

Grün, Carola; Klasen, Stephan

Working Paper

Growth, Inequality and Well-Being: Comparisons across Space and Time

IAI Discussion Papers, No. 94

Provided in Cooperation with:

Ibero-America Institute for Economic Research, University of Goettingen

Suggested Citation: Grün, Carola; Klasen, Stephan (2003) : Growth, Inequality and Well-Being: Comparisons across Space and Time, IAI Discussion Papers, No. 94, Georg-August-Universität Göttingen, Ibero-America Institute for Economic Research (IAI), Göttingen

This Version is available at:

<https://hdl.handle.net/10419/85303>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

**Ibero-Amerika Institut für Wirtschaftsforschung
Instituto Ibero-Americano de Investigaciones Económicas
Ibero-America Institute for Economic Research
(IAI)**

**Georg-August-Universität Göttingen
(founded in 1737)**



Diskussionsbeiträge · Documentos de Trabajo · Discussion Papers
ISSN 1431-181X

Nr. 94

**Growth, Inequality and Well-Being:
Comparisons across Space and Time**

**Carola Grün
Stephan Klasen**

October 2003

Growth, Inequality, and Well-Being: Comparisons across Space and Time*

Carola Grün[†] and Stephan Klasen[‡]

October 7, 2003

Abstract

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 conclusions emerging from the analysis are that our well-being measures drastically change our impression of levels of well-being of countries. They also significantly affect the ranking of countries, when compared to rankings based on real per capita incomes. These results appear not very sensitive to the data on inequality which this analysis is based upon. However, since the inclusion of inequality has an important impact on well-being comparisons, it is of great importance to generate more consistent and intertemporally as well as internationally comparable data on inequality that are necessary for such comparisons.

JEL classification: I31, D63

*We thank Syed Ahsan, Tony Atkinson, François Bourguignon, James Foster, Thesia Garner, Nanak Kakwani, Ekkehart Schlicht, Tony Shorrocks, Michael Ward, for helpful comments and discussions on this topic. Comments on earlier drafts of the paper from discussant and participants at the 22nd IARIW conference in Cracow 2000, the inequality conference in Milan in 2002, the CESifo conference on globalisation in Munich 2002, and the UNU/WIDER conference on inequality, poverty and human well-being in Helsinki in 2003 were also much appreciated. We also thank David Jesuit and Tim Smeeding for giving us access to LIS inequality data.

[†]University of Witwatersrand

[‡]University of Göttingen

1 Introduction

Despite its well-known short-comings (including well-known omissions, the neglect of stock changes, the inclusion of defensive expenditures, etc.), 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 as well as GDP are important measures of production possibility and business cycles. Hence, 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 Kraay, 2002; Ravallion, 1997).

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 capability approach) would suggest that, *ceteris paribus*, high economic inequality reduces aggregate well-being. In fact, there exists 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).

In the past the application of those measures was limited, mainly because of lack of comparable data on income distribution. {For some applications of these measures for individual countries or groups of countries, see Jenkins (1997); Klasen (1994); Grün and Klasen (2001); Kakwani (1981). Recent years, however, have seen great advances being made in the generation of data on income inequality (e.g. Deininger and Squire, 1996; Gottschalk and Smeeding, 1997; WIID, 2000). Thus it seems natural to apply 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. While Grün and Klasen (2003) applies these measures to intertemporal and global assessments of well-being, the focus here is to undertake international comparisons of well-being for different benchmark years. Due to the use of different years, this analysis will also include an intertemporal component.

The analysis consists of three major parts. In a first step, income inequality-adjusted welfare levels are calculated using various measures for as many countries as possible in 1960, 1970, 1980, 1990, and 1998. In the *international analysis* countries are ranked according to their welfare level in both pure income based measures and inequality-adjusted welfare indicators for these different benchmark years. A comparison of country specific

¹There are other well-being indicators that have attempted to address some of the short-comings of the GNP measure, including Nordhaus and Tobin (1972); UNDP (2002a); Osberg and Sharpe (2001); World Bank (2002b). None of these, however, are primarily concerned with tackling the distributional issue addressed here.

levels of well-being will demonstrate by how much aggregate welfare in a particular country is reduced once the unequal distribution of its income is taken into account. Looking at the welfare ranks, winners and losers can be detected, i.e. some countries will reach a higher welfare rank than their income rank and vice versa. In a second step, we then examine relative rankings of countries over time. In a third step, we will undertake a thorough sensitivity analysis to examine the robustness of our findings.

It should be pointed out at the start that this study presents results of an exercise that, to some degree, is still speculative. On the theoretical side, we are not aiming to propose definitive measures of well-being. Instead, we merely wish to illustrate how reasonable and empirically supported ways of incorporating inequality in an assessment of well-being will change the impression of well-being across space and time. On the empirical front, the conclusions should be seen as similarly tentative. While today many more data on income inequality across space and time are available, the accuracy and comparability of many of them remain open to question (see Atkinson and Brandolini, 2001; Deininger and Squire, 1996). The robustness of the results will be checked by a thorough sensitivity analysis. None of this can, however, substitute for long consistent time series of internationally standardized and comparable data which are at present not available. Moreover, the international comparisons of inequality are limited by changing sample sizes and irregularly spaced data points on inequality so that it is difficult to assess changes in ranking over time. Despite these short-comings, the analysis generates a number of important and usable findings that appear to be fairly robust to most of the many data problems we encountered.

The paper is organized as follows: the next section discusses the theoretical issues involved in comparing well-being across space and time. Section 3 introduces the measures of well-being we use in the paper. Section 4 discusses the data and our manipulations for this analysis. Section 5 presents the results for the international analysis, section 6 the sensitivity analysis. Section 7 examines well-being across time, while 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.² Ever since it became evident that social choice theory was not yielding acceptable³ procedures for making social welfare judgements, such 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 welfare comparisons across space and time generates additional problems. Those are discussed in detail in Sen (1982, 1984) and will only be

²For a related discussion, see also Grün and Klasen (2001) and Grün and Klasen (2003).

³Acceptable 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.

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. Intertemporal or international welfare comparisons, however, address different questions. 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 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 poses another problem, namely the appropriate exchange rate for international comparisons. In the past, most real income comparisons were based on official exchange rates despite the knowledge that they are often distorted as a result of speculation and currency restrictions, and that they imply a systematic undervaluation of the non-traded sector in poorer countries. In recent years, the International Comparison Programme (ICP)⁵ has generated purchasing power parity estimates of GDP and GNP based on international prices that try to address these particular short-comings.⁶

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, these comparisons can yield meaningful outcomes. Given the ubiquity of such comparisons, it appears that most analysts are willing to make such assumptions.

The most commonly used indicator for welfare comparisons across space and time is real per capita income. It can be derived from utilitarian welfare economics, thus focusing on a consequentialist approach to welfare measurement, using three alternative 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). An alternative set of assumptions 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

⁴One could try to 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. But this also leads to considerable problems, as it is not clear which British person should compare themselves to which French person, or whose welfare function should be used. For a discussion of those issues, see Sen (1982, 1984).

⁵The ICP produces estimates of the economies' main aggregates which are comparable across countries. Purchasing power parities are generated and used for converting the data into a common currency (UN, 1992). Unfortunately, not all countries participate in the project which had its last round of surveys in 1996, so that PPP had to be estimated based on similar countries. For a discussion, see Heston, Summers, and Aten (2002)

⁶While the 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; Hill, 2000). Moreover, as is revealed below, PPP adjustments can differ in their outcomes as the differences between the World Bank estimates (based on the 1993 ICP) and the Penn World Tables (based on the 1996 ICP) demonstrate.

⁷We abstract from the difficulties associated with the treatment of saving in an indicator of welfare. For a discussion, see Osberg and Sharpe (2002).

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, social welfare is recovered 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 her 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 are necessary for all real income comparisons, one has to assume in addition that the income distribution is 'optimal' in the sense that the ethical worth of each person's marginal dollar is equal (Samuelson, 1947).

All three sets of assumptions are problematic. While many aspects of the various approaches appear unrealistic, the need to *explicitly* ignore the distribution of income in a welfare comparison is particularly unpalatable. 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 as well as subjective well-being) clearly suggest that utility functions are not linear in income or consumption, nor that the existing distribution of incomes is 'optimal' from a social welfare point of view.⁸ Instead, these theoretical and empirical considerations point to concave utility functions, i.e. inequality reduces aggregate welfare as the marginal utility of income among the poor is much higher than among the rich.⁹

Non-utilitarian views of welfare would also suggest that income inequality reduces aggregate well-being. For example, Sen's capability approach (Sen, 1987) which calls for a maximisation 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 space.¹⁰ Similarly, application of Rawlsian principles would also suggest that welfare is higher in societies where inequality is lower (Rawls, 1971).¹¹

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

⁸See for example Alesina, Di Tella, and MacCulloch (2002) who show with the help of U.S. happiness data and the Euro-Barometer Survey Series that income inequality negatively affects the utility level of individuals, even though personal characteristics like individual income are controlled for. For similar findings, see Blanchflower and Oswald (2003); Schwarze and Härpfer (2002)

⁹This 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).

¹⁰For example, there appears to be a concave relationship between income and life expectancy, and income and educational achievement. For a discussion, see Klasen (1994).

¹¹In the lexicographic version of the maximin principle, only the position of the worst off is relevant; if one generalises 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).

declining marginal welfare returns of income.¹² Each of the measures proposed in the next chapter does precisely this in slightly different ways.

Before turning to this issue, however, it seems useful to consider one explicit objection to the incorporation of distributional issues in an assessment of well-being. It could be argued that higher inequality will lead to higher subsequent growth rates, so that one should explicitly consider this trade-off in a welfare assessment. The reason for such trade-off might be related to higher inequality promoting savings¹³ or to the incentive problems associated with redistribution policies (often relying on progressive taxation of labor earnings and profits).

While this is a potentially powerful argument, it is just one of many dynamic considerations that would need to be considered in an inter-temporal assessment of well-being. Other issues to be considered in such an inter-temporal assessment would include the role of savings, longevity, human capital accumulation, population dynamics, depreciation of natural, physical, and human capital.¹⁴ These issues go beyond the scope of this paper which concentrates on a static assessment of well-being at a certain point in time.¹⁵

In addition, there is a growing consensus that this trade-off between distribution and growth does not 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, 1998; Alesina and Rodrik, 1994; Clarke, 1995; Persson and Tabellini, 1994; Klasen, 2002). While these findings are still tentative and subject to some debate,¹⁶ they suggest that the older claim, that high inequality is necessary for growth, does not seem to be born out by the facts (see also Klasen, 1994).

3 The Well-Being Measures Used

This section describes 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

¹²This approach would also retain the consequentialist logic of the utilitarian calculus which evaluates a state of affairs by the consequences it generates, with no emphasis on procedural issues. One might argue, however, that it is important to consider inequality also for procedural questions as high inequality effectively limits the choices for those at the bottom of the distribution. For a discussion, see Sen (1999).

¹³Assuming a Keynesian consumption function, a more unequal distribution of income leads to higher aggregate savings which is one of the main determinants of per capita income (and, at least in the short run, the growth thereof) in any growth model.

¹⁴For a discussion of some of these issues, see for example World Bank (2002b); Berry, Bourguignon, and Morrison (1991)

¹⁵Thus we will also not be able to deal with the potentially interesting but conceptually and empirically very difficult issue of life-time incomes and its distribution, which has to take into account both the life-time income profile of incomes as well as an assessment of the distribution of longevity.

¹⁶See, for example, Forbes (2000) and Lundberg and Squire (2001). The last-named 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 poor countries, while it has a different effect for income growth among richer countries; the former study finds that increases in income inequality in a country appear to be correlated with higher growth in the subsequent five years, but there are serious questions about the reliability of making inferences based on the small and error-prone intertemporal variation of inequality data within a country over time.

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:

$$W = \mu(1 - I), \quad 0 \leq I \leq 1. \quad (1)$$

Welfare W is a function of mean income μ , reduced by a measure of inequality I . Thus, the existing degree of inequality adjusts mean income downward to reflect the welfare loss associated with the (unequal) distribution of that mean income. Several measures will be considered because there are on the one hand differences with respect to the intensity of 'welfare penalty' that is imposed for inequality. On the other hand the measures vary in the way they penalize different types of inequality.

The first measure considered here was proposed by Sen (1982) and incorporates inequality by using the Gini coefficient G :

$$S = \mu(1 - G). \quad (2)$$

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 person receiving rank 1 and thus the lowest weight for her income). It can also be derived from a utility function where individuals consider not only their own income, 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 experimental and empirical findings on inequality aversion and the link between income distribution and reported well-being (e.g. Easterlin, 1995; Banerjee, 1997; Amiel, Creedy, and Hurn, 1999; Blanchflower and Oswald, 2003; Schwarze and Härpfer, 2002; Alesina, Di Tella, and MacCulloch, 2002). The measure also has a nice graphical illustration. As discussed by Sen (1997), it represents twice the area below the generalized Lorenz Curve (which in turn is the Lorenz curve scaled up by mean income).

