measures, we find that world well-being is less than half if we use $\varepsilon=1$ and only about a quarter is we use $\varepsilon=2$. This is to say that 'our world' would be as well off as it is currently if it only had half or a quarter its income and distributed that evenly. Including the excluded poor countries would lead to even more dramatic reductions in well-being. Global inequality is not just a political, economic, and social problem, it is a welfare problem as it reduces aggregate global well-being considerably.

Figure 7 and Figure 8 also show that global inequality in our restricted world does not seem to have increased a great deal over the last 30 years. While it increased between 1970 and 1980, it appears to have decreased since. This is particularly due to the sharply rising income shares of the third and fourth quintiles where many of Asia's economies are situated (see Figure 8). Moreover, the composition of the quintiles have changed quite a bit. The richer quintiles from China have made it all the way into the third quintile of the world income distribution, while some of the richest quintiles in East Asia are now among the top 20% of the world income distribution. In contrast to some findings from other studies (e.g. UNDP, 1999), there has not been a uniform rise in global inequality, nor has there been no mobility of countries up and down the world income distribution. Inclusion of the poorest countries would, however, somewhat temper this assessment as they are likely to have contributed to increasing global inequality and reducing mobility.[44]

Clearly, global inequality is associated with major reductions in well-being. In fact, the reductions are larger than similar reductions within countries since inter-country inequality is so much larger than intra-country inequality. At the same time, high growth among the middle income groups and considerably mobility suggest that we are not necessarily facing a world of rising and ever more rigid global distribution.

## 8. Conclusion

In this paper, we have covered a lot of ground so that it is hard to summarize all of the significant findings. Perhaps the most important findings at this stage are the following two. First, the inclusion of inequality in a measure of well-being is well justified theoretically and has a large impact empirically. It affects our assessment of absolute well-

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10% (compared to, for example, over 40% of the population in the Netherlands or even in Nigeria reporting to be very happy). For details, see Inglehardt (1997).

[44] It is also apparent that global inequality is affected a great deal by the choice of PPP adjustment. The World Bank, which assumes that incomes in some of the poorer countries are much lower than the PWT, finds global inequality to be much higher. The trend of declining inequality in the 1990s is unaffected by this difference, however.

being in countries and, even more so, the world as a whole, the ranking of countries, and our assessment of change in well-being in some countries. Thus it is well worth exploring the linkages between growth, inequality, and well-being further. Second, much more work needs to be done to yield arrive at firm conclusions in place of the tentative findings of this paper. In particular, more work needs to be done to test the robustness of the findings to changes in the as yet shaky and often inconsistent data on inequality. Moreover, more effort should go into generating better and more consistent series on inequality. Some important progress has been made, but there is a long road ahead.

## Table 1: The Matching of Income and Inequality Data, 1960-1990

| | 1960 | | 1970 | | 1980 | | 1990 | |
|---|---|---|---|---|---|---|---|---|
| **Code** | **Gini** | **Quintiles** | **Gini** | **Quintiles** | **Gini** | **Quintiles** | **Gini** | **Quintiles** |
| TUN | - | - | - | - | - | - | 1990 (40.2) | 1990 |
| AUS | - | - | 1969 (32) | 1969 | 1981 (40) | 1981 | 1990 (41.7) | 1990 |
| NZL | - | - | 1973 (30.1) | 1973 | 1980 (34.8) | 1980 | 1990 (40.5) | 1990 |
| BEL | - | - | 1979 (28.3) | 1979 | 1985 (26.2) | 1985 | 1992 (26.9) | 1992 |
| BGR | - | - | - | - | 1980 (25) | 1980 | 1990 (24.5) | 1990 |
| DNK | - | - | 1976 (31) | 1976 | 1981 (31) | 1981 | 1992 (33.2) | 1992 |
| ESP | 1965 (32) | 1965 | 1973 (37.1) | 1973 | 1980 (26.8) | 1980 | 1990 (32.5) | 1990 |
| FIN | 1966 (31.8) | 1966 | 1977 (30.5) | 1977 | 1980 (30.9) | 1980 | 1991 (26.1) | 1991 |
| FRA | - | - | - | - | 1979 (34.9) | 1979 | 1989 (32.7) | 1989 |
| GBR | 1961 (25.3) | 1961 | 1970 (25.1) | 1970 | 1980 (24.9) | 1980 | 1990 (23.3) | 1990 |
| HUN | - | - | 1972 (22.8) | 1972 | 1982 (21) | 1982 | 1991 (32.2) | 1991 |
| ITA | - | - | 1977 (36.3) | 1977 | 1980 (34.3) | 1980 | 1991 (32.2) | 1991 |
| NLD | - | - | 1975 (28.6) | 1975 | 1981 (26.7) | 1981 | 1991 (29.4) | 1991 |
| NOR | 1962 (37.5) | 1962 | 1973 (37.5) | 1973 | 1984 (30.6) | 1984 | 1991 (33.3) | 1991 |
| POL | - | - | - | - | 1980 (24.9) | 1980 | 1990 (26.2) | 1990 |
| PRT | - | - | 1973 (40.6) | 1973 | 1980 (36.8) | 1980 | 1990 (36.8) | 1990 |
| SWE | 1967 (33.4) | 1967 | 1975 (27.3) | 1975 | 1980 (32.4) | 1980 | 1990 (32.5) | 1990 |
| TUR | - | - | 1973 (51) | 1973 | 1987 (44.1) | 1987 | - | - |
| BRA | 1960 (53) | 1960 | 1970 (57.6) | 1970 | 1980 (59.4) | 1980 | 1995 (60) | 1995 |
| CHL | 1968 (45.6) | 1968 | 1971 (46) | 1971 | 1989 (57.9) | 1989 | 1994 (56.5) | 1994 |
| COL | - | - | 1970 (52) | 1970 | 1988 (51.2) | 1988 | 1991 (51.3) | 1991 |
| PER | - | - | - | - | 1981 (49.3) | 1981 | 1994 (44.9) | 1994 |
| VEN | - | - | 1971 (47.7) | 1971 | 1981 (42.8) | 1981 | 1990 (53.8) | 1990 |
| BGD | 1963 (37.3) | 1963 | 1973 (36) | 1973 | 1981 (39) | 1981 | 1992 (28.3) | 1992 |
| CHN | - | - | - | - | 1980 (32) | 1980 | 1990 (34.6) | 1990 |
| HKG | - | - | 1971 (40.9) | 1971 | 1980 (37.3) | 1980 | 1991 (45) | 1991 |
| IDN | - | - | 1976 (34.6) | 1976 | 1980 (35.6) | 1980 | 1990 (33.1) | 1990 |
| IND | - | - | 1970 (30.4) | 1970 | 1983 (31.5) | 1983 | 1990 (29.7) | 1990 |
| JPN | 1962 (37.2) | 1962 | 1970 (36.9) | 1970 | 1980 (34.3) | 1980 | - | - |
| KOR | 1965 (34.3) | 1965 | 1970 (33.3) | 1970 | 1980 (38.6) | 1980 | - | - |
| LKA | 1963 (47) | 1963 | 1970 (37.7) | 1970 | 1980 (42) | 1980 | 1990 (30.1) | 1990 |
| MYS | - | - | 1970 (50) | 1970 | 1984 (48) | 1984 | 1992 (47.7) | 1992 |
| PAK | 1969 (30.6) | 1969 | 1970 (29.9) | 1970 | 1979 (32.2) | 1979 | 1991 (31.2) | 1991 |
| PHL | 1961 (49.7) | 1961 | 1971 (49.4) | 1971 | 1985 (46.1) | 1985 | 1991 (45) | 1991 |
| SGP | - | - | 1978 (37) | 1978 | 1980 (40.7) | 1980 | - | - |
| THA | 1962 (41.3) | 1962 | 1975 (41.7) | 1975 | 1981 (43.1) | 1981 | 1990 (48.8) | 1990 |
| BHS | - | - | - | - | 1986 (48.1) | 1986 | - | - |
| CAN | 1961 (30.8) | 1961 | 1971 (32.2) | 1971 | 1981 (31.8) | 1981 | 1990 (27.6) | 1990 |
| CRI | 1961 (50) | 1961 | 1971 (44.4) | 1971 | 1981 (47.5) | 1981 | 1989 (46) | 1989 |
| DOM | - | - | - | - | 1984 (43) | 1984 | - | - |
| JAM | 1958 (54.3) | 1958 | 1975 (44.5) | 1975 | 1988 (43.2) | 1988 | 1990 (41.8) | 1990 |
| MEX | 1963 (55.5) | 1963 | 1975 (57.9) | 1975 | 1984 (50.6) | 1984 | 1992 (50.3) | 1992 |
| PAN | - | - | 1970 (57) | 1970 | 1980 (47.5) | 1980 | 1991 (56.8) | 1991 |
| TTO | 1958 (46) | 1958 | 1971 (51) | 1971 | 1981 (41.7) | 1981 | - | - |
| USA | 1960 (34.9) | 1960 | 1970 (34.1) | 1970 | 1980 (35.2) | 1980 | 1990 (37.8) | 1990 |
| **Total** | **20** | | **37** | | **44** | | **38** | |

Gini coefficients are in parentheses.

For country codes see Appendix I.