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

$$D = \frac{\mu(1 - G)}{1 + G} = \mu\left(1 - \frac{2G}{1 + G}\right). \quad (3)$$

Clearly, the Dagum measure is a more extreme version of the Sen measure as it results in a higher penalty because of the denominator which imposes an additional punishment for inequality. The Dagum measure is also based on interdependent preferences and implies that people receive a further welfare penalty from the people ahead of them in the income distribution which also appears to be a reasonable assumption.¹⁷

In addition, two versions of the Atkinson welfare measure are presented. 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*,

¹⁷See Dagum (1990) for a derivation and justification of this measure.

as the welfare measure itself.¹⁸ 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 given in equation (4):¹⁹

$$A2 = \left[\frac{1}{N} \sum_{i=1}^N x_i^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}. \quad (4)$$

The measure depends crucially on the exponent ε , the *aversion to inequality factor*. The higher ε , the higher the penalty for inequality. Two cases are studied explicitly, $\varepsilon = 2$, denoted as $A2$, and $\varepsilon = 1$ ($A1$). In the latter case, the general form of the Atkinson measure is not defined and changes to:

$$\ln(A1) = \frac{1}{N} \sum_{i=1}^N \ln(x_i). \quad (5)$$

The Atkinson measures can be derived from social welfare functions that are additively separable functions of the individual incomes x_i . 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 $\varepsilon > 0$. All the measures exhibit constant relative risk aversion. The $\varepsilon = 1$ 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. While clearly $\varepsilon = 2$ penalises inequality more than $\varepsilon = 1$ 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, also appears to be within the range of reasonable presumptions (see Deaton, 1997; UNDP, 1995). Such penalties of inequality are still consistent with findings from the micro literature on utility and risk.²⁰ Most of the non-utilitarian theories suggested above would, in fact, require considerably higher inequality aversion.²¹

Before turning to the data and the results, it is important to briefly discuss the most important differences between the measures.²² Apart from the size of 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. As is already stated above, the Atkinson measures only consider individual incomes in an assessment of well-being while the Sen and Dagum measures consider relative incomes, i.e. the income distribution itself has a separate impact on well-being

¹⁸This has been done, for example, for Britain by Jenkins (1997) and also by UNDP in deriving the gender-related development index (UNDP, 1995). For a discussion of this index, see Bardhan and Klasen (1999).

¹⁹This measure also satisfies the general form of the well-being measure $W = \mu(1-I)$ where $I = \frac{1-A}{\mu}$. See Atkinson (1970) for discussion.

²⁰For different ways to measure inequality aversion and their results, see Stodder (1991); Amiel, Creedy, and Hurn (1999). See also discussion below.

²¹A strict interpretation of Rawls lexicographic maximin principle would require ε to be infinite (see also Atkinson, 1970).

²²For a more extensive discussion of these issues, refer to Atkinson (1970), Blackorby and Donaldson (1978), Sen (1997) and Dagum (1990).

(apart from its impact on the levels of individual incomes). As a result, the two groups of measures obey different properties. While all measures are consistent with the Dalton principle of transfers²³, the Atkinson measures additionally obeys a condition called transfer sensitivity. 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 (Sen, 1997). Most would agree that this is, at first blush, 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. The difference occurs 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 many see this as an undesirable property of the Gini-based measures, there is some empirical support that such income comparisons at the mode of the distribution are indeed highly relevant for welfare assessments.²⁴

Secondly, the Atkinson measures are subgroup consistent (implying that any increase in inequality in a subgroup will raise overall inequality and thus lower overall welfare), they are consistent with the Pareto principle (an increase in income of one person, holding all other incomes constant, will increase welfare) and are Generalized Lorenz Consistent (if a Generalized Lorenz Curve of a distribution is somewhere above and nowhere below the GLC of another distribution, welfare is higher in the former case). In contrast, none of the Gini-based measures are sub-group consistent and the Dagum measure additionally violates the Pareto Principle and is not Generalized Lorenz Consistent (although this only happens in rather extreme cases, see Dagum (1990)). There is some debate whether sub-group consistency is a desirable property or not. While some support it as a logically coherent requirement, others suggest that the impact of sub-group inequality on overall inequality and welfare depends heavily on the relative position of that sub-group in the overall income distribution (e.g. Sen, 1997; Dagum, 1990). Similarly, while the violation of the Pareto and Generalized Lorenz Criterion of the Dagum measure might be seen as problematic, a case can be made that such violations might be justified in extreme circumstances.²⁵

While the Atkinson measures thus have more desirably theoretical properties, the experimental and empirical literature on inequality aversion and subjective well-being generally seems to find more support for the Gini-type measures.²⁶ Regarding the size of the penalty for inequality, there is virtual unanimity in the literature that some form of inequality aversion or declining marginal well-being return of income is empirically observed, but the size of the well-being penalty for inequality differs greatly among individual studies, ranging from values below to above the ones considered here. It appears

²³The Dalton principle of transfers says that the value of an inequality measure must fall by a transfer from a richer person to a poorer person which does not reverse their position in the income ranking.

²⁴For a recent study on these issues, see for example Graham and Pettinato (2002). Analysing data from Peru (covering the period 1985-2000) and Russia (1995-1998), they found that relative income differences seem to matter more for those in the middle of the distribution than for other income groups.

²⁵For example, if the richest person in society got a bit richer, the Pareto and Generalized Lorenz Criterion suggest an improvement of welfare. One might, however, plausibly argue that everyone else is worse off due to the greater distance they now have to the richest person and that this negative effect might outweigh the positive effect of the higher mean income. For a discussion, see Dagum (1990).

²⁶See for example Amiel, Creedy, and Hurn (1999); Easterlin (1995); Alesina, Di Tella, and MacCulloch (2002); Kapteyn and van Herwaarden (1980); Wansbeek and Kapteyn (1983)

that studies that are investigating the impact of inequality on subjective well-being find larger inequality aversion than those based on experiments.²⁷ But the range of the penalty for inequality aversion considered here is well within the range found in the experimental and empirical literature.

4 The Data

For the following analysis, the main source of data on inequality is the World Income Inequality Database version 1.0 (WIID, 2000), which provides more than 5.000 Gini coefficients and associated distributions for 151 countries. The main sources used for assembling the data set were the Deininger-Squire data (Deininger and Squire, 1996), the Luxembourg Income Study (LIS, 2000), the TransMonee Project (TransMonee, 1999) as well as other research studies and information provided by various Central Statistical Offices. To get recent data for developing countries as well as some OECD countries, Gini coefficients and income shares published by the World Bank's Poverty Monitor (World Bank, 2002a) and directly provided by LIS are added.²⁸ In WIID all observations are classified as either 'reliable' or 'less reliable'. Only observations which are categorised as 'reliable' and represent the entire population of a country are considered.²⁹ With respect to the underlying income concept, inequality data must be based on gross or net income, or on expenditures. Regarding the unit of income recipient, data based on person (or household per capita), or households are chosen. Only for few countries the analysis has to rely on data that either have been adjusted for household composition using an equivalence scale or where the income concept used and the reference unit are unknown.³⁰ The data are assembled for 5 benchmark years (1960, 1970, 1980, 1990, 1998). In cases where there is no data point for that particular benchmark year, the closest data point available was chosen, as shown in 1, which also shows the country acronyms used in subsequent tables.³¹ In the case where several Gini coefficients with associated distributions were available for

²⁷See for example Amiel, Creedy, and Hurn (1999); Blanchflower and Oswald (2003); Alesina, Di Tella, and MacCulloch (2002); Stodder (1991); Schwarze and Härpfer (2002); Kapteyn and van Herwaarden (1980).

²⁸Our special thanks go to David Jesuit and Tim Smeeding for kindly providing the most recent data of several OECD countries.

²⁹The quality of income inequality data provided by Deininger and Squire (1996) was already evaluated by them. If the data satisfy a minimum standard, i.e. they are based on household surveys, representative of the entire country, and a comprehensive concept of income (or expenditure) is used, they are included in the so-called 'high quality' set. Atkinson and Brandolini (2001), however, warn of the 'mechanical use' of the data. In WIID, data have been scrutinized one by one once again and the quality of the data was sometimes rated differently. Therefore, it happens that data classified as 'not accepted' and therefore not contained in the quality subset of Deininger-Squire are part of the 'reliable data set' in WIID. The opposite, that data belonging to the quality set but are categorized as 'not reliable' in WIID, is also possible.

³⁰For a discussion of the use of equivalence scales in the context of welfare measurement, please refer to Atkinson, Rainwater, and Smeeding (1995), Deaton (1997), and Ayala, Martinez, and Ruiz-Huerta (2001).

³¹The greatest concessions had to be made for less developed countries like Pakistan, Panama and Chile in 1960, or for Nepal, Indonesia and Singapore in 1970. But also in case of developed countries like Finland in 1960 and 1970, or Belgium and Italy in 1970, the inequality data come from considerably later periods. For 1998, the latest available income distribution estimate has been applied which in a few cases date as far back as 1990 or 1991, but in most cases comes from the period 1993 to 1997. Combining

a particular country at a particular point in time, the observation consistent with the definition of previous or subsequent benchmark years was retained.

Ideally, one would want to at least ensure that the indicators used are based on a consistent definition of income and reference unit both across countries and time.³² Pursuing this strategy would result in only a small number of countries and not allow a meaningful international analysis. While the main analysis deals with differing income concepts and reference units, in the sensitivity analysis, we try to generate consistent data by making suitable adjustments to base all data on unequivalized gross income per person.

Regarding income data one could consider per capita income, per capita disposable income, or per capita consumption (from national accounts or from household surveys). To get the largest possible sample and to compare ourselves directly to per capita income as the commonly used welfare indicator, we rely on per capita gross national product³³ as presented in the national accounts as the income concept used. The calculation of the well-being measures is based on purchasing power adjusted real GNP per capita provided by the Penn World Table (PWT), versions 6.1 Aten:2001. For comparative purposes, data on GNP per capita based on official exchange rates from the World Bank for all years as well as the World Bank's purchasing power adjusted GNP per capita figures³⁴ for the years 1980, 1990, and 1998 (WDI, 1999, 2001, 2002) will also be presented.³⁵

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.³⁶ The next two are the Atkinson measure with $\varepsilon = 1$ and the Sen measure, exhibiting a comparatively 'mild' well-being penalty for inequality. The last two are the Atkinson ($\varepsilon = 2$) and the Dagum measures with a more heavy implied well-being penalty for inequality. The analysis is restricted to only 43 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.

an income estimate from the exact benchmark year with inequality data that might come from up a few years earlier or later is done under the (implicit) assumption that changes in income distribution between adjacent years are typically smaller than changes in mean income, which is clearly born out by the countries for which we have exact data.

³²Even if Gini coefficients are based on the same definition of income and economic unit they might not be comparable across countries, because of differences in sample methods, quality of surveys etc. (see WIID, 2000).

³³Gross national product should better capture welfare of the population than gross domestic product as the former includes earnings from abroad and excludes earnings by foreigners. We could also rely on consumption means from household surveys, but this is unavailable for many of our data points. Also, there are large and generally not well understood discrepancies between survey means and national accounts consumption data, that differ across countries. For a discussion, see for example Ravallion (2002).

³⁴The series used is GNI per capita, PPP in current international dollars. Gross national income is the "sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income [...] from abroad" (WDI, 2002). All data taken from the World Bank were deflated to 1996 prices using the US GDP deflator (WDI, 2002) as this is the base year in PWT 6.1.

³⁵To compare changes in well-being across time in a particular country, we also use real per capita GNP in local currency units, as reported in the WDI (2002)

³⁶The country acronyms are explained in Table 2.

Well-being, as estimated by the various measures, falls drastically when considering inequality. Using the Atkinson ($\varepsilon = 1$) or Sen measure, well-being falls by about 10-65 per cent, and 70 (Brazil and Mexico) to nearly 80 per cent (Gabon) in the Atkinson ($\varepsilon = 2$) and Dagum measures. Compared to pure income per capita measures, existing inequality leads to major reductions in measured well-being in all the countries considered, but the size of the well-being penalty differs greatly between countries.

As expected from the discussion of inequality-adjusted measures above, there are some differences in the extent of 'penalty' for inequality, depending on the measure used. For example, Pakistan (PAK) gets penalized less by the Atkinson ($\varepsilon = 2$) measure than the Sen measure, while the reverse is the case for the Philippines (PHL). The reason is that in the Philippines the poorest do particularly badly corresponding to a heavy penalty in the Atkinson measure, while in Pakistan the middle income groups do relatively worse, which attracts the higher penalty in the Gini-based measure.

Regarding the ranking of countries, there is a considerable difference between the ranks using exchange rate and PPP, suggesting the presence of over- and undervalued exchange rates. As expected and consistent with the Balassa-Samuelson Theorem, the discrepancy between per capita income evaluated at official exchange rates and PPP is larger among poorer countries, related to the undervaluation of the non-traded sectors. Regarding ranks of countries, no assessment of inequality can dislodge the USA from the highest rank in all measures that use PPP-adjusted income, and nothing can prevent Tanzania (TZA) from being at the bottom of the list for those indicators with data being available. But there are a number of remarkable rank reversals when inequality is progressively being considered. For example, Bangladesh (BGD) and Madagascar (MDG) trade places between the pure income and the broader well-being measures. In the two income measures Madagascar is four ranks ahead; in the last two columns, Bangladesh is six and seven ranks ahead.³⁷ A similar reversal occurs, somewhat surprisingly, between Britain (GBR) and Sweden (SWE). Sweden is ahead in the pure income measures, while Britain is ahead in measures that also consider distribution; in fact, it mostly occupies the second highest spot in this list. This suggests that the very low inequality observed in today's Sweden was not already present in the 1960s, and the rise of Britain in the distribution-adjusted measures reminds us that Britain was among the most equal countries in Europe in 1960.³⁸

Table 3 shows the rankings for 48 countries in 1970. 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 (BRA) and Gabon (GAB) are among the countries that lose most: Well-being using the Dagum measure is about 75 per cent below the level it would be if its per capita income were equally distributed. The USA is the best-off countries only when using PPP-adjusted per capita income. As soon as inequality is considered, it is surpassed by Denmark (DNK). In the Atkinson ($\varepsilon = 2$) measure, the US is additionally surpassed by the Netherlands (NLD) and Australia (AUS), suggesting

³⁷Colombia is another country that also falls considerably, once PPP and inequality is considered.

³⁸Gottschalk and Smeeding (2000) also report fairly high income inequality in Sweden in the 1960s, consistent with the results here. In the Luxembourg Income Study (LIS), which begins only in the 1980s, Sweden is found to be considerably more equal than Britain. The reversal occurred due to drastically rising inequality in Britain in the 1980s and a sharp drop in inequality in Sweden in the 1970s. See also the sensitivity analysis in the next chapter and Atkinson and Brandolini (2001); Grün and Klasen (2003).

that the poorest fare much worse in the US than in these two countries, thus attracting the higher penalty in the Atkinson measure. At the bottom Nepal (NPL) has the lowest well-being regardless of the measure used. Some more dramatic reversals in rank occur. Panama falls from number 26 in the exchange rate list to number 39 in Atkinson ($\varepsilon = 2$) measure. Conversely, the Philippines rises from 12 ranks below in the first column to one rank above Panama (PAN) once inequality is considered in the Atkinson ($\varepsilon = 2$) measure. Unequal Brazil trades places with more equal Korea (KOR), and now Sweden maintains its rank when inequality the Gini-based inequality measures are applied, while Britain's fall in the income rank cannot be completely compensated by its still comparatively low inequality.

Table 4 examines 58 countries for 1980. There is one more indicator, PPP adjusted income per capita from the World Bank (WDI, 2002), which is placed alongside the PPP data from the Penn World Tables. The comparison suggests the World Bank's PPP adjustment, which are based on the 1993 ICP, and the PWT's PPP adjustment, which are based on the 1996 ICP, while similar, do not come to the same results many countries. This is particularly pronounced for countries which did not participate in one or both of these exercises and where the incomes were therefore estimated. For example, China (CHN), Indonesia (IDN), Botswana (BWA), Malaysia (MYS), and Venezuela (VEN) look somewhat 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 case for most Latin American countries (except Venezuela), the Philippines, Korea, and virtually all OECD countries.³⁹ Several rank changes happen as a result of these differences in the PPP adjustments. To facilitate comparisons with the earlier tables, we continue to base our inequality-adjustments on the PWT which is also likely to be more reliable as it is based on a more recent ICP survey.

The inequality-adjusted measures continue to show much lower well-being than the income measures. Brazil, Colombia (COL), and Gabon continue to suffer from the largest reductions in well-being. Due to (comparatively) high income growth and little change in inequality, the US regains its top spot in all PPP-income and inequality-adjusted measures, and Ethiopia is at the bottom in all measures considered. But important rank reversals continue in-between. Near the bottom, Nepal rises above Bangladesh due to much lower inequality in Nepal.⁴⁰ Similarly, Morocco (MAR) far surpasses Botswana (BWA), once inequality is progressively considered and more equal Korea now surpasses much richer but much more unequal Gabon by up to three ranks. Among richer countries, Britain still rises in the ranks when inequality is considered. Unequal Brazil and more equal Costa Rica now trade places.

Table 5 examines the per capita income and well-being in 73 countries in 1990. The differences between the PWT and the World Bank PPP adjustments still exist, but remain consistent in the sense that the differences in assessment in 1990 are largely the same as for

³⁹A small part of the problem might be related to the use of the US GDP deflator to turn current PPP GNI into 1996 prices. But when using the PWT's deflators, the results are very similar and the differences observed above remain. They are likely to be due to differences between the 1993 and the 1996 ICP as well as different adjustment and estimation procedures for countries that did not participate in the one or both of the surveys.

⁴⁰The sharp drop in inequality in Nepal is surprising and might partly be due to data quality issues. See also discussion below

1980, although they are generally smaller now, particularly among OECD countries.⁴¹ The inequality-adjusted well-being measures continue to show levels of well-being up to 75% lower than per capita income. Inequality-adjusted well-being is particularly low in some African (such as South Africa (ZAF), Sierra Leone (SLE), Zimbabwe (ZWE), and Kenya (KEN) as well as Latin American countries (including Brazil, Chile (CHL), Honduras (HDN), Guatemala (GTM), and Mexico (MEX)). Sierra Leone has the dubious distinction of having the lowest income shares in its poorest quintile observed anywhere in the data set so that well-being is reduced by 84% if the Atkinson ($\varepsilon = 2$) measure is applied.

Regarding rank reversals, Brazil and South Africa, two of the world's most unequal countries, get surpassed in the Atkinson measure ($\varepsilon = 2$) by Egypt, a country 17 and 22 ranks, respectively, below in the income ranking with less than half the PPP income per capita. That is to say, South Africa could generate the same level of well-being with less than half of its per capita income, if that income was as evenly distributed as it is in Egypt.

Low levels of income and sizeable income inequality assure that many African countries land at the bottom end in all measures. In contrast, China and all South Asian countries rise in ranks, once inequality is considered. At the other end of the spectrum, the US only retains the second spot in the PPP-adjusted income measures and the mildly penalizing inequality-adjusted measures. In the Dagum measure it is surpassed by Canada (CAN) and Luxembourg (LUX) and, in the Atkinson ($\varepsilon = 2$) measure, additionally by Belgium (BEL) and Finland (FIN). 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).⁴² Similarly, higher inequality in Britain ensures that the country no longer rises in ranks once inequality is considered.

Table 6 shows the well-being measures for 77 countries in 1998. At the bottom end, we again find mostly African countries. Indonesia still improves in ranks and is now ahead of Peru in the Dagum and Atkinson ($\varepsilon = 2$) measures. Likewise, poorer but more equal Bulgaria (BGR) and richer but more unequal Mexico trade places in those two measures. The same applies to poorer but more equal Turkey and richer but more unequal Chile. At the top end, Luxembourg continues to top the well-being list in all indicators, but the USA is now back to the second or third rank. This is again due to higher income growth in the US (with little change in inequality), compared to other nations. Rising inequality and poorer growth in Canada leads to a fall in ranks for Canada (compared to 1990) and it now surpassed by some other OECD countries in the Atkinson ($\varepsilon = 2$) and Dagum measures. Also, higher inequality in Britain ensures that Britain for the first time falls in

⁴¹As a result, growth among richer countries appears higher when using the PWT than when using the WDIs. This is discussed in detail in Grün and Klasen (2003).

⁴²Please note that these results differ from Ayala, Martinez, and Ruiz-Huerta (2001) who, based on micro data, find that the US is surpassed only by Belgium in the Atkinson ($\varepsilon = 2$) measure, while Canada and Sweden remain considerably worse off. The difference in findings is probably due to the fact that the present analysis uses the mean (gross) income variable based on national accounts, while in Ayala, Martinez, and Ruiz-Huerta (2001) mean income refers to disposable income based on adjusted micro data. Other sources of differences could be the different PPP adjustments (PWT versus OECD PPP adjustments), and differences in the measured Gini coefficients.

rank, once inequality is concerned. In contrast, Sweden rises considerably in rank, once inequality is considered. In fact, in Sweden has the smallest inequality recorded here and thus the least reduction in well-being in the inequality-adjusted measures. In the Atkinson ($\varepsilon = 2$) measure, well-being is reduced by only 14%, and in the Dagum measure by only 36%.

It is hard to summarize the many particular findings from this discussion and the much more detailed information contained in the tables. But a few points are worth noting. First, as expected, real income comparisons based on official exchange rates give a very misleading impression of well-being. In particular, they systematically understate well-being in developing countries. At the same time, there are also persistent and systematic discrepancies between the two sets of available PPP estimates. Secondly, the consideration of the income distribution has a large impact on well-being. Well-being falls by 15-85 per cent once inequality is taken into account. Third, this has a large impact on static comparisons of well-being in the five benchmark years as discussed in detail above. But fourth, it also changes the impression of relative well-being changes between countries over time. The comparison of welfare levels between Indonesia and Peru in 1980-1998 in Figure 1 is a good example. Relying on per capita income measures, Peru is far ahead of Indonesia in all years. But due to higher growth in Indonesia in the 1980s, the gap is getting smaller. But once inequality is considered as well, Peru's welfare level drops sharply and in 1998 Indonesia has not only closed the gap but, when using the Atkinson ($\varepsilon = 2$) measure or the Dagum measure, reached a slightly higher welfare level than Peru. While it is still far from closing the per capita income gap to Peru, it has already closed the well-being gap due to its much lower inequality.⁴³ Figure 2 which examines the welfare levels for the US and Canada between 1970 and 1990 is another good illustration of the impact of growth and inequality changes on the relative rankings of countries. While the negatively sloped curves for the US (from per capita income to inequality-adjusted income levels) become steeper when going from 1970 to 1990 thereby indicating rising inequality which leads to lower welfare levels, Canada experiences declining inequality and is thus able, according to the Atkinson ($\varepsilon = 2$) measure and the Dagum measure, to reach a higher welfare level than the US.⁴⁴ This is particularly the case when the Atkinson measure is used suggesting that the well-being comparison is driven by particularly large differences in the income share of the poorest quintile. As shown in the Figure, Canada's well-being advantage would be even larger if an Atkinson measure with a greater penalty (the example here is $\varepsilon = 5$) were used.

A third illustrative example is the comparison between Poland and Brazil from 1980 to 1998. In all three years, Poland and Brazil have similar per capita income levels. But due to the much higher inequality in Brazil, well-being is dramatically lower in all three years. This is particularly pronounced in 1990 where the gap in inequality between the two countries is particularly sizable. In 1998, the situation changes a bit. While Brazil had reduced its inequality a bit, it increased considerably in Poland, so that the gap in the inequality adjusted measures is considerably smaller now.

⁴³These figures already include the impact of the Asian financial crisis on economic growth in Indonesia which was sharply negative in 1997 and 1998; if Indonesia returns to its previous high growth, it will soon surpass Peru in per capita income, and, if it is able to maintain its relatively low inequality, it will far surpass it in well-being terms.

⁴⁴Interestingly, Canada, despite its smaller income, also regularly surpasses the US in the Human Development Index calculated by the United Nations Development Programme UNDP (2002b).

While Poland is a transition country where both per capita income and inequality increased in the 1990s, there are many more transition countries where per capita income *shrank* and inequality increased.⁴⁵ In Figure 4 the well-being implications are powerfully demonstrated.⁴⁶ In 1990, Kyrgyzstan and Ukraine both had higher per capita incomes and lower inequality than Egypt, thus having much higher levels of (inequality-adjusted) well-being. In 1998, inequality has increased sharply to levels higher than Egypt's, and income growth was negative over the decade, while Egypt experienced moderate income growth and maintained its inequality level. As a result, per capita incomes in Egypt in 1998 is about the same as in Ukraine and substantially higher than in Kyrgyzstan. Once inequality is considered, well-being is now significantly higher in Egypt than in Ukraine and the well-being gap to Kyrgyzstan is much larger than the income gap. Looking at the income decline in transition countries thus seriously understates the comparative performance of this group of countries. In well-being terms, the 1990s were even more of a catastrophe for many transition countries than suggested by per capita income.