## Table 2: Welfare measures 1960

| Rank | GNP/cap[a] | GDP/cap[b] | Atkinson (ε=1)[c] | Sen[d] | Dagum[e] | Atkinson (ε=2)[f] |
|---|---|---|---|---|---|---|
| 1 | 180.34 PAK | 638 PAK | 87.8% PAK | 69.4% PAK | 53.2% PAK | 78.3% PAK |
| 2 | 214.16 BGD | 904 KOR | 77.4% THA | 58.7% THA | 33.6% PHL | 48.4% PHL |
| 3 | 278.14 LKA | 943 THA | 82.0% KOR | 50.3% PHL | 41.6% THA | 66.2% KOR |
| 4 | 450.83 THA | 952 BGD | 67.2% PHL | 65.7% KOR | 45.7% BGD | 64.0% THA |
| 5 | 701.16 PHL | 1133 PHL | 81.5% BGD | 62.7% BGD | 48.9% KOR | 67.9% BGD |
| 6 | 1225.6 KOR | 1259 LKA | 71.5% LKA | 53.0% LKA | 36.1% LKA | 52.7% LKA |
| 7 | 1268 JAM | 1773 JAM | 61.2% BRA | 45.7% JAM | 29.6% JAM | 40.4% BRA |
| 8 | 1426.7 TTO | 1784 BRA | 73.9% JAM | 47.0% BRA | 30.7% BRA | 54.2% JAM |
| 9 | 1474 CRI | 2096 CRI | 69.9% CRI | 50.0% CRI | 33.3% CRI | 39.2% MEX |
| 10 | 1549.6 MEX | 2836 MEX | 57.9% MEX | 44.5% MEX | 28.6% MEX | 54.1% CRI |
| 11 | 1630.3 BRA | 2885 CHL | 71.8% CHL | 54.4% CHL | 37.3% CHL | 52.9% CHL |
| 12 | 1971.4 CHL | 2954 JPN | 79.9% JPN | 62.8% JPN | 45.8% JPN | 63.9% JPN |
| 13 | 4423.3 ESP | 3123 ESP | 88.2% ESP | 68.0% ESP | 51.5% ESP | 76.1% ESP |
| 14 | 8207 JPN | 5291 FIN | 69.9% TTO | 54.0% TTO | 37.0% TTO | 46.8% TTO |
| 15 | 9561.3 GBR | 5610 NOR | 86.1% FIN | 62.5% NOR | 45.4% NOR | 64.0% NOR |
| 16 | 9574.4 FIN | 5627 TTO | 82.5% NOR | 68.2% FIN | 51.7% FIN | 74.5% FIN |
| 17 | 11144 NOR | 6823 GBR | 80.0% SWE | 69.2% CAN | 49.9% SWE | 58.1% SWE |
| 18 | 11546 CAN | 7258 CAN | 89.4% GBR | 66.6% SWE | 52.9% CAN | 73.9% CAN |
| 19 | 12976 SWE | 7592 SWE | 87.0% CAN | 74.7% GBR | 59.6% GBR | 80.4% GBR |
| 20 | 14210 USA | 9895 USA | 79.7% USA | 65.1% USA | 48.3% USA | 60.6% USA |

a): Data taken from World Development Indicators 1999, measuring GNP/cap in constant 1995 US-Dollars.
b): Data taken from Penn World Table 5.6, measuring real GDP/cap in constant dollars (chain index) using international prices 1985.
c): Atkinson measure (ε=1) computed on the basis of and expressed as a share of GDP/cap (column 2).
d): Sen measure computed on the basis of and expressed as a share of GDP/cap (column 2).
e): Dagum measure computed on the basis of and expressed as a share of GDP/cap (column 2).
f): Atkinson measure (ε=2) computed on the basis of and expressed as a share of GDP/cap (column 2).

## Table 3: Welfare measures 1970

| Rank | GNP/cap[a] | GDP/cap[b] | Atkinson (ε=1)[c] | Sen[d] | Dagum[e] | Atkinson (ε=2)[f] |
|---|---|---|---|---|---|---|
| 1 | 198.75 IND | 715 IDN | 84.5% IDN | 65.4% IDN | 43.3% IND | 72.9% IDN |
| 2 | 236.84 BGD | 802 IND | 87.8% IND | 69.6% IND | 64.8% IDN | 77.9% IND |
| 3 | 274.45 PAK | 1029 PAK | 88.2% PAK | 50.6% PHL | 33.9% PHL | 46.1% PHL |
| 4 | 297.8 IDN | 1243 LKA | 67.2% PHL | 70.1% PAK | 54.0% PAK | 27.7% PAN |
| 5 | 340.59 LKA | 1280 BGD | 81.3% LKA | 62.3% LKA | 45.2% LKA | 78.9% PAK |
| 6 | 762.46 THA | 1403 PHL | 82.1% BGD | 64.0% BGD | 47.1% BGD | 67.6% LKA |
| 7 | 829.34 PHL | 1526 THA | 75.3% THA | 58.3% THA | 41.1% THA | 57.3% THA |
| 8 | 1162.1 COL | 1680 KOR | 52.9% PAN | 48.0% COL | 26.9% BRA | 68.6% BGD |
| 9 | 1366 MYS | 2140 COL | 84.4% KOR | 42.4% BRA | 31.6% COL | 38.9% BRA |
| 10 | 1662.7 TUR | 2154 MYS | 66.7% MYS | 50.0% MYS | 27.4% PAN | 44.7% TUR |
| 11 | 1736.6 JAM | 2202 TUR | 59.2% BRA | 49.0% TUR | 32.5% TUR | 47.2% MYS |
| 12 | 1878.5 CRI | 2434 BRA | 65.5% TUR | 43.0% PAN | 33.3% MYS | 55.2% COL |
| 13 | 1975.1 TTO | 2584 PAN | 68.9% COL | 66.7% KOR | 50.0% KOR | 71.9% KOR |
| 14 | 2015 KOR | 2645 JAM | 71.3% JAM | 55.5% JAM | 38.4% JAM | 33.3% MEX |
| 15 | 2289.3 MEX | 2904 CRI | 53.9% MEX | 55.6% CRI | 26.7% MEX | 51.0% JAM |
| 16 | 2382.7 CHL | 3017 SGP | 74.4% CRI | 42.1% MEX | 38.5% CRI | 57.7% CRI |
| 17 | 2386.7 PAN | 3306 PRT | 83.4% SGP | 63.0% SGP | 37.0% CHL | 51.4% CHL |
| 18 | 2548.3 BRA | 3358 HUN | 70.7% CHL | 54.0% CHL | 46.0% SGP | 28.5% TTO |
| 19 | 2649.7 HUN | 3605 CHL | 78.3% PRT | 59.4% PRT | 42.3% PRT | 62.2% PRT |
| 20 | 4161 VEN | 3987 MEX | 92.1% HUN | 77.2% HUN | 41.9% HKG | 70.3% SGP |
| 21 | 4922.6 PRT | 4502 HKG | 75.4% HKG | 59.1% HKG | 62.9% HUN | 59.7% HKG |
| 22 | 5946.7 HKG | 5861 ESP | 55.8% TTO | 48.9% TTO | 32.5% TTO | 84.7% HUN |
| 23 | 6486.6 SGP | 6795 TTO | 82.4% ESP | 62.9% ESP | 45.9% ESP | 47.9% VEN |
| 24 | 8097.1 ESP | 7307 JPN | 69.5% VEN | 52.3% VEN | 35.5% VEN | 67.0% ESP |
| 25 | 10816 ITA | 7568 ITA | 78.1% JPN | 63.1% JPN | 46.1% JPN | 61.5% JPN |
| 26 | 11913 GBR | 7753 VEN | 77.2% NOR | 63.7% ITA | 46.7% ITA | 58.7% NOR |
| 27 | 12297 CAN | 8034 NOR | 83.7% ITA | 62.5% NOR | 45.5% NOR | 70.5% ITA |
| 28 | 12400 NZL | 8108 FIN | 85.3% FIN | 69.5% FIN | 53.3% FIN | 71.7% FIN |
| 29 | 13123 AUS | 8331 BEL | 88.3% BEL | 71.7% BEL | 55.9% BEL | 77.3% BEL |
| 30 | 14608 FIN | 8537 GBR | 90.0% GBR | 74.9% GBR | 53.8% NZL | 72.8% NZL |
| 31 | 15534 NOR | 9199 NLD | 86.2% NZL | 71.4% NLD | 52.7% DNK | 72.2% DNK |
| 32 | 16284 BEL | 9392 NZL | 88.5% NLD | 69.9% NZL | 55.5% NLD | 81.8% GBR |
| 33 | 16626 NLD | 9670 DNK | 85.4% DNK | 69.0% DNK | 59.9% GBR | 70.6% CAN |
| 34 | 18253 USA | 10124 CAN | 84.7% CAN | 67.8% CAN | 51.2% CAN | 78.4% NLD |
| 35 | 18962 SWE | 10756 AUS | 85.5% AUS | 68.0% AUS | 51.5% AUS | 72.6% AUS |
| 36 | 19970 JPN | 10766 SWE | 88.3% SWE | 72.7% SWE | 57.1% SWE | 76.3% SWE |
| 37 | 21755 DNK | 12963 USA | 81.5% USA | 65.9% USA | 49.2% USA | 64.6% USA |

a): Data taken from World Development Indicators 1999, measuring GNP/cap in constant 1995 US-Dollars.
b): Data taken from Penn World Table 5.6, measuring real GDP/cap in constant dollars (chain index) using international prices 1985.
c): Atkinson measure (ε=1) computed on the basis of and expressed as a share of GDP/cap (column 2).
d): Sen measure computed on the basis of and expressed as a share of GDP/cap (column 2).
e): Dagum measure computed on the basis of and expressed as a share of GDP/cap (column 2).
f): Atkinson measure (ε=2) computed on the basis of and expressed as a share of GDP/cap (column 2).