The results from this section clearly demonstrate the large impact our inequality-adjusted measures have on our impression of absolute levels of well-being in countries, the comparative ranking of countries at particular points in time, and the impression of the change in rankings over time. Clearly, considering inequality matters for international assessments of well-being.

6 Sensitivity Analysis

The robustness of the results is checked with the help of two different approaches. First, we simply replace the data on income distribution used in the original analysis by alternative data. Those are either based on different income concepts and/or reference units or come from a different data source.⁴⁷ For countries with such alternatives available, we replace the Gini coefficients and income shares, calculate the measures, rank the countries again and compare the results with those obtained from the original analysis.

Table 7 shows the Gini coefficients and their alternatives, what income concepts and recipient units they are based upon as well as the resulting changes in rankings. The simultaneous replacement approach leads mainly to no or only small changes in ranking. In a few cases, more dramatic changes occur although it is unclear to what extent these are due to data errors.⁴⁸

⁴⁵This issue, and its well-being implications, has been discussed in detail by Grün and Klasen (2001).

⁴⁶As the PWT have no income data for many transition countries, this figure is based on the WDI data.

⁴⁷In addition, this replacing approach is restricted to alternative data which are based on the same year (plus/minus one year) as used in the main analysis. The source of alternative data is given in Table 7.

⁴⁸An interesting example is Jamaica in 1960. The alternative Gini coefficient used for Jamaica in 1960 exceeds the one originally used by only 1.7 percentage points, which leads to only little changes in ranking when focussing on the Gini based measures. However, the income shares from the alternative source are very different, leaving the poorest 20 per cent with only half the income and increasing the share of income going to the richest 20 per cent of population considerably. The Atkinson measures responds to these dramatic changes with notably lower ranks. It is quite implausible that a very similar Gini can produce such great differences in income shares, suggesting a data error. We nevertheless used the data

Turning to the year 1980, Canada and Norway experienced significant changes in ranking. For both countries the alternative Gini coefficients were taken from LIS (2000) and are based on the same specifications as the ones used in the original analysis. However, the Gini coefficients itself differ considerably, thereby leading to changes up to 8 ranks. Data on inequality provided by the Luxembourg Income Study are derived from micro data sets and undergo different strategies of top and bottom coding. Both differences may contribute to the existing differences in rank⁴⁹.

Mexico in 1990 is another example of the range of inequality data available for one particular point in time. Both Gini coefficients were provided by Deininger and Squire (1996) but belong to different quality classifications. The main difference between the two indices is the income share going to the richest 20 per cent of population, which amounts to 59.3 per cent in the first distribution but is declining to 53.6 per cent in the one used alternatively. Consequently, the distribution of income is more equal according to the alternative data and especially the measures that penalize the existing degree of inequality more rank Mexico up to 6 positions higher. Despite these particular anomalies and differences, the overall impression from Table 7 is one of great stability in the ranks when alternative inequality data are used.

In a second kind of sensitivity analysis, we use a regression-based approach to deal with the inconsistencies in terms of the income concepts and reference units used. The sample is expanded by adding countries not considered in the main analysis but which are part of the reliable set in WIID (2000). This enables us to get several observations per country at the same time which should enhance our ability to identify the reference unit and income definition effects. In particular, we regress the Gini coefficients available on the income definition (expenditure, net income, unknown income, or gross income, the excluded category), and the reference unit considered (household, family, unknown, equivalized, or person, the excluded category). Following suggestions from Atkinson and Brandolini (2001), dummy variables for Deininger-Squire data labelled as 'cs' (no consistent source) and 'ps' (primary source unknown) are also included.

Regression 1 in Table 8 shows that indeed the income definition and the choice of reference unit do matter. Expenditure-based and net-income or equivalized Gini coefficients are typically lower, while household-based Gini coefficients appear to be higher.⁵⁰ The interaction term net income and OECD countries in the second regression shows that the difference between gross and net income is largely a phenomenon of OECD countries, as one would expect (Atkinson and Brandolini, 2001).

As a next step, the Gini coefficients are adjusted according to the regression results from the first estimation. All the Gini coefficients are thereby based on the omitted categories, i.e. gross income per person. This way we hope to have dealt with the most

as both the 'original' source (Deininger and Squire, 1996) and WIID classified them as reliable. Clearly, more thorough analysis of the consistency of Gini coefficients and income shares in the two inequality data bases might be necessary.

⁴⁹See Atkinson and Brandolini (2001) for a discussion of related issues

⁵⁰The somewhat surprising result about household-based Gini coefficients was also found by Lundberg and Squire (2001). Note that the regressions here have considerably higher explanatory power (as measured by the R-squared) as the ones used by Dollar and Kraay (2002) and Lundberg and Squire (2001). We do not make a similar adjustment for quintile shares where a similar regression was much more poorly determined. As a result, we are only able to apply this sensitivity analysis to the Gini-based measures.

glaring inconsistencies, although further adjustments are surely possible (Atkinson and Brandolini, 2001).

How do the results change if one uses these adjusted Gini coefficients for the calculation of the Gini based measures? Table 9 shows that generally the results do not change greatly. Using the Sen measure, the vast majority of rankings remain the same or change only by one position. Regarding the Dagum measure, more significant variations happen, but again there is more persistence than change. Only in 1990 are there more significant changes in rank. Moreover, all of the dramatic rank reversals and changes discussed earlier still hold.

These sensitivity analyses suggest that few of the basic results on the large absolute impact of income inequality and the change in ranks as a result of it are seriously affected by using different data sets or addressing the inconsistencies in the underlying income concept and reference unit. However, quite a number of individual rankings are affected so that analyses focussing on smaller differences, particularly among OECD countries, should be based upon more consistent data sources rather than rely on the somewhat heterogeneous information used here (e.g. Ayala, Martinez, and Ruiz-Huerta, 2001).

7 Concluding Remarks

Most theories of well-being as well as an overwhelming array of experimental and empirical literature document the well-being penalty imposed by inequality. Nevertheless, this insight is rarely used to adjust international and intertemporal comparisons of well-being. In this paper we combine the insights from this literature with newly available internationally (roughly) comparable data of per capita income and its distribution to demonstrate the impact of considering inequality in an assessment of well-being. The impression of well-being derived from inequality-adjusted measures drastically differs from the one obtained when looking at the mean income alone.

In particular, due to sizable inequality existing in most countries, our measures show dramatically reduced levels of well-being, compared to per capita income. Due to great differences in inequality between countries, incorporating inequality has a sizable impact on the ranking of countries in terms of their average well-being. Countries like Brazil, Mexico, Chile, but also the USA have considerably lower levels of well-being than suggested by per capita income. In contrast, countries such as Indonesia, Bangladesh, Finland, Sweden and Belgium are examples of reaching a higher well-being rank than their pure income rank. Moreover, different trends in inequality affect the ranking of countries over time. In particular, the progressive worsening of Britain in the inequality-adjusted ranks is not just due to a falling behind in per capita incomes, but also due to worsening inequality, compared to other industrialized countries. More dramatically, inequality-adjusted well-being in many transition countries in the 1990s has collapsed to levels of lower middle-income countries and sometimes even low-income countries due to the combination of drastically falling inequality and greatly increased inequality.

Our sensitivity analysis suggests that the results are quite robust to using different data sources and to dealing with some of the known inconsistencies in the inequality data. Nevertheless, there remains much room for improvement in generating more consistent, comparable, and timely inequality data that will allow more accurate and robust assessments of well-being across space and time.

Table 1: Income and Inequality Data, 1960-1998

Country	Code	1960	1970	1980	1990	1998
Algeria	DZA	-	-	-	1988 (38.7)	1995 (35.3)
Australia	AUS	-	1969 (32.0)	1981 (40.0)	1990 (41.7)	1994 (31.1) ^b
Bahamas	BHS	-	-	-	-	1993 (45.3)
Bangladesh	BGD	1963 (37.3)	1973 (36.0)	1981 (39.0)	1989 (28.9)	1996 (33.6)
Barbados	BRB	-	-	1979 (48.9)	-	-
Belgium	BEL	-	1979 (28.3)	1985 (26.2)	1988 (26.6)	1997 (25.0) ^b
Benin	BEN	1959 (42.0)	-	-	-	-
Bolivia	BOL	-	1968 (53.0)	-	1990 (42.0)	-
Botswana	BWA	-	-	1986 (54.2)	-	-
Brazil	BRA	1960 (53.0)	1970 (57.6)	1980 (57.8)	1989 (59.6)	1997 (51.7) ^a
Bulgaria	BGR	-	-	-	1990 (24.5)	1997 (27.3)
Burkina Faso	BFA	-	-	-	-	1994 (48.2)
Burundi	BDI	-	-	-	-	1992 (33.3)
Cambodia	KHM	-	-	-	-	1997 (40.4) ^a
Canada	CAN	1965 (31.6)	1971 (32.2)	1981 (31.8)	1990 (27.6)	1998 (30.5) ^b
Central African Republic	CAF	-	-	-	-	1993 (61.3)
Chad	TCD	1958 (35.0)	-	-	-	-
Chile	CHL	1968 (45.6)	1971 (46.0)	-	1990 (56.1) ^a	1994 (54.8) ^a
China	CHN	-	-	1980 (32.0)	1990 (34.6)	1997 (39.8) ^a
Colombia	COL	1964 (62.0)	1970 (52.0)	1978 (54.5)	1991 (51.3)	-
Costa Rica	CRI	1961 (50.0)	1971 (44.4)	1981 (47.5)	1989 (46.1)	-
Cote d'Ivoire	CIV	1959 (43.0)	-	1985 (41.2)	1988 (36.9)	1995 (36.7)
Denmark	DNK	1963 (37.0)	1976 (31.0)	1981 (31.0)	1987 (33.1)	1995 (37.4)
Dominican Republic	DOM	-	-	1984 (43.3)	1989 (50.5)	-
Ecuador	ECU	-	1968 (38.0)	-	1988 (43.9) ^a	1995 (43.7)
Egypt	EGY	-	-	-	1991 (32.0)	1995 (28.9)
El Salvador	SLV	1965 (53.0)	-	1977 (48.4)	-	-
Ethiopia	ETH	-	-	1981 (32.4) ^a	-	1995 (40.0)
Fiji	FJI	-	1968 (46.0)	-	-	-
Finland	FIN	1966 (31.8)	1977 (30.5)	1980 (30.9)	1987 (26.1)	1997 (23.6)
France	FRA	1962 (50.0)	1970 (39.8)	1979 (34.9)	-	1994 (28.8) ^b
Gabon	GAB	1960 (64.0)	1975 (59.3)	1977 (63.2)	-	-
The Gambia	GMB	-	-	-	-	1992 (47.8)
Ghana	GHA	-	-	-	1989 (36.7)	1997 (32.7)

continued on next page

Table 1: *continued*

Country	Code	1960	1970	1980	1990	1998
Greece	GRC	1957 (38.0)	1974 (35.1)	1981 (33.3)	1988 (35.2)	-
Guatemala	GTM	-	-	1979 (49.7)	1989 (59.1)	-
Guinea	GIN	-	-	-	1991 (46.8)	1994 (40.3)
Guinea-Bissau	GNB	-	-	-	-	1991 (56.2)
Guyana	GUY	1956 (56.2)	-	-	-	1993 (40.2)
Honduras	HND	-	1968 (61.9)	-	1990 (57.4) ^a	1992 (52.6)
Hong Kong	HKG	-	1971 (40.9)	1980 (37.3)	1986 (42.0)	1991 (45.0)
Hungary	HUN	-	1972 (22.8)	1982 (21.0)	1991 (23.3)	1998 (25.3)
India	IND	1960 (32.6)	1970 (30.4)	1983 (31.5)	1990 (29.7)	1997 (37.8)
Indonesia	IDN	-	1976 (34.6)	1980 (35.6)	1990 (33.1)	1995 (34.2)
Ireland	IRL	-	1973 (38.7)	1980 (35.7)	1987 (34.6)	-
Italy	ITA	-	1977 (36.3)	1980 (34.3)	1989 (32.7)	1995 (34.2) ^b
Jamaica	JAM	1958 (54.3)	1975 (44.5)	1988 (43.2)	1990 (41.8)	1996 (36.4)
Japan	JPN	1962 (37.2)	1970 (35.5)	1980 (33.4)	-	-
Jordan	JOR	-	-	1980 (40.8)	1991 (40.7)	1997 (36.4)
Kenya	KEN	-	-	-	1992 (54.4)	1994 (44.5)
Republic of Korea	KOR	1965 (34.3)	1970 (33.3)	1980 (38.6)	1988 (33.6)	1993 (31.6)
Laos	LAO	-	-	-	-	1992 (30.4)
Lesotho	LSO	-	-	-	1987 (56.0)	1993 (57.9) ^a
Luxembourg	LUX	-	-	-	1985 (27.1)	1994 (23.5) ^b
Madagascar	MDG	1960 (53.0)	-	1980 (46.9) ^a	-	1993 (43.4)
Malaysia	MYS	-	1970 (50.0)	1979 (51.0)	1989 (48.4)	-
Mali	MLI	-	-	-	1989 (36.5) ^a	1994 (50.5)
Mauritania	MRT	-	-	-	1988 (42.5)	1995 (38.9)
Mauritius	MUS	-	-	1980 (45.7)	1986 (39.6)	1991 (36.7)
Mexico	MEX	1963 (53.0)	1968 (57.7)	1984 (50.6)	1989 (55.0)	1992 (50.3)
Mongolia	MNG	-	-	-	-	1995 (33.2)
Morocco	MAR	-	-	1984 (39.2)	1991 (39.2)	1999 (39.5)
Mozambique	MOZ	-	-	-	-	1997 (39.6) ^a
Namibia	NAM	-	-	-	-	1993 (74.3) ^a
Nepal	NPL	-	1977 (53.0)	1984 (30.1)	-	1996 (36.7)
Netherlands	NLD	1962 (42.0)	1975 (28.6)	1981 (26.7)	1991 (29.4)	1994 (25.3) ^b
New Zealand	NZL	-	1973 (30.1)	1980 (34.8)	1989 (36.6)	1990 (40.2)
Nicaragua	NIC	-	-	-	-	1993 (50.3)

continued on next page

Table 1: *continued*

Country	Code	1960	1970	1980	1990	1998
Niger	NER	1960 (34.0)	-	-	1992 (36.1)	1995 (50.6)
Nigeria	NGA	1959 (51.0)	-	1986 (37.0)	1992 (41.2)	1997 (50.6)
Norway	NOR	1962 (37.5)	1973 (37.5)	1979 (31.2)	1990 (33.3)	1995 (23.8) ^b
Pakistan	PAK	1969 (30.6)	1970 (29.9)	1979 (32.3)	1988 (31.4)	1997 (31.2)
Panama	PAN	1969 (48.0)	1970 (57.0)	1980 (47.5)	1989 (56.5)	1997 (48.5)
Papua New Guinea	PNG	-	-	-	-	1997 (50.9)
Paraguay	PRY	-	-	-	1991 (39.7) ^a	-
Peru	PER	1961 (61.0)	-	1981 (49.3)	1986 (42.8)	1997 (46.2) ^a
Philippines	PHL	1961 (49.7)	1971 (49.4)	1985 (46.1)	1988 (44.7)	1997 (46.2)
Poland	POL	-	-	1980 (24.9)	1990 (26.2)	1996 (33.7)
Portugal	PRT	-	1973 (40.6)	1980 (36.8)	1990 (36.8)	1991 (35.6)
Romania	ROM	-	-	-	1989 (23.4)	1994 (28.7)
Rwanda	RWA	-	-	1983 (28.9)	-	-
Senegal	SEN	1960 (56.0)	-	-	1991 (53.8)	1994 (41.3)
Sierra Leone	SLE	-	1968 (60.8)	-	1989 (62.9)	-
Singapore	SGP	-	1978 (37.0)	1980 (40.7)	1988 (41.0)	-
South Africa	ZAF	-	-	-	1993 (62.3)	1994 (59.3)
Spain	ESP	1965 (32.0)	1973 (37.1)	1980 (34.2)	1990 (30.3) ^b	1991 (33.0)
Sri Lanka	LKA	1963 (47.0)	1970 (37.7)	1980 (42.0)	1990 (30.1)	1995 (34.4)
Sweden	SWE	1967 (37.9)	1975 (31.4)	1980 (29.4)	1990 (29.0)	1995 (22.1) ^b
Tanzania	TZA	1964 (54.0)	-	-	1991 (59.0)	1993 (38.1)
Thailand	THA	1962 (41.3)	1969 (42.6)	1981 (43.1)	1990 (48.8)	1998 (41.4)
Trinidad and Tobago	TTO	1958 (46.0)	1971 (51.0)	1981 (41.7)	-	-
Tunisia	TUN	1965 (42.3)	1971 (53.0)	1985 (43.4) ^a	1990 (40.2)	-
Turkey	TUR	1968 (56.0)	1973 (51.0)	-	1987 (44.1)	1994 (41.5)
Uganda	UGA	-	-	-	1989 (33.0)	1993 (39.2)
United Kingdom	GBR	1961 (25.3)	1970 (25.1)	1980 (24.9)	1990 (32.3)	1999 (34.5) ^b
USA	USA	1960 (34.9)	1970 (34.1)	1980 (35.2)	1990 (37.8)	1997 (37.2) ^b
Venezuela	VEN	1962 (42.0)	1971 (47.7)	1981 (42.8)	1989 (44.1)	-
Vietnam	VNM	-	-	-	1992 (35.7) ^a	1998 (36.1) ^a
Yemen	YEM	-	-	-	1992 (39.5) ^a	1998 (21.8) ^a
Zambia	ZMB	1959 (48.0)	-	1976 (51.0)	1991 (48.3) ^a	1996 (49.8)
Zimbabwe	ZWE	-	-	-	1990 (56.8)	-

continued on next page

Table 1: *continued*

Country	Code	1960	1970	1980	1990	1998
---------	------	------	------	------	------	------

Notes: Gini coefficients are in parentheses. If not otherwise indicated, data are taken from WIID (2000).

a: Data taken from the World Bank (World Bank, 2002a).

b: Data are kindly provided by David Jesuit and Tim Smeeding (LIS).

Table 2: **Welfare Measures 1960**

Rank	GNP/cap* (exchange rate)	GNP/cap** (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
43	TZA	n.a.	TZA	TZA	TZA	TZA
42	IND	163	PAK	PAK	PAK	NGA
41	PAK	187	IND	IND	NGA	PAK
40	NGA	217	NGA	NGA	MDG	MDG
39	BGD	222	BGD	ZMB	IND	IND
38	LKA	271	BEN	MDG	ZMB	ZMB
37	TCD	292	ZMB	DHM	SEN	DHM
36	BEN	357	THA	THA	THA	THA
35	MDG	374	MDG	BGD	LKA	LKA
34	NER	413	TCD	LKA	DHM	BGD
33	THA	459	LKA	GUY	BGD	GUY
32	CIV	601	KOR	TCD	COL	SEN
31	GUY	620	NER	SEN	GAB	TCD
30	ZMB	627	CIV	CIV	TCD	COL
29	SEN ^d	650	GUY	COL	GUY	GAB
28	PHL	715	SEN	KOR	BRA	CIV
27	TUN ^a	791	PHL	PHL	PHL	PHL
26	COL ^b	1239	TUN	GAB	KOR	BRA
25	SLV	1328	BRA	NER	TUR	KOR
24	KOR	1347	PAN	BRA	CIV	PER
23	JAM	1395	COL	TUN	PER	TUR
22	TTO	1466	JAM	TUR	TUR	JAM
21	PAN	1590	TUR	PER	TUN	NER
20	MEX	1621	GAB	PAN	PAN	TUN
19	TUR ^d	1637	PER	JAM	JAM	PAN

continued on next page

Table 2: *continued*

Rank	GNP/cap* (exchange rate)	GNP/cap** (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
18	PER 1857	SLV 3289	SLV 64.0	SLV 47.0	SLV 47.9	SLV 30.7
17	BRA 1887	CRI 3443	MEX 62.1	CRI 50.0	MEX 42.0	CRI 33.3
16	GAB 1911	CHL 3631	CRI 69.9	MEX 47.0	TTO 46.8	MEX 30.7
15	CRI 2010	MEX 3866	CHL 71.8	CHL 54.4	CRI 54.1	CHL 37.4
14	CHL 2209	TTO 3946	TTO 69.9	TTO 54.0	CHL 52.9	TTO 37.0
13	GRC 3537	GRC 4267	GRC 80.7	GRC 62.0	FRA 31.6	GRC 44.9
12	VEN ^c 3896	JPN 4543	JPN 79.9	JPN 62.8	JPN 63.9	JPN 45.8
11	ESP 4740	ESP 4663	ESP 88.2	ESP 68.0	GRC 69.5	ESP 51.5
10	JPN 8372	VEN 7369	FRA 59.9	FRA 50.0	ESP 76.1	FRA 33.3
9	GBR 9752	FIN 7488	VEN 73.6	VEN 58.0	VEN 53.7	VEN 40.8
8	FIN 10087	FRA 7848	FIN 86.1	NOR 62.5	NLD 52.1	NOR 45.5
7	FRA 10857	NOR 8140	NOR 82.5	FIN 68.2	SWE 50.0	NLD 40.8
6	NOR 11363	NLD 9381	NLD 73.1	NLD 58.0	NOR 64.0	FIN 51.7
5	CAN 11795	GBR 9744	SWE 75.2	SWE 62.1	FIN 74.5	SWE 45.0
4	NLD 12416	CAN 10204	GBR 89.4	DNK 63.0	DNK 60.8	DNK 46.0
3	USA 13579	SWE 10215	DNK 79.4	CAN 68.4	USA 60.6	CAN 52.0
2	SWE 13600	DNK 10999	CAN 85.7	GBR 74.7	CAN 72.8	GBR 59.6
1	DNK 15458	USA 12223	USA 79.7	USA 65.1	GBR 80.4	USA 48.3

Notes: All rankings are based on the absolute values of the well-being indicator.

The last four columns present the ratios of the respective inequality-adjusted income to GNP per capita, PPP, shown in the third column.

*: GNP per capita, constant 1996 US-Dollars (WDI, 1999, 2001).

** : Real GNP per capita, 1996 prices (Summers and Heston, 1991; Heston, Summers, and Aten, 2001).

^a: Income data of Tunisia (TUN) from 1961.

^b: Income data of Colombia (COL) from 1965.

^c: Income data of Venezuela (VEN) from 1967.

^d: Income data of Senegal (SEN) and Turkey (TUR) from 1968.

n.a.: Income data not available.

Table 3: Welfare Measures 1970

Rank	GNP/cap (exchange rate)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
48	NPL	160	NPL	NPL	NPL	NPL
47	IND	215	SLE	SLE	SLE	SLE
46	BGD	261	PAK	PAK	HND	HND
45	SLE	281	HND	HND	PAK	PAK
44	PAK	285	BGD	BGD	BGD	BGD
43	IDN	306	IDN	IDN	IDN	IDN
42	LKA	332	IND	IND	IND	IND
41	HND	577	LKA	LKA	LKA	LKA
40	THA	776	THA	THA	THA	THA
39	BOL	845	TUN	TUN	PAN	TUN
38	PHL	846	PHL	PHL	PHL	PHL
37	ECU	906	TUN	BOL	TUN	BOL
36	TUN	980	BOL	ECU	BOL	MYS
35	MYS	1384	KOR	MYS	MYS	BRA
34	COL	1415	MYS	PAN	BRA	COL
33	FJI	1685	COL	BRA	ECU	ECU
32	TUR	1703	FJI	PAN	FJI	PAN
31	JAM	1911	BRA	FJI	TUR	TUR
30	TTO	2029	TUR	TUR	COL	FJI
29	KOR	2214	JAM	KOR	TTO	KOR
28	MEX	2309	PAN	JAM	JAM	JAM
27	CRI	2417	CRI	MEX	MEX	MEX
26	PAN	2437	CHL	CRI	KOR	CRI
25	BRA	2600	HUN	CHL	CHL	GAB
24	CHL	2670	SGP	GAB	CRI	CHL
23	HUN	2703	MEX	TTO	GAB	TTO
22	GAB	3446	TTO	SGP	SGP	SGP
21	VEN	4196	PRT	HUN	PRT	PRT
20	PRT	5166	GAB	HKG	PRT	HKG
19	SGP	5589	HKG	HUN	HUN	HUN
18	HKG	6065	IRL	IRL	IRL	IRL
17	GRC	6984	GRC	VEN	VEN	VEN

continued on next page

Table 3: *continued*

Rank	GNP/cap (exchange rate)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)					
16	IRL	8483	ESP	9074	GRC	82.6	GRC	64.9	68.0	GRC	48.0
15	ESP	8677	VEN	10087	ESP	82.4	ESP	62.9	FRA	48.7	45.9
14	ITA	11064	NOR	11071	NOR	77.2	NOR	62.5	ESP	67.0	45.5
13	GBR	12151	FIN	11320	JPN	75.5	ITA	63.7	JPN	56.2	46.7
12	CAN	12522	ITA	11356	FRA	71.2	JPN	64.5	NOR	58.7	43.1
11	NZL	12648	JPN	11454	ITA	83.7	FRA	60.2	ITA	70.5	47.6
10	AUS	13698	GBR	12172	FIN	85.3	FIN	69.6	FIN	71.7	53.3
9	FIN	15389	BEL	12302	BEL	88.3	BEL	71.8	BEL	77.3	55.9
8	NOR	15840	FRA	12360	GBR	90.0	GBR	74.9	CAN	70.6	51.2
7	BEL	16714	NLD	13488	NZL	86.2	CAN	67.8	NZL	72.8	59.9
6	FRA	16774	NZL	13570	CAN	84.7	NZL	70.0	GBR	81.8	53.8
5	USA	17443	CAN	13888	NLD	88.5	NLD	71.4	SWE	69.0	55.5
4	NLD	17890	AUS	14691	SWE	84.5	AUS	68.0	USA	64.6	51.5
3	SWE	19874	SWE	14873	AUS	85.5	SWE	68.6	NLD	78.4	52.2
2	JPN	20370	DNK	16053	USA	81.5	USA	65.9	AUS	72.6	49.2
1	DNK	22190	USA	16290	DNK	85.4	DNK	69.0	DNK	72.2	52.7

Notes: For definition of columns, see Table 2.