## Table 4: Welfare measures 1980

| Rank | GNP/cap[a] | GDP/cap[b] | GNP/cap[c] | Atkinson (ε=1)[d] | Sen[e] | Dagum[f] | Atkinson (ε=2)[g] |
|---|---|---|---|---|---|---|---|
| 1 | 169.67 CHN | 882 IND | 390 BGD | 86.8% IND | 68.5% IND | 52.1% IND | 76.6% IND |
| 2 | 215.11 IND | 972 CHN | 450 CHN | 87.3% CHN | 68.0% CHN | 43.9% BGD | 66.3% BGD |
| 3 | 219.1 BGD | 1085 BGD | 520 IND | 80.6% BGD | 61.0% BGD | 51.5% CHN | 75.8% CHN |
| 4 | 313.84 PAK | 1110 PAK | 560 PAK | 86.2% PAK | 67.6% PAK | 51.0% PAK | 75.7% PAK |
| 5 | 449.88 LKA | 1281 IDN | 820 LKA | 84.0% IDN | 64.4% IDN | 47.5% IDN | 71.4% IDN |
| 6 | 480.55 IDN | 1635 LKA | 850 IDN | 73.1% PHL | 58.0% LKA | 40.8% LKA | 56.1% PHL |
| 7 | 1114.8 THA | 1879 PHL | 1470 THA | 89.1% LKA | 53.9% PHL | 36.9% PHL | 52.4% THA |
| 8 | 1164.2 PHL | 2178 THA | 1680 JAM | 71.8% THA | 56.9% THA | 39.8% THA | 78.6% LKA |
| 9 | 1280.2 DOM | 2343 DOM | 2070 DOM | 75.7% DOM | 56.7% DOM | 39.6% DOM | 46.0% COL |
| 10 | 1307.9 BGR | 2362 JAM | 2090 PHL | 75.8% JAM | 56.8% JAM | 39.7% JAM | 58.6% DOM |
| 11 | 1347.2 JAM | 2874 TUR | 2260 MYS | 67.8% PER | 48.8% COL | 32.3% COL | 59.0% JAM |
| 12 | 1606.1 COL | 2875 PER | 2270 BGR | 66.4% COL | 50.7% PER | 33.9% PER | 34.1% BRA |
| 13 | 1973 TUR | 2946 COL | 2340 TUR | 74.8% TUR | 55.9% TUR | 26.7% CHL | 52.4% PER |
| 14 | 2283 MYS | 3093 KOR | 2380 KOR | 69.7% PAN | 42.1% CHL | 25.4% BRA | 42.2% CHL |
| 15 | 2356.9 CRI | 3392 PAN | 2620 PER | 60.7% CHL | 40.6% BRA | 38.8% TUR | 57.7% TUR |
| 16 | 2411.8 CHL | 3717 CRI | 2960 COL | 55.4% BRA | 52.5% PAN | 35.6% PAN | 44.9% CRI |
| 17 | 2496.9 PAN | 3799 MYS | 3120 POL | 77.8% KOR | 61.4% KOR | 35.6% CRI | 50.0% PAN |
| 18 | 2577.7 PER | 3892 CHL | 3290 PAN | 67.8% CRI | 52.5% CRI | 35.1% MYS | 60.0% KOR |
| 19 | 2908.6 POL | 3926 BGR | 3340 CRI | 69.7% MYS | 52.0% MYS | 44.3% KOR | 50.3% MYS |
| 20 | 3171.3 MEX | 4303 BRA | 3560 BRA | 92.1% BGR | 75.0% BGR | 32.8% MEX | 47.9% MEX |
| 21 | 3420.8 KOR | 4419 POL | 3640 HUN | 80.4% PRT | 49.4% MEX | 46.2% PRT | 63.6% PRT |
| 22 | 4040.5 VEN | 4982 PRT | 3770 CHL | 91.4% POL | 63.2% PRT | 60.0% BGR | 84.5% BGR |
| 23 | 4126.5 HUN | 4992 HUN | 4430 TTO | 67.2% MEX | 75.1% POL | 60.2% POL | 83.6% POL |
| 24 | 4422.7 BRA | 6054 MEX | 4450 MEX | 93.9% HUN | 79.0% HUN | 40.0% VEN | 57.3% VEN |
| 25 | 4930.8 TTO | 7053 SGP | 5050 PRT | 75.2% VEN | 59.3% SGP | 42.2% SGP | 88.4% HUN |
| 26 | 6996.2 PRT | 7390 ESP | 5720 VEN | 79.1% SGP | 57.2% VEN | 65.3% HUN | 64.7% SGP |
| 27 | 10427 ESP | 7401 VEN | 5880 BHS | 89.4% ESP | 73.2% ESP | 35.1% BHS | 42.3% BHS |
| 28 | 11290 HKG | 8719 HKG | 6090 SGP | 79.4% HKG | 62.7% HKG | 45.7% HKG | 48.6% TTO |
| 29 | 11802 BHS | 10072 JPN | 6320 ESP | 66.6% BHS | 57.0% BHS | 57.7% ESP | 64.5% HKG |
| 30 | 11834 SGP | 10167 GBR | 6650 HKG | 72.4% TTO | 58.3% TTO | 41.1% TTO | 79.2% ESP |
| 31 | 13692 NZL | 10323 ITA | 8110 NZL | 83.2% JPN | 65.7% JPN | 48.9% JPN | 68.4% JPN |
| 32 | 14219 GBR | 10362 NZL | 8440 GBR | 82.4% NZL | 65.2% NZL | 48.4% NZL | 66.8% NZL |
| 33 | 14654 ITA | 10851 FIN | 8470 FIN | 86.7% ITA | 65.7% ITA | 48.9% ITA | 56.5% AUS |
| 34 | 15480 AUS | 11109 BEL | 8770 AUS | 89.9% GBR | 69.1% FIN | 42.9% AUS | 70.6% FIN |
| 35 | 15989 CAN | 11262 TTO | 8790 NOR | 84.5% FIN | 60.0% AUS | 48.3% FRA | 75.3% ITA |
| 36 | 19605 FIN | 11284 NLD | 8820 ITA | 76.2% AUS | 75.1% GBR | 52.8% FIN | 71.6% DNK |
| 37 | 20322 NLD | 11305 BHS | 8860 JPN | 85.4% DNK | 65.1% FRA | 52.7% DNK | 69.8% FRA |
| 38 | 21472 FRA | 11342 DNK | 9030 NLD | 83.5% FRA | 69.0% DNK | 60.1% GBR | 81.9% GBR |
| 39 | 21671 BEL | 11756 FRA | 9380 SWE | 90.0% BEL | 73.8% BEL | 51.0% SWE | 71.6% SWE |
| 40 | 21880 USA | 12141 NOR | 9480 DNK | 90.1% NLD | 73.3% NLD | 53.2% NOR | 80.5% BEL |
| 41 | 22153 SWE | 12456 SWE | 9940 FRA | 87.0% NOR | 67.6% SWE | 58.5% BEL | 81.1% NLD |
| 42 | 22782 NOR | 12520 AUS | 10120 BEL | 84.8% SWE | 69.4% NOR | 57.9% NLD | 76.0% NOR |
| 43 | 25734 DNK | 14133 CAN | 10320 CAN | 85.6% CAN | 68.2% CAN | 51.7% CAN | 62.2% USA |
| 44 | 27663 JPN | 15295 USA | 12860 USA | 80.1% USA | 64.8% USA | 47.9% USA | 71.6% CAN |

a): Data taken from World Development Indicators 1999, measuring GNP/cap in constant 1995 US-Dollars.
b): Data taken from Penn World Table 5.6, measuring real GDP/cap in constant dollars (chain index) using international prices 1985.
c): Data taken from World Development Indicators 1999, measuring GNP/cap, PPP adjusted, in current international dollars.
d): Atkinson measure (ε=1) computed on the basis of and expressed as a share of GDP/cap (column 2).
e): Sen measure computed on the basis of and expressed as a share of GDP/cap (column 2).
f): Dagum measure computed on the basis of and expressed as a share of GDP/cap (column 2).
g): Atkinson measure (ε=2) computed on the basis of and expressed as a share of GDP/cap (column 2).

## Table 5: Welfare measures 1990

| Rank | GNP/cap[a] | | GDP/cap[b] | | GNP/cap[c] | | Atkinson (ε=1)[d] | | Sen[e] | | Dagum[f] | | Atkinson (ε=2)[g] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 281.11 | BGD | 1264 | IND | 750 | BGD | 83.8% | CHN | 65.4% | CHN | 48.6% | CHN | 30.4% | PAN |
| 2 | 301.77 | IND | 1324 | CHN | 1100 | IND | 88.3% | IND | 70.3% | IND | 37.9% | PHL | 70.5% | CHN |
| 3 | 350.93 | CHN | 1390 | BGD | 1190 | PAK | 87.1% | PAK | 68.9% | PAK | 54.2% | IND | 78.9% | IND |
| 4 | 438.53 | PAK | 1394 | PAK | 1390 | CHN | 89.3% | BGD | 55.0% | PHL | 52.5% | PAK | 59.6% | PHL |
| 5 | 595.34 | LKA | 1763 | PHL | 1640 | LKA | 75.3% | PHL | 71.7% | BGD | 55.9% | BGD | 76.6% | PAK |
| 6 | 741.1 | IDN | 1974 | IDN | 1980 | IDN | 73.4% | PER | 55.1% | PER | 27.5% | PAN | 80.4% | BGD |
| 7 | 1058.6 | PHL | 2096 | LKA | 2780 | JAM | 55.7% | PAN | 43.2% | PAN | 38.1% | PER | 55.4% | PER |
| 8 | 1475.9 | JAM | 2188 | PER | 2790 | PER | 86.5% | IDN | 66.9% | IDN | 50.3% | IDN | 33.2% | BRA |
| 9 | 1580.1 | BGR | 2545 | JAM | 2860 | PHL | 88.0% | LKA | 69.9% | LKA | 25.0% | BRA | 76.8% | IDN |
| 10 | 1739.4 | COL | 2888 | PAN | 3670 | TUN | 77.2% | JAM | 58.2% | JAM | 41.1% | JAM | 46.6% | COL |
| 11 | 1761.7 | TUN | 2910 | TUN | 3920 | THA | 54.8% | BRA | 48.7% | COL | 32.2% | COL | 61.7% | JAM |
| 12 | 1821.7 | PER | 3300 | COL | 4140 | BGR | 67.6% | COL | 40.0% | BRA | 53.7% | LKA | 78.4% | LKA |
| 13 | 1976.8 | THA | 3499 | CRI | 4420 | POL | 78.5% | TUN | 59.8% | TUN | 27.8% | CHL | 48.2% | THA |
| 14 | 2267.7 | CRI | 3580 | THA | 4560 | MYS | 67.8% | THA | 51.2% | THA | 34.4% | THA | 49.7% | CRI |
| 15 | 2402.9 | PAN | 3820 | POL | 4770 | PAN | 70.1% | CRI | 53.0% | CRI | 42.6% | TUN | 41.7% | CHL |
| 16 | 2732 | POL | 4042 | BRA | 4840 | COL | 61.3% | CHL | 43.5% | CHL | 36.1% | CRI | 62.7% | TUN |
| 17 | 2888.4 | CHL | 4338 | CHL | 4850 | CRI | 90.6% | POL | 52.3% | MYS | 35.4% | MYS | 43.6% | VEN |
| 18 | 3050.7 | MYS | 5124 | MYS | 4880 | BRA | 70.4% | MYS | 46.2% | VEN | 30.0% | VEN | 52.3% | MYS |
| 19 | 3080.8 | MEX | 5357 | HUN | 6190 | HUN | 63.6% | VEN | 73.8% | POL | 33.1% | MEX | 48.3% | MEX |
| 20 | 3315.1 | VEN | 5827 | MEX | 6520 | MEX | 67.6% | MEX | 49.7% | MEX | 58.4% | POL | 82.2% | POL |
| 21 | 4025.7 | BRA | 6055 | VEN | 6810 | CHL | 85.0% | HUN | 67.8% | HUN | 51.2% | HUN | 71.2% | HUN |
| 22 | 4645.9 | HUN | 6203 | BGR | 7080 | VEN | 92.3% | BGR | 75.5% | BGR | 46.2% | PRT | 64.2% | PRT |
| 23 | 9605.7 | PRT | 7478 | PRT | 10450 | PRT | 80.6% | PRT | 63.2% | PRT | 60.6% | BGR | 85.5% | BGR |
| 24 | 13359 | ESP | 9583 | ESP | 12220 | ESP | 85.6% | ESP | 67.5% | ESP | 51.0% | ESP | 57.0% | NZL |
| 25 | 14532 | NZL | 11513 | NZL | 12990 | NZL | 76.5% | NZL | 59.8% | NZL | 42.6% | NZL | 73.5% | ESP |
| 26 | 17197 | AUS | 12488 | ITA | 14710 | AUS | 80.2% | ITA | 55.0% | HKG | 37.9% | HKG | 55.7% | AUS |
| 27 | 17811 | GBR | 13029 | NLD | 15960 | GBR | 75.1% | AUS | 58.3% | AUS | 41.1% | AUS | 56.8% | HKG |
| 28 | 17891 | ITA | 13217 | GBR | 16040 | NLD | 74.8% | HKG | 67.8% | ITA | 51.3% | ITA | 65.2% | DNK |
| 29 | 18473 | CAN | 13232 | BEL | 16240 | ITA | 85.4% | GBR | 67.7% | GBR | 51.2% | GBR | 74.1% | ITA |
| 30 | 18813 | HKG | 13904 | FRA | 16290 | NOR | 87.0% | NLD | 70.6% | NLD | 50.1% | DNK | 62.8% | NOR |
| 31 | 23918 | NLD | 13909 | DNK | 16350 | SWE | 82.5% | DNK | 66.8% | DNK | 50.7% | FRA | 74.0% | NLD |
| 32 | 25265 | FIN | 14059 | FIN | 16470 | FIN | 89.3% | BEL | 67.3% | FRA | 54.6% | NLD | 73.7% | GBR |
| 33 | 25497 | FRA | 14445 | AUS | 16720 | HKG | 85.2% | FRA | 73.1% | BEL | 50.0% | NOR | 72.5% | FRA |
| 34 | 25567 | USA | 14762 | SWE | 17080 | DNK | 80.2% | NOR | 66.7% | NOR | 50.9% | SWE | 57.5% | USA |
| 35 | 25605 | SWE | 14849 | HKG | 17810 | FRA | 89.4% | FIN | 67.5% | SWE | 57.6% | BEL | 78.9% | BEL |
| 36 | 25680 | BEL | 14902 | NOR | 17990 | CAN | 85.9% | SWE | 73.9% | FIN | 45.1% | USA | 73.5% | SWE |
| 37 | 27962 | NOR | 17173 | CAN | 18090 | BEL | 77.0% | USA | 62.2% | USA | 58.6% | FIN | 78.4% | FIN |
| 38 | 30739 | DNK | 18054 | USA | 22660 | USA | 88.4% | CAN | 72.4% | CAN | 56.8% | CAN | 76.6% | CAN |

a): Data taken from World Development Indicators 1999, measuring GNP/cap in constant 1995 US-Dollars.
b): Data taken from Penn World Table 5.6, measuring real GDP/cap in constant dollars (chain index) using international prices 1985.
c): Data taken from World Development Indicators 1999, measuring GNP/cap, PPP adjusted, in current international dollars.
d): Atkinson measure (ε=1) computed on the basis of and expressed as a share of GDP/cap (column 2).
e): Sen measure computed on the basis of and expressed as a share of GDP/cap (column 2).
f): Dagum measure computed on the basis of and expressed as a share of GDP/cap (column 2).
g): Atkinson measure (ε=2) computed on the basis of and expressed as a share of GDP/cap (column 2).