Table 4: **Welfare Measures 1980**

Rank	GNP/cap (exchange rate)	GNI/cap* (PPP)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)					
58	ETH ^a	119	COL	n.a.	ETH	86.5	ETH	67.6	ETH	76.1	ETH	51.0
57	NPL	154	POL	n.a.	NPL	65.4	ZMB	49.0	ZMB	45.2	ZMB	32.5
56	CHN	170	ETH ^a	721	BGD	974	NPL	88.0	MDG	53.2	MDG	36.2
55	BGD	227	CHN	809	CHN	1069	MDG	72.1	BGD	61.0	BGD	43.9
54	IND	234	NPL	862	MDG	1082	BGD	80.5	NPL	69.9	NPL	53.8
53	NGA	253	BGD	985	RWA	1099	CHN	87.3	NGA	68.0	NGA	46.0
52	PAK	325	NGA	1020	PAK	1138	NGA	82.7	NGA	63.0	CHN	51.5
51	RWA	328	ZMB	1143	ZMB	1147	RWA	88.9	PAK	67.7	PAK	51.1
50	MDG	345	IND	1178	NGA	1156	PAK	86.4	RWA	71.1	IND	52.1

continued on next page

Table 4: *continued*

Rank	GNP/cap (exchange rate)	GNI/cap* (PPP)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)							
49	LKA	439	MDG	1178	IND	86.9	IND	68.5	IND	76.6	RWA	55.2		
48	IDN	493	PAK	1178	LKA	1778	IDN	84.0	LKA	58.0	IDN	71.4	LKA	40.8
47	ZMB	553	RWA	1266	IDN	1818	LKA	89.1	IDN	64.4	LKA	78.6	IDN	47.5
46	CIV	1004	IDN	1460	CIV	2404	CIV	77.4	CIV	58.8	THA	52.4	BWA	29.7
45	MAR	1111	LKA	1864	THA	2708	THA	71.8	BWA	45.8	BWA	43.1	CIV	41.6
44	THA	1135	CIV	2163	DOM	2824	BWA	63.1	THA	56.9	CIV	61.1	THA	39.8
43	PHL	1187	THA	2568	MAR	2928	DOM	75.7	DOM	56.7	DOM	58.6	DOM	39.6
42	DOM	1309	MAR	2867	JAM	3157	MAR	80.4	PHL	53.9	COL	40.7	PHL	36.9
41	JAM	1482	JAM	3078	PHL	3282	JAM	75.8	MAR	60.8	PHL	56.1	JAM	39.7
40	BWA	1515	BWA	3113	BWA	3334	JAM	73.0	JAM	56.8	JAM	59.0	COL	29.4
39	SLV	1589	DOM	3763	GTM	4034	COL	62.2	COL	45.5	MAR	66.3	MAR	43.7
38	TUN	1613	GTM	3957	SLV	4061	GTM	69.6	GTM	50.3	GTM	51.5	GTM	33.6
37	GTM	1620	MYS	4080	SLV	4100	SLV	69.9	SLV	51.6	SLV	52.0	SLV	34.8
36	MUS	1802	SLV	4115	JOR	4217	JOR	74.7	MYS	49.0	MYS	46.2	MYS	32.5
35	JOR	1880	MUS	4133	COL	4284	MYS	66.6	PER	50.7	BRA	36.8	PER	33.9
34	COL	1957	TUN	4133	PER	4673	PER	67.8	TUN	56.6	CRI	44.9	BRA	26.8
33	MYS	2312	PHL	4326	MYS	4704	TUN	75.6	JOR	59.2	PAN	50.0	TUN	39.4
32	PAN	2459	JOR	4537	KOR	4750	PAN	69.7	PAN	52.5	JOR	58.8	PAN	35.6
31	PER	2490	PAN	4801	PAN	4760	CRI	67.8	BRA	42.2	PER	52.4	JOR	42.0
30	POL	2967	PER	5170	CRI	5176	BRA	58.0	CRI	52.5	TUN	59.2	GAB	22.6
29	CRI	3044	KOR	5293	MUS	5642	KOR	77.8	KOR	61.4	GAB	33.7	CRI	35.6
28	MEX	3245	GAB	6454	BRA	6170	GAB	53.6	GAB	36.8	KOR	60.0	MUS	37.3
27	KOR	3760	CRI	6472	POL	6632	MUS	82.9	MUS	54.3	BRB	35.8	KOR	44.3
26	VEN	4075	BRA	6876	BRA	7434	MEX	67.2	MEX	49.4	MEX	47.9	MEX	32.8
25	HUN	4210	VEN	7105	VEN	8004	VEN	75.2	VEN	57.2	MUS	68.4	VEN	40.0
24	BRA	4512	TTO	7562	HUN	8052	POL	91.4	POL	75.1	TTO	48.6	BRB	34.4
23	GAB	5057	MEX	7738	GAB	8162	BRB	63.3	BRB	51.1	VEN	57.3	TTO	41.1
22	TTO	5065	HUN	9497	PRT	8796	TTO	72.4	TTO	58.3	POL	83.6	POL	60.2
21	BRB	6909	SGP	9971	SGP	9115	PRT	80.4	PRT	63.2	PRT	63.6	PRT	46.2
20	PRT	7343	PRT	10024	BRB	9928	HUN	93.9	HUN	79.0	IRL	59.1	SGP	42.2
19	GRC	10122	IRL	10253	IRL	9944	IRL	77.8	IRL	64.4	SGP	64.7	IRL	47.4
18	SGP	10886	ESP	12152	SGP	10987	SGP	79.1	SGP	59.3	HUN	88.4	HUN	65.3

continued on next page

Table 4: *continued*

Rank	GNP/cap (exchange rate)	GNI/cap* (PPP)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
17	IRL	HKG	ESP	ESP	ESP	ESP	ESP
16	ESP	BRB	GRC	HKG	HKG	HKG	HKG
15	HKG	GRC	HKG	GRC	GRC	GRC	GRC
14	NZL	NZL	NZL	NZL	NZL	NZL	NZL
13	GBR	GBR	GBR	GBR	ITA	AUS	AUS
12	ITA	FIN	ITA	NOR	ITA	NOR	ITA
11	AUS	ITA	FIN	AUS	JPN	JPN	JPN
10	CAN	AUS	JPN	FIN	FIN	FIN	FRA
9	FIN	JPN	BEL	JPN	GBR	FRA	FIN
8	USA	SWE	NOR	ITA	FRA	ITA	GBR
7	NLD	FRA	FRA	FRA	NOR	GBR	NOR
6	FRA	NLD	NLD	BEL	NLD	SWE	SWE
5	BEL	NOR	AUS	NLD	BEL	DNK	DNK
4	SWE	BEL	SWE	SWE	SWE	BEL	NLD
3	NOR	DNK	DNK	DNK	DNK	CAN	BEL
2	DNK	CAN	CAN	CAN	CAN	NLD	CAN
1	JPN	USA	USA	USA	USA	USA	USA

Notes: The inequality-adjustment in the last four columns is based on GNP/cap, PPP shown in the fourth column. For other definitions, see Table 2

*: Real GNI per capita, 1996 prices (WDI, 2002).

^a: Income data of Ethiopia (ETH) from 1981.

Table 5: **Welfare Measures 1990**

Rank	GNP/cap (exchange rate)	GNI/cap (PPP)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
73	TZA	COL	TZA	TZA	TZA	TZA	TZA
72	VNM	TZA	UGA	SLE	SLE	SLE	SLE
71	NGA	YEM	MLI	UGA	UGA	ZMB	ZMB
70	NER	MLI	NER	MLI	MLI	UGA	UGA
69	SLE	NGA	ZMB	ZMB	ZMB	MLI	MLI
68	UGA	NER	NGA	KEN	KEN	KEN	KEN

continued on next page

Table 5: *continued*

Rank	GNP/cap (exchange rate)	GNI/cap (PPP)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
67	MLI 256	UGA 846	YEM 1092	NER 83.2	NGA 58.9	SEN 41.1	NGA 41.7
66	BGD 289	ZMB 893	SLE 1106	NGA 78.7	NER 63.9	NGA 64.4	NER 47.0
65	YEM 306	SLE 893	GHA 1159	YEM 79.5	YEM 60.6	NER 70.8	SEN 30.0
64	IND 327	KEN 1078	VNM 1192	SEN 62.8	SEN 46.2	MRT 49.7	YEM 43.4
63	KEN 345	VNM 1124	KEN 1267	GHA 82.2	GHA 63.3	YEM 64.3	GHA 46.3
62	GHA 352	BGD 1159	BGD 1273	VNM 83.4	VNM 64.3	HND 37.0	MRT 40.3
61	CHN 358	SEN 1345	MRT 1367	MRT 72.9	MRT 57.5	GHA 68.7	HND 27.1
60	MRT 420	MRT 1426	SEN 1453	BGD 89.0	HND 42.6	VNM 71.4	VNM 47.4
59	PAK 454	CIV 1530	IND 1655	HND 58.6	BGD 71.2	LSO 37.8	LSO 28.2
58	ZMB 514	GHA 1553	PAK 1705	LSO 59.6	LSO 44.0	GIN 42.8	BGD 55.2
57	GIN 517	PAK 1576	CHN 1791	IND 88.3	CIV 63.1	BGD 80.3	ZWE 27.5
56	SEN 557	IND 1600	CIV 1811	CIV 81.8	IND 70.3	GTM 30.7	GIN 36.2
55	LKA 580	CHN 1623	HND 2078	PAK 87.0	PAK 68.6	ZWE 42.8	CIV 46.1
54	HND 634	GIN 1669	LSO 2273	CHN 83.8	CHN 65.4	CIV 67.9	CHN 48.6
53	ZWE 676	BOL 2017	GIN 2303	GIN 67.1	ZWE 43.2	CHN 70.5	PAK 52.2
52	CIV 693	LSO 2098	BOL 2325	ZWE 61.1	GIN 53.2	IND 78.9	IND 54.2
51	LSO 748	IDN 2156	LKA 2463	BOL 76.4	BOL 58.0	PAK 76.8	GTM 25.7
50	IDN 761	HND 2249	IDN 2721	GTM 54.2	GTM 40.9	BOL 60.0	BOL 40.8
49	BOL 805	LKA 2307	ZWE 2818	DOM 67.7	DOM 49.5	PAN 30.8	DOM 32.9
48	EGY 967	ZWE 2620	PHL 2993	LKA 88.0	PHL 55.3	DOM 48.7	PHL 38.2
47	PHL 1113	EGY 2840	DOM 3019	PHL 75.7	LKA 69.9	PHL 60.5	PAN 27.8
46	MAR 1285	ECU 2944	EGY 3161	IDN 86.6	IDN 66.9	ECU 54.6	LKA 53.7
45	DOM 1333	GTM 3211	JOR 3274	ECU 74.0	ECU 56.1	BRA 31.8	ECU 39.0
44	GTM 1359	MAR 3222	MAR 3415	JOR 78.8	JOR 59.3	LKA 78.4	IDN 50.3
43	ECU 1436	JAM 3327	ECU 3444	PAN 56.1	PER 57.2	IDN 76.8	JOR 42.2
42	JOR 1465	JOR 3628	PER 3478	PER 76.9	PAN 43.5	JOR 64.3	PER 40.1
41	ROM 1570	PER 3651	GTM 3524	EGY 86.6	MAR 60.8	ZAF 28.6	JAM 41.1
40	DZA 1595	DOM 3721	JAM 3611	MAR 80.4	JAM 58.2	PER 61.9	MAR 43.7
39	BGR 1607	PHL 3837	COL 4680	JAM 77.3	EGY 68.0	COL 46.6	COL 32.2
38	JAM 1624	PAN 4265	CRI 4713	COL 67.6	COL 48.7	JAM 61.7	BRA 25.3
37	TUN 1797	TUN 4370	PAN 4742	BRA 52.9	THA 51.2	MAR 66.3	EGY 51.5
36	PER 1882	THA 4393	THA 4772	THA 67.8	BRA 40.4	THA 48.2	CHL 28.1

continued on next page

Table 5: *continued*

Rank	GNP/cap (exchange rate)	GNI/cap (PPP)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
35	PRY 1900	PRY 4648	TUN 4773	CRI 71.0	CRI	CRI 53.9	THA 34.4
34	THA 2013	DZA 5042	DZA 4798	CHL 61.8	CHL	EGY 43.9	ZAF 23.2
33	COL 2119	MYS 5262	ROM 4811	TUN 78.5	ZAF	CHL 37.7	CRI 36.9
32	PAN 2432	CHL 5436	PRY 5072	ZAF 51.3	TUN	MEX 40.9	TUN 42.6
31	POL 2611	TUR 5668	CHL 5791	DZA 80.4	DZA	TUN 62.7	MEX 29.0
30	TUR 2673	VEN 5680	TUR 5800	PRY 78.6	PRY	DZA 62.9	DZA 44.2
29	CRI 2982	CRI 5853	BRA 6052	TUR 74.8	MEX	DZA 66.7	MYS 34.8
28	MUS 2988	BGR 6190	POL 6225	MYS 70.1	MYS	MYS 51.8	PRY 43.1
27	MYS 3109	POL 6213	MYS 6247	MEX 61.9	TUR	TUR 57.7	TUR 38.8
26	MEX 3143	BRA 6271	BGR ^a 6575	ROM 92.3	ROM	VEN 55.7	VEN 38.8
25	CHL 3237	MUS 6468	VEN 6745	VEN 74.0	VEN	ROM 85.0	ROM 62.1
24	VEN 3344	MEX 7152	MEX 7093	POL 90.6	POL	POL 82.2	POL 58.4
23	ZAF 4026	ROM 7233	ZAF 7476	BGR 92.3	BGR	BGR 85.5	MUS 43.2
22	BRA 4108	ZAF 9215	MUS 8980	MUS 79.4	MUS	MUS 63.8	BGR 60.6
21	HUN 4740	KOR 10293	HUN 9180	KOR 84.3	KOR	KOR 71.9	KOR 49.7
20	KOR 8119	HUN 10467	KOR 9949	HUN 92.6	HUN	IRL 76.7	PRT 46.2
19	PRT 10082	PRT 12878	PRT 12229	PRT 80.6	PRT	PRT 63.2	HUN 62.2
18	GRC 11265	IRL 13538	GRC 12292	IRL 76.6	GRC	HUN 86.2	GRC 47.9
17	IRL 14124	GRC 13643	IRL 13031	GRC 82.3	IRL	GRC 67.1	IRL 48.6
16	ESP 14317	ESP 14848	ESP 14436	NZL 80.8	NZL	NZL 64.5	NZL 46.4
15	NZL 14442	SGP 15219	NZL 15219	ESP 87.3	ESP	AUS 55.7	SGP 41.8
14	AUS 18185	NZL 15485	GBR 18135	AUS 75.1	SGP	ESP 76.4	ESP 53.5
13	ITA 18236	AUS 19044	SGP 18425	SGP 79.1	AUS	SGP 64.7	AUS 41.1
12	GBR 18253	GBR 19171	ITA 19015	GBR 85.4	HKG	HKG 62.0	HKG 40.8
11	SGP 18356	HKG 19392	AUS 19086	GBR 76.9	GBR	GBR 73.7	GBR 51.2
10	CAN 18807	ITA 19902	NLD 19652	NOR 82.8	ITA	NOR 67.6	ITA 50.7
9	HKG 19187	FIN 20064	FIN 19720	ITA 87.8	NOR	DNK 64.1	NOR 50.0
8	NLD 25737	NLD 20354	BEL 19729	NLD 87.0	SWE	NLD 74.0	SWE 50.9
7	BEL 26358	SWE 20412	NOR 19837	SWE 85.9	NLD	ITA 77.4	DNK 50.2
6	FIN 26614	DNK 21942	SWE 20026	DNK 82.1	DNK	SWE 73.5	NLD 54.6
5	USA 26721	NOR 21965	HKG 20827	FIN 89.4	BEL	USA 57.5	BEL 57.9
4	SWE 26836	BEL 22336	DNK 21151	BEL 89.7	FIN	FIN 78.4	FIN 58.6

continued on next page

Table 5: *continued*

Rank	GNP/cap (exchange rate)	GNI/cap (PPP)	GNP/cap (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
3	NOR 28499	CAN 22486	CAN 21548	CAN 88.4	CAN 72.4	BEL 79.9	USA 45.1
2	DNK 31475	USA 27169	USA 26450	USA 77.0	USA 62.2	CAN 76.6	CAN 56.8
1	LUX 46827	LUX 28861	LUX 31339	LUX 89.5	LUX 72.9	LUX 80.1	LUX 57.3

Notes: For definition of columns, see Tables 2 and 4.

^a: Income data of Bulgaria (BGR) from 1991.

Table 6: **Welfare Measures 1998**

Rank	GNP/cap* (exchange rate)	GNI/cap** (PPP)	GNP/cap*** (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
77	ETH 109	TZA 466	TZA 461	GNB 57.4	GNB 43.8	GNB 32.1	GNB 28.0
76	BDI 148	BDI 563	ETH 543	TZA 81.0	TZA 61.9	CAF 28.5	TZA 44.8
75	GNB 164	ETH 573	BDI 584	ETH 80.2	ETH 60.0	NER 36.8	ETH 42.9
74	MOZ 181	GNB 593	GNB 593	BDI 85.2	CAF 38.7	TZA 67.3	CAF 24.0
73	TZA 187	MLI 690	ZMB 809	CAF 51.2	BDI 66.7	ETH 67.2	NER 32.8
72	NER 219	ZMB 690	NER 820	NER 62.5	NER 49.4	ZMB 49.3	ZMB 33.5
71	NPL 227	YEM 699	MLI 863	ZMB 68.5	ZMB 50.2	BDI 73.7	MLI 32.9
70	NGA 233	MOZ 709	YEM 898	MLI 68.3	MLI 49.5	MLI 50.4	BDI 50.0
69	MDG 237	NER 738	UGA 899	NGA 68.4	NGA 49.4	NGA 49.8	NGA 32.8
68	BFA 262	MDG 738	NGA 927	BFA 71.3	BFA 51.8	BFA 55.3	BFA 35.0
67	MLI 272	NGA 748	BFA 938	UGA 80.4	GMB 52.2	GMB 52.0	GMB 35.3
66	YEM 272	BFA 874	MOZ 939	MOZ 70.8	UGA 60.8	UGA 66.2	UGA 43.7
65	KHM 278	KEN 971	CAF 974	79.8	MOZ 60.4	MOZ 65.5	MOZ 43.3
64	VNM 310	CAF 1049	GMB 1026	92.6	KEN 55.5	LSO 34.2	KEN 38.4
63	UGA 340	UGA 1059	GHA 1212	74.4	YEM 78.2	KEN 57.0	NIC 33.0
62	CAF 342	NPL 1205	MRT 1227	79.8	MRT 61.1	NIC 49.0	LSO 26.6
61	KEN 342	KHM 1273	KEN 1253	79.8	NIC 49.7	YEM 85.1	MRT 43.9
60	GMB 354	SEN 1302	KHM 1271	68.1	KHM 59.6	MRT 64.7	KHM 42.5
59	BGD 369	LAO 1321	MNG ^a 1318	85.8	GHA 67.3	NAM 19.1	YEM 64.2
58	ZMB 373	BGD 1379	LAO ^a 1362	84.7	LSO 42.1	KHM 66.3	GHA 50.7
57	GHA 402	GMB 1428	NPL 1406	56.1	MNG 66.8	GHA 75.0	SEN 41.6

continued on next page

Table 6: *continued*

Rank	GNP/cap* (exchange rate)	GNI/cap** (PPP)	GNP/cap*** (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
56	NIC	CIV	SEN	NPL	SEN	MNG	NAM
55	LAO	MRT	NIC	SEN	NPL	SEN	HND
54	IND	MING	BGD	LAO	LAO	HND	NPL
53	MNG	PAK	VNM ^b	BGD	HND	NPL	MNG
52	MRT	GHA	CIV	HND	BGD	LAO	LAO
51	PAK	VNM	PAK	VNM	NAM	BGD	BGD
50	SEN	GIN	LSO	CIV	VNM	CIV	VNM
49	GIN	NIC	HND	NAM	CIV	VNM	CIV
48	LSO	IND	MDG	PAK	MDG	MDG	MDG
47	HND	PNG	IND	MDG	PAK	PNG	PNG
46	CHN	HND	GIN	IND	PNG	PAK	PAK
45	CIV	LSO	PNG	IND	IND	IND	IND
44	GUY	IDN	LKA	GIN	GIN	GIN	GIN
43	LKA	ECU	GUY	PHL	PHL	PHL	PHL
42	IDN	LKA	CHN	GUY	GUY	CHN	GUY
41	PNG	EGY	IDN	CHN	CHN	GUY	CHN
40	EGY	CHN	PHL	LKA	LKA	ECU	ECU
39	PHL	JAM	ECU	ECU	ECU	LKA	LKA
38	ROM	MAR	JAM	IDN	IDN	PER	MAR
37	MAR	GUY	MAR	MAR	MAR	MAR	PER
36	BGR	JOR	JOR	JAM	JAM	IDN	IDN
35	DZA	PHL	EGY	JOR	PER	JAM	JAM
34	ECU	PER	NAM	PER	JOR	ZAF	JOR
33	JOR	DZA	ROM	EGY	EGY	PAN	ZAF
32	JAM	BGR	PER	DZA	PAN	JOR	PAN
31	NAM	PAN	DZA	PAN	ZAF	BRA	BRA
30	PER	THA	BGR	ROM	DZA	DZA	DZA
29	THA	NAM	PAN	ZAF	ROM	EGY	EGY
28	PAN	ROM	THA	BRA	BRA	ROM	ROM
27	TUR	BRA	BRA	BGR	THA	MEX	THA
26	MEX	TUR	TUR	THA	BGR	THA	MEX
25	POL	MEX	ZAF	MEX	MEX	BGR	CHL

continued on next page

Table 6: *continued*

Rank	GNP/cap* (exchange rate)	GNI/cap** (PPP)	GNP/cap*** (PPP)	Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)	Sen (% of GNP/cap, PPP)	Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)	Dagum (% of GNP/cap, PPP)
24	ZAF 3910	POL 7713	MEX 7614	TUR 77.5	TUR 58.5	CHL 43.4	TUR 41.3
23	MUS 4001	CHL 8325	POL 8401	CHL 63.0	CHL 45.2	TUR 61.6	BGR 57.1
22	BRA 4545	ZAF 8374	HUN 9100	POL 85.9	POL 66.3	POL 74.9	POL 49.6
21	HUN 4805	MUS 8461	CHL 9545	HUN 91.7	HUN 74.7	BHS 47.6	HUN 59.6
20	CHL 5401	HUN 10074	MUS 12525	MUS 82.1	MUS 63.3	HUN 84.2	MUS 46.3
19	KOR 11084	KOR 13551	KOR 13205	BHS 70.8	BHS 54.7	MUS 68.2	BHS 37.7
18	BHS 12045	BHS 14261	PRT 14366	KOR 86.1	KOR 68.4	NZL 57.0	PRT 47.5
17	PRT 12062	PRT 14843	BHS ^a 15869	PRT 82.7	PRT 64.4	PRT 67.5	KOR 52.0
16	NZL 15585	NZL 16242	NZL 16328	NZL 76.5	NZL 59.8	KOR 74.1	NZL 42.6
15	ESP 16572	ESP 16553	ESP 16679	ESP 84.6	ESP 67.0	ESP 71.4	ESP 50.4
14	ITA 20078	SWE 20682	ITA 20960	ITA 83.6	HKG 55.0	HKG 56.8	HKG 37.9
13	CAN 20698	FIN 20818	FIN 21208	GBR 83.8	ITA 65.8	ITA 69.5	ITA 49.0
12	GBR 21407	ITA 20876	FRA 21313	GBR 74.8	GBR 65.5	GBR 70.8	GBR 48.7
11	AUS 22592	GBR 20915	GBR 21556	FRA 88.7	FRA 71.2	DNK 63.6	DNK 45.6
10	HKG 22760	HKG 21352	SWE 21717	FIN 92.8	DNK 62.7	FRA 79.2	FRA 55.3
9	SWE 28792	FRA 21546	BEL 22471	DNK 80.2	FIN 76.4	AUS 73.1	AUS 52.6
8	FRA 28921	AUS 22314	NLD 23225	SWE 93.0	AUS 68.9	CAN 75.0	CAN 53.3
7	FIN 29121	NLD 22712	AUS 23837	BEL 91.1	CAN 69.5	FIN 86.4	FIN 61.8
6	BEL 29878	CAN 23470	CAN 23987	AUS 86.0	BEL 75.0	BEL 82.8	BEL 60.0
5	NLD 30209	BEL 23975	HKG 24902	CAN 86.9	SWE 77.9	SWE 86.2	NLD 59.6
4	USA 30592	DNK 24218	DNK 25118	NLD 90.5	NLD 74.7	NLD 81.4	SWE 63.8
3	DNK 37004	NOR 26977	NOR 26403	NOR 92.1	USA 62.8	USA 65.3	USA 45.8
2	NOR 37538	USA 29852	USA 31167	USA 80.9	NOR 76.2	NOR 84.6	NOR 61.6
1	LUX 48749	LUX 37167	LUX 38973	LUX 92.4	LUX 76.5	LUX 85.7	LUX 61.9

Notes: All rankings are based on the absolute values of the well-being indicator.