## Table 6: Welfare measures 1997

| Rank | GNP/cap[a] | GNP/cap[b] | Atkinson (ε=1)[c] | Sen[d] | Dagum[e] | Atkinson (ε=2)[f] |
|---|---|---|---|---|---|---|
| 1 | 183 TZA | 620 TZA | 81.0% TZA | 61.9% TZA | 44.8% TZA | 67.3% TZA |
| 2 | 202 NER | 720 YEM | 79.4% YEM | 47.6% ZMB | 31.2% ZMB | 50.5% NGA |
| 3 | 223 YEM | 830 NER | 71.3% NGA | 60.6% YEM | 43.5% YEM | 64.3% YEM |
| 4 | 229 MDG | 860 NGA | 76.2% MDG | 56.6% MDG | 29.6% KEN | 40.9% KEN |
| 5 | 239 NGA | 900 MDG | 75.5% ZMB | 45.6% KEN | 39.4% MDG | 59.2% ZMB |
| 6 | 326 UGA | 910 ZMB | 83.1% NER | 64.8% NER | 47.0% NER | 60.6% MDG |
| 7 | 330 KEN | 1090 BGD | 60.6% KEN | 62.6% NGA | 45.5% NGA | 70.8% NER |
| 8 | 352 BGD | 1160 UGA | 79.1% UGA | 59.2% UGA | 42.1% UGA | 42.5% SEN |
| 9 | 384 GHA | 1160 KEN | 89.3% BGD | 45.9% SEN | 29.8% SEN | 65.1% UGA |
| 10 | 387 ZMB | 1300 LAO | 62.7% SEN | 71.7% BGD | 33.0% NIC | 38.4% KGZ |
| 11 | 392 IND | 1410 TKM | 88.1% LAO | 49.7% NIC | 55.9% BGD | 80.5% BGD |
| 12 | 408 NIC | 1450 MDA | 82.4% TKM | 69.6% LAO | 27.5% ZWE | 49.0% NIC |
| 13 | 414 LAO | 1580 PAK | 81.5% MDA | 64.2% TKM | 28.8% KGZ | 42.8% ZWE |
| 14 | 502 PAK | 1610 GHA | 68.1% NIC | 63.5% MDA | 47.3% TKM | 42.5% HND |
| 15 | 554 SEN | 1660 IND | 62.3% KGZ | 43.2% ZWE | 46.5% MDA | 68.4% TKM |
| 16 | 641 MDA | 1690 SEN | 84.8% GHA | 44.7% KGZ | 30.1% HND | 66.8% MDA |
| 17 | 642 TKM | 1820 NIC | 61.1% ZWE | 46.3% HND | 53.4% LAO | 79.1% LAO |
| 18 | 656 ZWE | 2170 UKR | 87.1% PAK | 66.1% GHA | 35.7% UKR | 51.6% UKR |
| 19 | 668 CHN | 2180 KGZ | 63.3% HND | 68.9% PAK | 49.4% GHA | 73.2% GHA |
| 20 | 723 HND | 2240 ZWE | 88.3% IND | 52.6% UKR | 52.5% PAK | 76.6% PAK |
| 21 | 766 GUY | 2260 HND | 71.0% UKR | 70.2% IND | 54.2% IND | 32.3% PRY |
| 22 | 770 LKA | 2460 LKA | 67.5% SLV | 41.9% CHN | 30.4% CHN | 79.0% IND |
| 23 | 817 KGZ | 2460 UZB | 84.6% UZB | 50.1% SLV | 33.5% SLV | 46.8% SLV |
| 24 | 912 BOL | 2800 GUY | 55.4% PRY | 40.9% PRY | 25.7% PRY | 60.0% BOL |
| 25 | 972 UZB | 2810 BOL | 76.4% BOL | 58.0% BOL | 40.8% BOL | 72.0% UZB |
| 26 | 1096 IDN | 2860 SLV | 88.0% LKA | 66.7% UZB | 42.6% GUY | 64.4% GUY |
| 27 | 1097 EGY | 3070 CHN | 79.2% GUY | 59.8% GUY | 50.0% UZB | 78.4% LKA |
| 28 | 1170 PHL | 3080 EGY | 80.7% CHN | 69.9% LKA | 53.7% LKA | 64.9% CHN |
| 29 | 1272 BGR | 3210 MRC | 79.8% MRC | 60.8% MRC | 37.9% PHL | 28.6% ZAF |
| 30 | 1281 MRC | 3330 JAM | 78.8% JOR | 59.3% JOR | 43.7% MRC | 30.4% PAN |
| 31 | 1399 ROM | 3350 JOR | 86.6% EGY | 55.0% PHL | 42.2% JOR | 65.4% MRC |
| 32 | 1409 DZA | 3390 IDN | 81.2% JAM | 62.1% JAM | 45.0% JAM | 33.2% BRA |
| 33 | 1452 UKR | 3670 PHL | 75.3% PHL | 68.0% EGY | 35.1% RUS | 64.3% JOR |
| 34 | 1479 JOR | 3860 PRY | 84.9% IDN | 52.0% RUS | 25.0% BRA | 59.6% PHL |
| 35 | 1525 JAM | 3870 BGR | 71.6% RUS | 65.8% IDN | 51.5% EGY | 67.4% JAM |
| 36 | 1531 ECU | 3970 LVA | 84.1% BGR | 55.1% PER | 49.1% IDN | 54.2% RUS |
| 37 | 1683 SLV | 4140 LTU | 81.0% LTU | 40.0% BRA | 23.2% ZAF | 76.4% EGY |
| 38 | 1946 PRY | 4250 DZA | 73.4% PER | 62.7% LTU | 38.1% PER | 73.9% IDN |
| 39 | 2015 LTU | 4270 ROM | 72.9% ECU | 57.0% ECU | 27.2% COL | 55.4% PER |
| 40 | 2039 COL | 4280 RUS | 87.0% LVA | 37.7% ZAF | 39.9% ECU | 39.5% COL |
| 41 | 2047 BLR | 4580 PER | 54.8% BRA | 69.0% LVA | 45.7% LTU | 56.3% ECU |
| 42 | 2092 TUN | 4700 ECU | 83.0% DZA | 64.7% DZA | 27.5% PAN | 66.0% LTU |
| 43 | 2234 RUS | 4820 BLR | 51.3% ZAF | 42.8% COL | 47.8% DZA | 71.1% BGR |
| 44 | 2580 PER | 5050 TUN | 88.7% ROM | 73.3% BGR | 52.7% LVA | 44.7% THA |
| 45 | 2626 CRI | 6350 BRA | 55.7% PAN | 43.2% PAN | 42.6% TUN | 69.6% DZA |
| 46 | 2815 LVA | 6490 THA | 60.1% COL | 59.8% TUN | 57.9% BGR | 76.1% LVA |
| 47 | 2821 THA | 6510 CRI | 78.5% TUN | 71.3% ROM | 36.1% CRI | 62.7% TUN |
| 48 | 2993 PAN | 6510 POL | 64.4% THA | 71.6% BLR | 55.5% ROM | 49.7% CRI |
| 49 | 3304 MEX | 6570 COL | 88.9% BLR | 53.0% CRI | 37.7% THA | 78.9% ROM |
| 50 | 3377 ZAF | 6890 PAN | 70.1% CRI | 54.7% THA | 32.8% MYS | 79.2% BLR |
| 51 | 3472 POL | 6970 HUN | 69.8% MYS | 48.6% MYS | 33.1% MEX | 48.3% MEX |
| 52 | 3499 VEN | 7190 ZAF | 84.0% POL | 49.7% MEX | 55.8% BLR | 51.1% MYS |
| 53 | 3645 SVK | 7730 MYS | 67.6% MEX | 66.9% POL | 36.2% VEN | 51.6% VEN |
| 54 | 3796 MUS | 7860 SVK | 71.0% VEN | 53.2% VEN | 50.3% POL | 69.3% POL |
| 55 | 4468 MYS | 8110 MEX | 89.7% HUN | 72.1% HUN | 27.8% CHL | 47.6% BHS |
| 56 | 4478 CHL | 8660 VEN | 70.8% BHS | 43.5% CHL | 37.7% BHS | 41.7% CHL |
| 57 | 4519 BRA | 9230 MUS | 95.4% SVK | 54.7% BHS | 56.3% HUN | 81.4% HUN |
| 58 | 4517 HUN | 10080 BHS | 61.4% CHL | 63.3% MUS | 46.3% MUS | 68.2% MUS |
| 59 | 10163 SVN | 11880 SVN | 82.1% MUS | 81.7% SVK | 69.1% SVK | 91.2% SVK |
| 60 | 11243 PRT | 12240 CHL | 91.4% SVN | 74.9% SVN | 47.5% PRT | 57.0% NZL |
| 61 | 11632 BHS | 14180 PRT | 82.7% PRT | 64.4% PRT | 59.9% SVN | 67.5% PRT |
| 62 | 14800 ESP | 15690 ESP | 76.5% NZL | 63.0% NZL | 46.0% NZL | 84.0% SVN |
| 63 | 15233 NZL | 15780 NZL | 85.6% ESP | 67.5% ESP | 38.9% AUS | 55.7% AUS |
| 64 | 15456 ISR | 17680 ISR | 75.1% AUS | 56.0% AUS | 31.6% HKG | 73.5% ESP |
| 65 | 19104 ITA | 19010 SWE | 82.9% ISR | 64.5% ISR | 51.0% ESP | 69.3% ISR |
| 66 | 19267 CAN | 19510 AUS | 84.4% SWE | 48.0% HKG | 47.6% ISR | 70.5% SWE |
| 67 | 19689 AUS | 19660 FIN | 89.4% FIN | 59.5% GBR | 42.4% GBR | 56.8% HKG |
| 68 | 19946 GBR | 20100 ITA | 85.3% GBR | 65.5% ITA | 48.7% ITA | 48.9% USA |
| 69 | 23647 HKG | 20710 GBR | 88.2% ITA | 71.8% FIN | 37.5% USA | 73.3% GBR |
| 70 | 25685 SWE | 21300 NLD | 74.8% HKG | 67.8% NLD | 51.3% NLD | 62.8% NOR |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71 | 26020 | FIN | 21750 | CAN | 87.0% | NLD | 77.0% | SWE | 56.0% | FIN | 65.2% | DNK |
| 72 | 27402 | NLD | 23090 | BEL | 86.1% | CAN | 68.5% | CAN | 52.0% | CAN | 78.4% | FIN |
| 73 | 28284 | BEL | 23450 | DNK | 82.5% | DNK | 54.5% | USA | 62.6% | SWE | 77.9% | ITA |
| 74 | 28310 | USA | 24260 | NOR | 80.2% | NOR | 67.7% | NOR | 51.1% | NOR | 74.0% | NLD |
| 75 | 35947 | NOR | 24350 | HKG | 89.3% | BEL | 73.1% | BEL | 57.6% | BEL | 74.1% | CAN |
| 76 | 36418 | DNK | 29080 | USA | 70.9% | USA | 78.3% | DNK | 64.3% | DNK | 78.9% | BEL |
| 77 | 46035 | LUX[g] | 32360 | LUX[g] | 90.0% | LUX | 73.1% | LUX | 57.6% | LUX | 81.5% | LUX |

a): Data taken from World Development Indicators 1999, measuring GNP/cap in constant 1995 US-Dollars.
b): Data taken from World Development Indicators 1999, measuring GNP/cap, PPP adjusted, in current international dollars.
c) Atkinson measure (ε=1) computed on the basis of and expressed as a share of GNP/cap, current intl. dollars (column 2).
d) Sen measure computed on the basis of and expressed as a share of GNP/cap, current intl. dollars (column 2).
e): Dagum measure computed on the basis of and expressed as a share of GNP/cap, current intl. dollars (column 2).
f): Atkinson measure (ε=2 computed on the basis of and expressed as a share of GNP/cap, current intl. dollars (column 2).
g) For Luxembourg the latest available information on income per capita stems from 1996.

## Table 7: Sensitivity Analysis for Great Britain

| Year | Gini used in first analysis[a] | IFS | Changes in Ranking | | | |
|---|---|---|---|---|---|---|
| | | | Atkinson (e=1) | Sen measure | Dagum measure | Atkinson (e=2) |
| 1960 | 25.3 | 25.0 | - | - | - | - |
| 1970 | 25.1 | 25.5 | - | - | -2 | -1 |
| 1980 | 24.9 | 25.3 | - | - | - | -1 |
| 1990 | 23.3 | 33.7 | - | - | - | -1 |
| 1997 | 40.5 | 33.7 | na | +1 | +1 | na |

a) 1960-1990: Deininger / Squire 1996; 1997: World Income Inequality Database, 1999.
na: no income share per quintile available

## Table 8: Sensitivity Analysis for the US

| Year | DS 1996 | DS 1998 | Changes in Ranking | | | |
|---|---|---|---|---|---|---|
| | | | Atkinson (e=1) | Sen measure | Dagum measure | Atkinson (e=2) |
| 1970 | 34.1 | 39.6 | - | - | -1 | -4 |
| 1980 | 35.2 | 40.6 | -1 | -1 | -3 | -4 |
| 1990 | 37.8 | 42.8 | - | -1 | -3 | -4 |

DS 1996: data taken from Deininger/Squire, 1996, based on gross income, household.
DS 1998: data taken from updated Deininger/Squire, 1998 based on income net taxes, person

**Table 9: Simultaneous Sensitivity Test using LIS data**

| Year | Country | Deininger Squire (1996) | LIS | Changes in Ranking | |
|---|---|---|---|---|---|
| | | | | Sen measure | Dagum measure |
| 1970 | Britain | 25.1 | 28.5 | - | -3 |
| 1970 | Canada | 32.2 | 34.0 | - | -3 |
| 1970 | USA | 34.1 | 35.9 | - | -1 |
| 1980 | Australia | 40.0 | 35.1 | +4 | +4 |
| 1980 | Canada | 31.8 | 33.0 | - | +1 |
| 1980 | The Netherlands | 26.7 | 33.4 | -5 | -8 |
| 1980 | Norway | 30.6 | 30.2 | -1 | +1 |
| 1980 | Sweden | 32.4 | 29.3 | +1 | +3 |
| 1980 | USA | 35.2 | 36.9 | -1 | -3 |
| 1990 | Britain | 32.2 | 36.2 | -1 | -1 |
| 1990 | Canada | 27.6 | 35.1 | - | - |
| 1990 | Italy | 32.2 | 28.7 | +1 | +1 |
| 1990 | The Netherlands | 29.4 | 30.6 | - | -2 |
| 1990 | Norway | 33.3 | 31.8 | - | -1 |
| 1990 | Sweden | 32.5 | 31.1 | - | -1 |
| 1990 | USA | 37.8 | 39.1 | - | - |

**Table 10: Simultaneous Sensitivity Test using adjusted LIS**

| Year | Country | Deininger Squire (1996) | LIS | Changes in Ranking | |
|---|---|---|---|---|---|
| | | | | Sen measure | Dagum measure |
| 1980 | France | 34.8 | 29.4 | +3 | +4 |
| 1990 | Australia | 41.7 | 30.8 | +4 | +4 |
| 1990 | Belgium | 26.9 | 23.0 | +1 | +3 |
| 1990 | Britain | 32.2 | 33.5 | -2 | -2 |
| 1990 | Canada | 27.6 | 28.5 | - | - |
| 1990 | Denmark | 33.2 | 23.9 | +2 | +3 |
| 1990 | Finland | 26.1 | 22.7 | -2 | -2 |
| 1990 | Italy | 32.2 | 25.5 | - | +1 |
| 1990 | The Netherlands | 29.4 | 26.8 | - | +2 |
| 1990 | Norway | 33.3 | 23.0 | +2 | +4 |
| 1990 | Spain | 32.5 | 30.6 | - | -1 |
| 1990 | Sweden | 32.5 | 22.9 | - | +2 |
| 1990 | USA | 37.8 | 35.0 | - | -2 |

Table 11: Average Gini-Coeffiecient over time

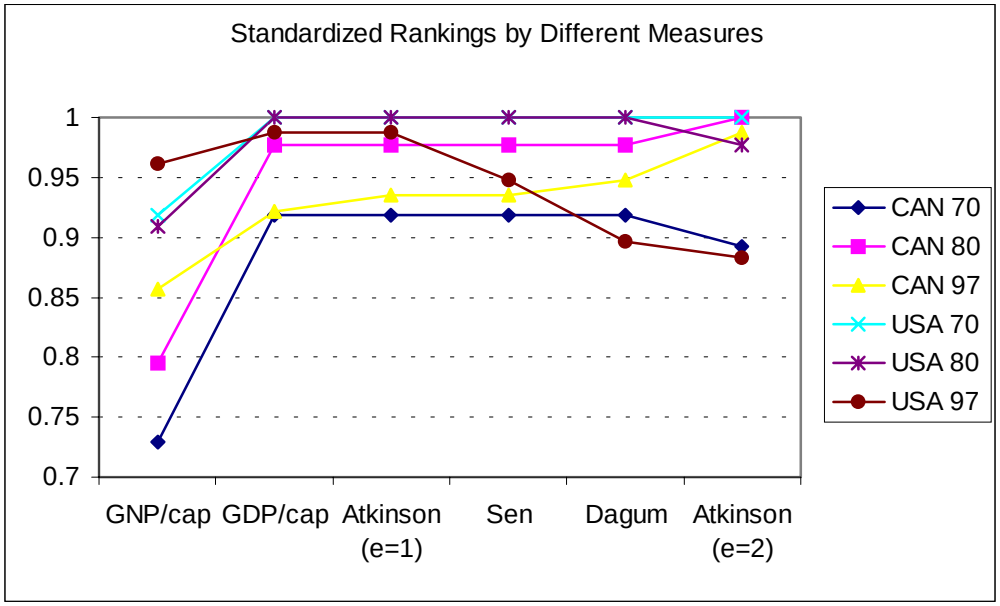
| Year | Average Gini coefficient | Number of Observations |
|---|---|---|
| 1960 | 39.4 | 35 |
| 1970 | 40.0 | 61 |
| 1980 | 38.9 | 72 |
| 1990 | 38.3 | 101 |
| 1997 | 38.0 | 69 |

Table 12: Kuznet's Curves and Temporal Inequality Trends

| | (1) | (2) | (3) |
|---|---|---|---|
| Constant | 40.57 (36.47) | 39.79 (67.25) | 44.62 (32.39) |
| Income/cap | | | -0.0008 (-5.513) |
| Income/cap, inverse | | | -1443.55 (-1.11) |
| Dummy 60 | 0.91 (0.87) | 0.81 (.77) | |
| Dummy 70 | -1.58 (-1.73) | -1.79 (-1.96) | |
| Dummy 80 | -1.99 (-2.26) | -2.18 (-2.48) | |
| Dummy 90 | -2.75 (-3.51) | -3.18 (-4.04) | |
| N | 300 | 300 | 304 |
| $R^2$ | 0.11 | 0.11 | 0.11 |

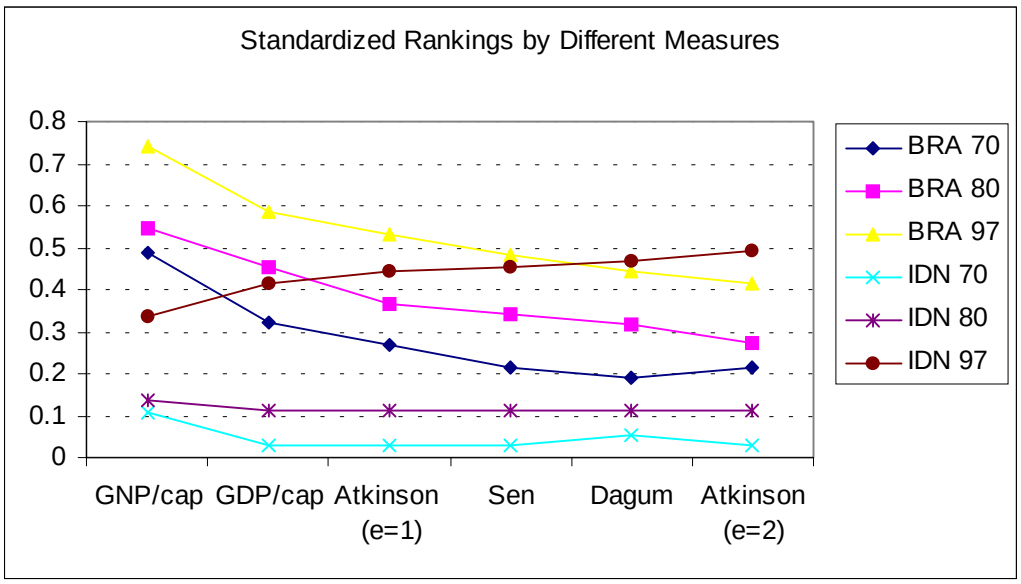
T-Statistics in parentheses. Left out category is 1997.
Specification (1) is a fixed effects estimation, specification (2) random effects.
Specification (3) tests for Kuznets hypothesis

**Figure 1:**



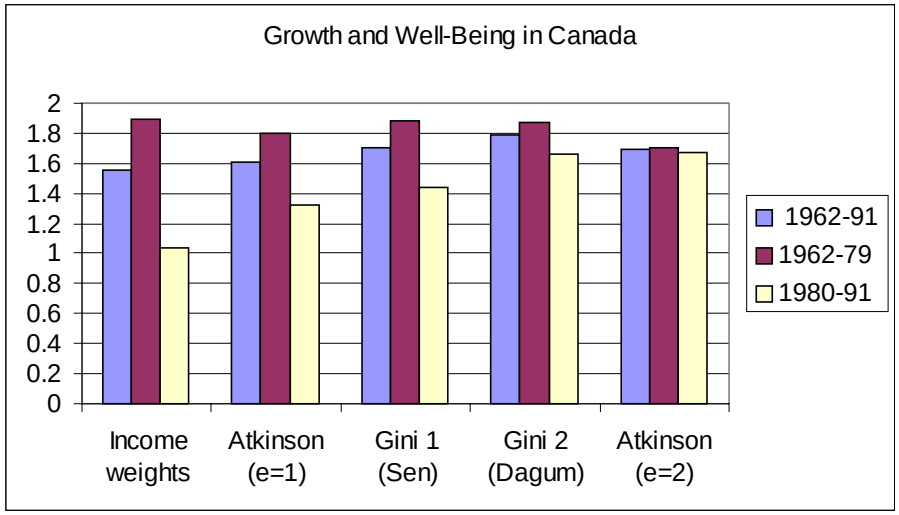

GNP/cap: GNP per capita in constant 1995 dollars (WDI, 1999)
GDP/cap: 1970, 1980: GDP per capita in constant 1985 ppp-adjusted dollars (PWT 5.6); 1997: GNP per capita, current ppp-adjusted dollars

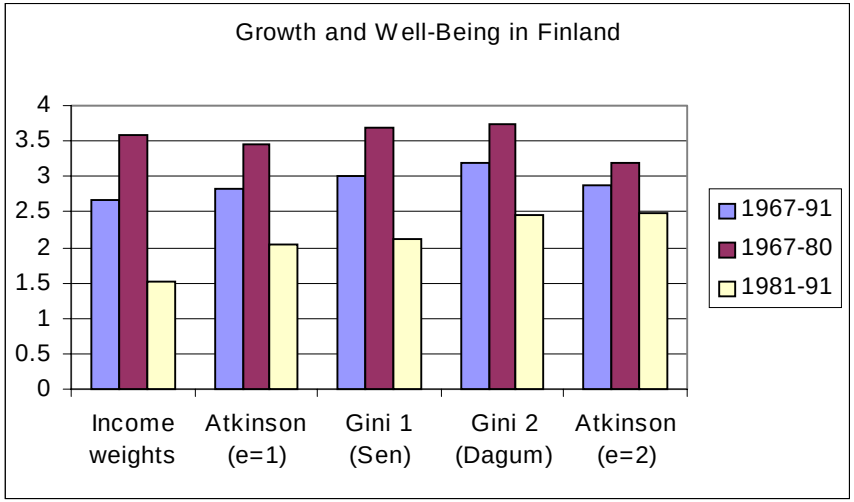
**Figure 2:**

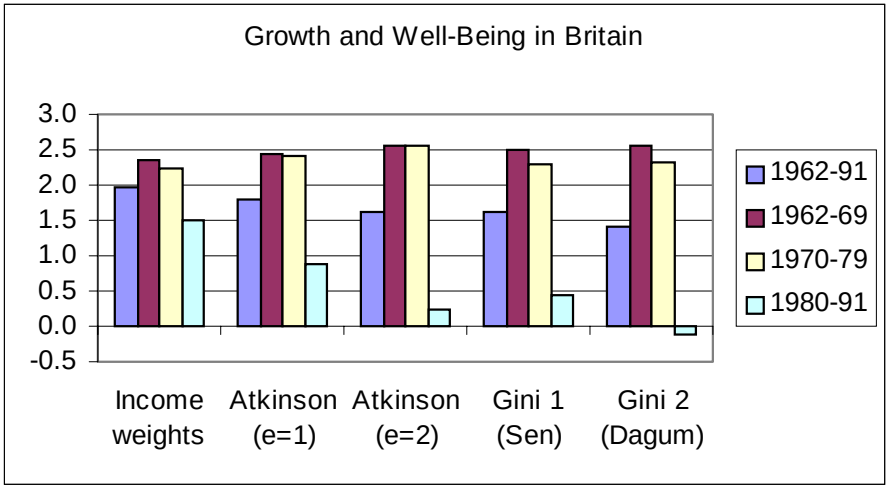


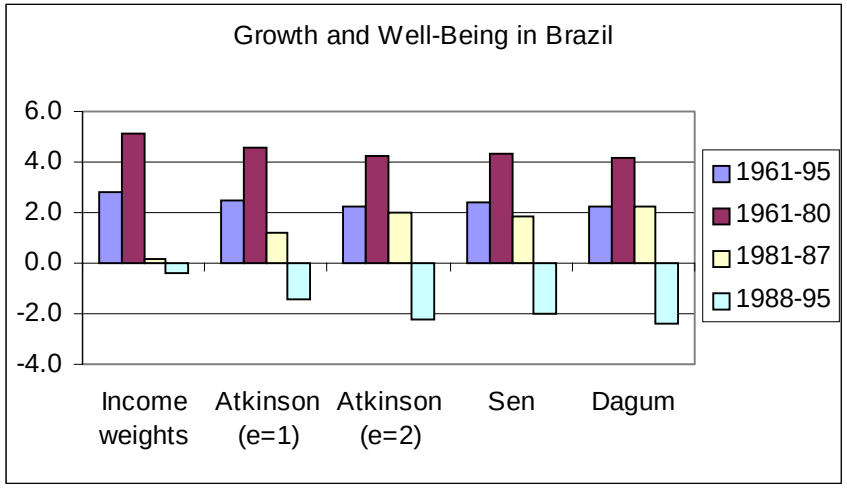

GNP/cap: GNP per capita in constant 1995 dollars (WDI, 1999)
GDP/cap: 1970, 1980: GDP per capita in constant 1985 ppp-adjusted dollars (PWT 5.6); 1997: GNP per capita, current ppp-adjusted dollars

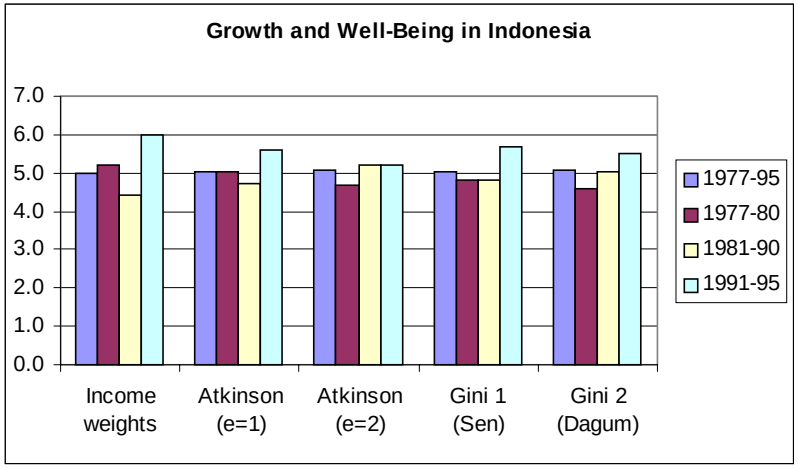
**Figure 3: Growth and Well-Being over time in different countries**




Growth and Well-Being in Indonesia
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Income weights
Atkinson (e=1)
Atkinson (e=2)
Gini 1 (Sen)
Gini 2 (Dagum)
1977-95
1977-80
1981-90
1991-95

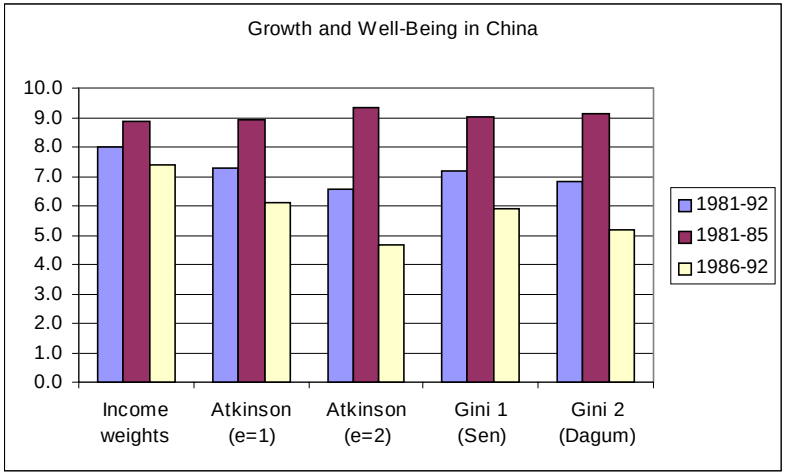

Growth and Well-Being in China
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Income weights
Atkinson (e=1)
Atkinson (e=2)
Gini 1 (Sen)
Gini 2 (Dagum)
1981-92
1981-85
1986-92

**Figure 4**

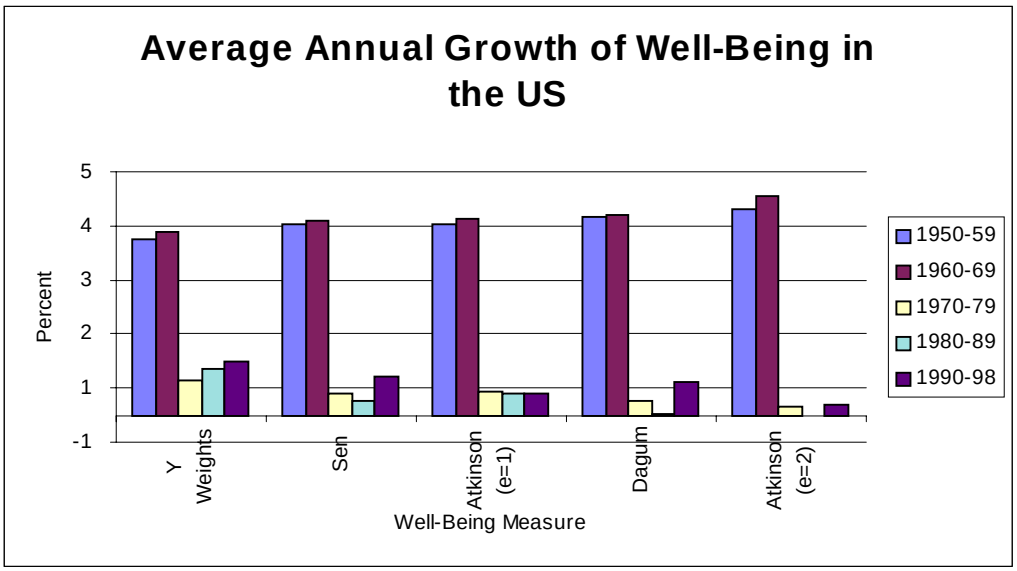



**Figure 5**

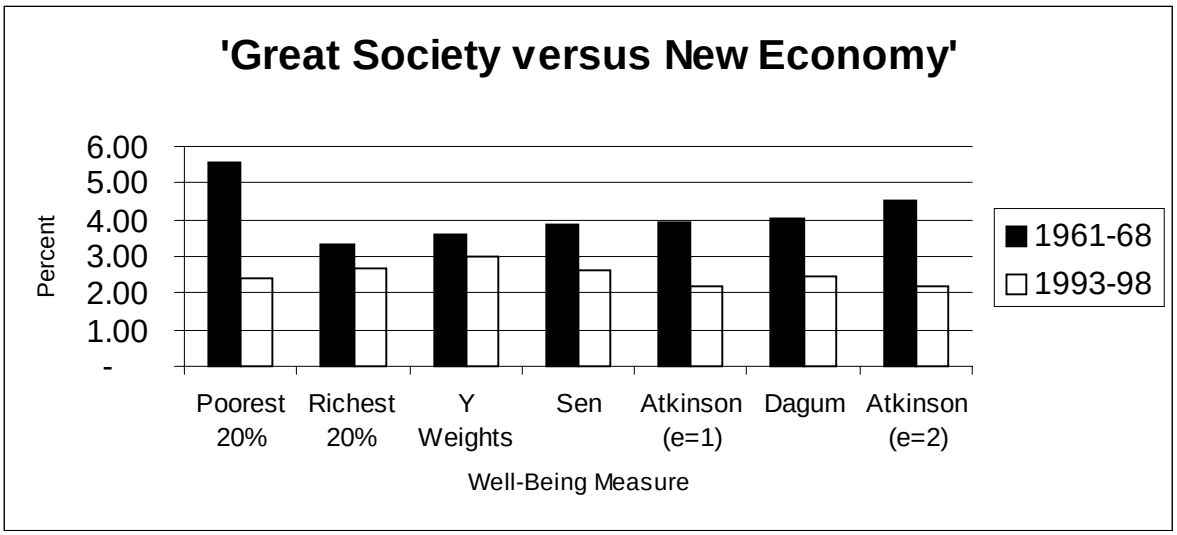



**Figure 6**

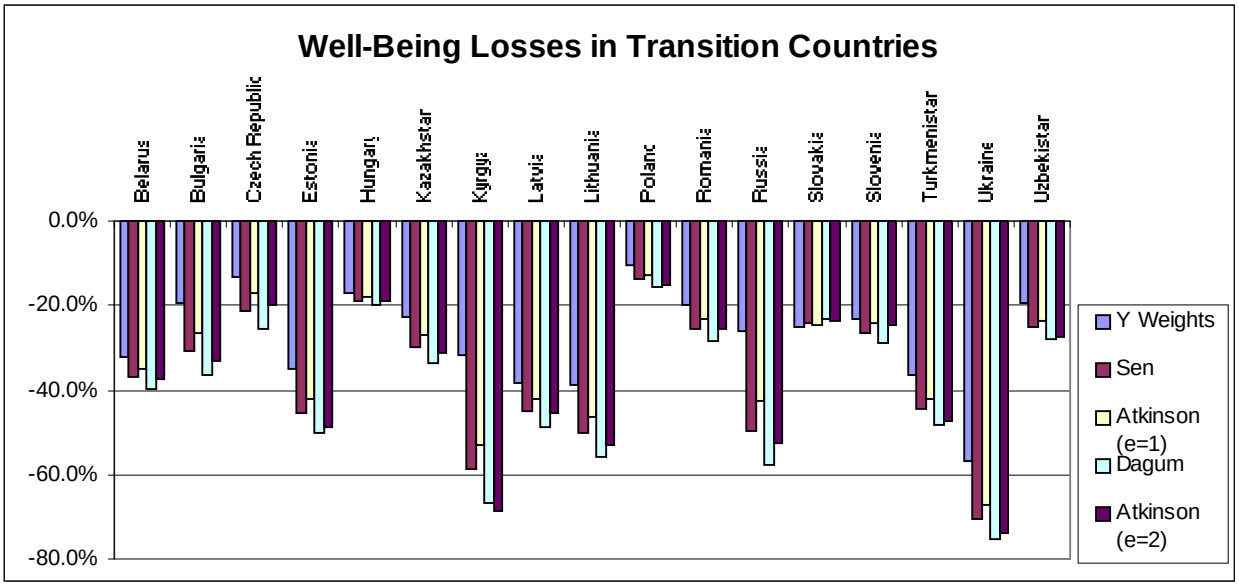


**Figure 7**

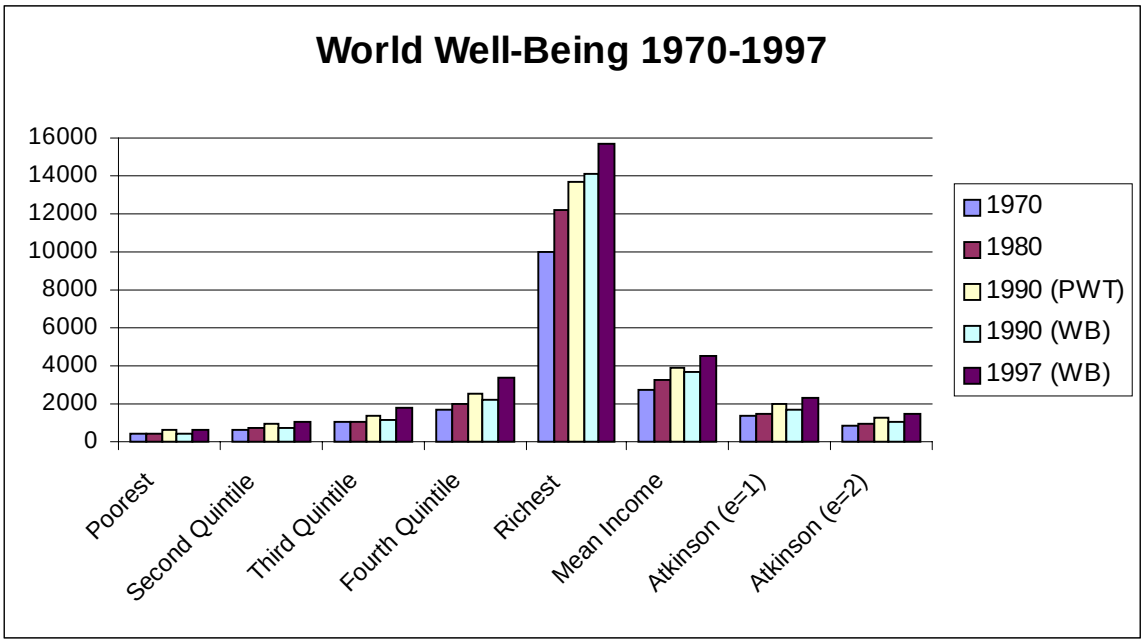
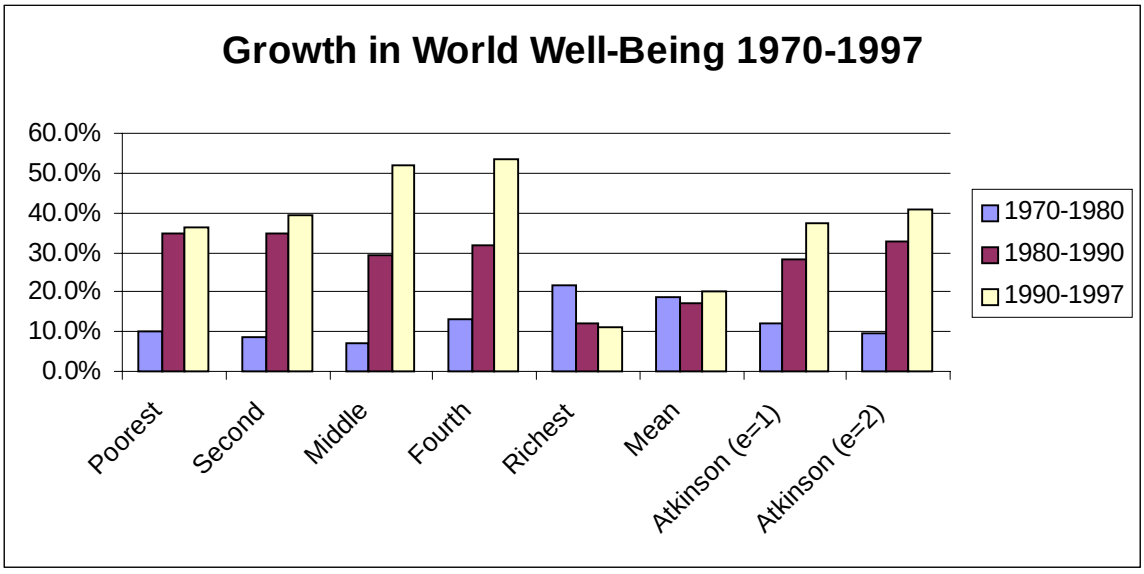



**Figure 8**



**Appendix I:**
Country Acronyms:

| | |
|---|---|
| AUS | Australia |
| BEL | Belgium |
| BGD | Bangladesh |
| BGR | Bulgaria |
| BHS | Bahamas |
| BOL | Bolivia |
| BRA | Brazil |
| CAN | Canada |
| CHL | Chile |
| CHN | China |
| COL | Colombia |
| CRI | Costa Rica |
| DNK | Denmark |
| DOM | Dominican Republic |
| DZA | Algeria |
| ECU | Ecuador |
| EGY | Egypt |
| ESP | Spain |
| FIN | Finland |
| FRA | France |
| GBR | United Kingdom |
| GHA | Ghana |
| GUY | Guyana |
| HKG | Hong Kong |
| HND | Honduras |
| HUN | Hungary |
| IDN | Indonesia |
| IND | India |
| ISR | Israel |
| ITA | Italy |
| JAM | Jamaica |
| JOR | Jordan |
| JPN | Japan |
| KEN | Kenya |
| KGZ | Kyrgyz Republic |
| KOR | Korea, Republic of |
| LAO | Lao |
| LKA | Sri Lanka |
| LTU | Lithuania |
| LUX | Luxembourg |
| LVA | Latvia |
| MDA | Moldova |
| MDG | Madagascar |
| MEX | Mexico |
| MRC | Morocco |
| MUS | Mauritius |
| MYS | Malaysia |
| NER | Niger |
| NGA | Nigeria |
| NIC | Nicaragua |
| NLD | Netherlands |
| NOR | Norway |
| NZL | New Zealand |
| PAK | Pakistan |
| PAN | Panama |
| PER | Peru |
| PHL | Philippines |
| POL | Poland |
| PRT | Portugal |
| PRY | Paraguay |
| ROM | Romania |
| RUS | Russian Federation |
| SEN | Senegal |
| SGP | Singapore |
| SLV | El Salvador |
| SVK | Slovak Republic |
| SVN | Slovenia |
| SWE | Sweden |
| THA | Thailand |
| TKM | Turkmenistan |
| TUN | Tunisia |
| TUR | Turkey |
| TZA | Tanzania |
| UGA | Uganda |
| UKR | Ukraine |
| USA | United States |
| VEN | Venezuela |
| ZAF | South Africa |
| ZMB | Zambia |
| ZWE | Zimbabwe |

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