The last four columns present the ratios of the respective adjusted income to unadjusted GNP per capita, PPP.

*: GNP per capita, constant 1996 US-Dollars (WDI, 1999, 2001).

** : Real GNI per capita, 1996 prices (WDI, 2002).

***: Real GNP per capita, 1996 prices (Summers and Heston, 1991; Heston, Summers, and Aten, 2001).

^a: Income data of Mongolia (MNG), Laos (LAO), and Bahamas (BHS) from 1996.

^b: Income data of Vietnam (VNM) from 1997.

Table 7: Test of Sensitivity

Year	Country	Gini used	Based on	Alternative Gini	Based on	Changes in Ranking ^a			
						Atkinson ($\epsilon = 1$)	Sen	Atkinson ($\epsilon = 2$)	Dagum
1960	Brazil	53.0	IGH	54.0	IGP	+2	-	+5	-2
	Chile	45.6	IGH	44.0	IGP	-	-	+1	+1
	Jamaica	54.3	IGH	56.0	IGP	-8	-1	-13	-2
	Mexico	53.0	IGH	55.5	IGH	-	-1	-2	-1
	Philippines	49.7	IGH	48.0	IGP	-	-	+1	+1
	Sri Lanka	47.0	IGH	44.0	IGP	-	-	-	+2
	Sweden	37.9	IGH	33.4	INH	-	+1	+2	+1
1970	Mexico	57.7	IGH	52.2	IGH	+3	+1	+2	+1
	Sierra Leone	60.8	IGH	56.0	IGP	-	-	+2	+1
	Sweden	31.4	IGH	27.3	INH	+1	+1	+3	+1
	Australia	40.0	IGH	38.6	IGF ^b	+1	+2	-	-
1980	Canada	31.8	IGF	36.4	IGF ^b	-4	-3	-6	-6
	France	34.9	IGH	31.7	INH	-1	-	+3	+2
	Norway	31.2	INH	26.2	INH ^b	+6	+4	+8	+4
	Spain	34.2	IGH ^c	26.8	ENH	+2	+2	+2	+2
	Sweden	29.4	IGH	32.4	INH	-2	-2	-2	-2
	Algeria	38.7	ENP	40.1	E-H ^d	-	-1	-2	-3
	Australia	37.3	IGH	32.8	INH	+1	+2	+1	+3
	Brazil	59.6	IGP	63.4	IGP	-1	-1	-1	-6
1990	Chile	56.1	I - ^d	51.9	IGP	-	+3	-	+4
	China	34.6	IGP	33.5	I - H ^d	-	-	-	-
	Denmark	33.1	IGH	39.0	IGF	-3	-2	-2	-4
	Finland	26.1	INH	20.2	INH ^{eqc}	+1	+1	+4	+3
	Ghana	36.7	ENP	33.9	E - Hpc	-	-	-	-
	Ireland	34.6	INH	38.9	IGH	-	-2	-	-1
	Jordan	40.7	ENP	43.4	E - Hpc ^d	-1	-2	-2	-2
	Kenya	54.4	ENP	57.5	E - Hpc ^d	-	-	-	+1
	Mexico	55.0	IGP	46.9	IGH	+2	+2	+6	+5
	Nigeria	41.2	ENP	45.0	E - Hpc ^d	-2	-1	-2	-1
	Pakistan	31.4	ENH	32.4	IGH	+1	-	-	-
	Philippines	44.7	IGH ^c	45.7	IGP	-1	-	-1	-
	Sweden	29.0	IGH	32.5	INH	+1	-2	-1	-2

continued on next page

Table 7: *continued*

Year	Country	Gini used	Based on	Alternative Gini	Based on	Changes in Ranking ^a			
						Atkinson ($\epsilon = 1$)	Sen	Atkinson ($\epsilon = 2$)	Dagum
	Uganda	33.0	E N Heq	44.4	E - H ^d	-	-2	-3	-2
	Zambia	48.3	E - H ^d	43.5	E N P	+3	+1	+4	+1
1998	Denmark	37.4	I G F ^c	33.7	I N F ^c	-	-	+1	-
	Madagascar	43.4	E N P	46.0	E - Hpc ^d	-	-1	-1	-1
	Turkey	41.5	E - Hpc ^d	49.0	I N H ^c	-1	-2	-1	-4
	Uganda	39.2	E - Hpc	40.8	E - P	-	-	-	-

^a: A positive sign corresponds to a higher rank, a negative one indicates a worsening in ranking.

Inequality data applied is predominantly provided by Deininger and Squire (1996). Additional data sources are indicated as follows.

^b: Data originally provided by Luxembourg Income Study.

^c: See WIID (2000) for further information on data source.

^d: Data taken from the World Bank (World Bank, 2002a).

Income concept is either income (I) or expenditure (E), and both concepts can be gross (G) or net (N).

Unit of reference can be per person (P), household (H), or household per capita (Hpc). In a few cases an equivalence scale was applied to calculate the data (Heq). If any component is not reported or unknown,

- is shown.

Table 8: Determinants of Gini Coefficients

	(1)		(2)	
Expenditure	-3.85**	(0.39)	-3.57**	(0.38)
Net income	-1.84**	(0.27)	1.38**	(0.48)
Unknown income	1.24	(1.64)	1.39	(1.61)
Household	1.06**	(0.28)	1.14**	(0.27)
Family	0.64	(0.45)	0.70	(0.44)
Unknown reference unit	-1.24	(1.62)	-1.19	(1.60)
Equivalentized	-4.65**	(0.30)	-4.35**	(0.29)
Primary source unknown	1.79**	(0.63)	1.88**	(0.62)
No consistent source	-0.39	(0.25)	-0.44	(0.24)
OECD * Net income	-		-4.64**	(0.56)
Intercept	36.08**	(0.27)	35.92**	(0.26)
N	2033		2033	
R ²	0.21		0.23	

Significance levels: * : 5% ** : 1%; Standard errors in parentheses.

Table 9: Change in Rankings Due to Adjusted Gini Coefficients

	No change	1 Rank	2 Ranks	3 Ranks	4+ Ranks
<i>Sen measure</i>					
1960	35	7	0	0	1
1970	28	18	2	0	0
1980	26	22	6	2	1
1990	42	22	3	3	0
1998	43	21	6	1	1
<i>Dagum measure</i>					
1960	24	12	7	0	0
1970	29	14	1	4	0
1980	26	21	7	3	0
1990	31	21	15	3	0
1998	35	30	6	0	1

References

- AHLUWALIA, M., AND H. CHENERY (1974): "The economic framework," in *Redistribution with Growth*, ed. by H. Chenery, et al. Oxford University Press, London.
- ALESINA, A., R. DI TELLA, AND R. MACCULLOCH (2002): "Inequality and happiness: Are Europeans and Americans different?," Mimeographed, Harvard University, Cambridge, MA.

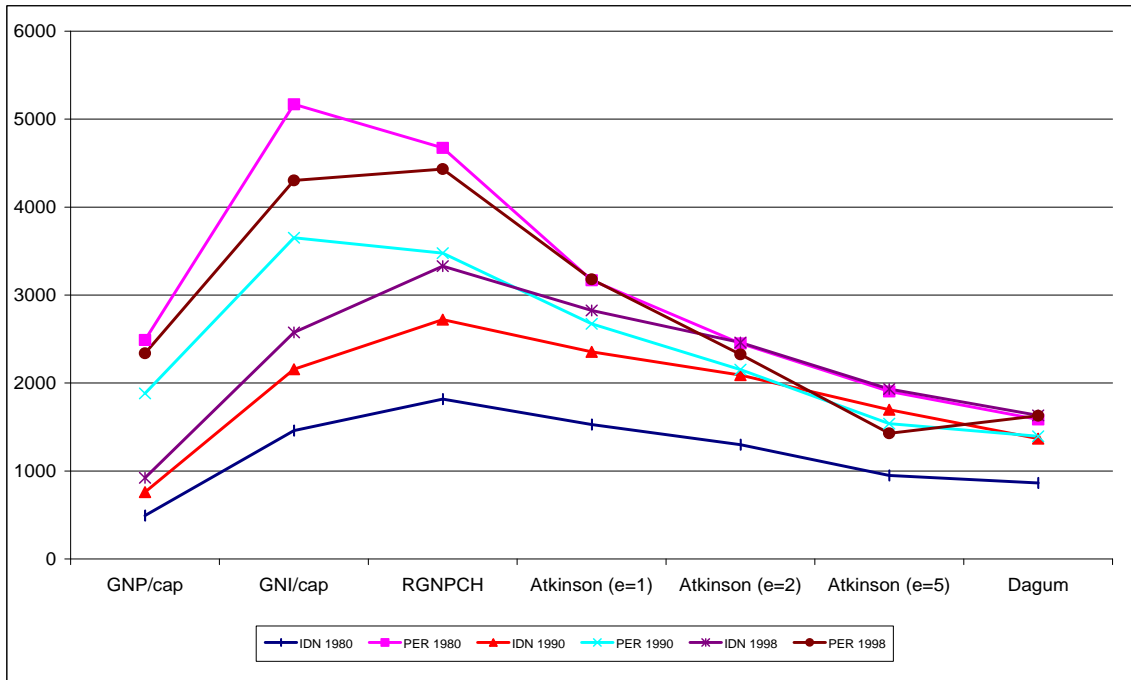
- ALESINA, A., AND D. RODRIK (1994): "Distributive politics and economic growth," *Quarterly Journal of Economics*, 109(2), 465–490.
- AMIEL, Y., J. CREEDY, AND S. HURN (1999): "Measuring attitudes towards inequality," *Scandinavian Journal of Economics*, 101(1), 83–96.
- ARROW, K. (1963): *Social Choice and Individual Values*. Yale University Press, New Haven.
- ATKINSON, A. B. (1970): "On the measurement of inequality," *Journal of Economic Theory*, 2(3), 244–263.
- ATKINSON, A. B., AND A. BRANDOLINI (2001): "Promise and pitfalls in the use of "secondary" data-sets: Income inequality in OECD countries as a case study," *Journal of Economic Literature*, 39(3), 771–799.
- ATKINSON, A. B., L. RAINWATER, AND T. SMEEDING (1995): *Income Distribution in OECD Countries*. OECD, Paris.
- AYALA, L., R. MARTINEZ, AND J. RUIZ-HUERTA (2001): "The impact of unemployment on inequality and poverty in OECD countries," *Economics of Transition*, 9(2), 417–447.
- BANERJEE, A. (1997): "Policy making in an overconsuming world: Some finger exercises," Mimeographed, Cambridge.
- BARDHAN, A., AND S. KLASSEN (1999): "UNDP's gender-related indices: A critical review," *World Development*, 27(6), 985–1010.
- BERRY, A., F. BOURGUIGNON, AND C. MORRISON (1991): "Global economic inequality and its trends since 1950," in *Economic Inequality and Poverty*, ed. by L. Osberg. M.E. Sharpe, Inc., Armonk.
- BLACKORBY, C., AND D. DONALDSON (1978): "Measures of relative equality and their meaning in terms of social welfare," *Journal of Economic Theory*, 18(1), 59–80.
- BLANCHFLOWER, D., AND A. OSWALD (2003): "Does inequality reduce happiness? Evidence from the States of the USA from the 1970s to the 1990s," Mimeographed, Warwick University.
- CLARKE, G. R. G. (1995): "More evidence on income distribution and growth," *Journal of Development Economics*, 47(2), 403–427.
- DAGUM, C. (1990): "On the relationship between income inequality measures and social welfare functions," *Journal of Econometrics*, 43(1-2), 91–102.
- DEATON, A. (1997): *The Analysis of Household Surveys*. The John Hopkins University Press, Baltimore.
- DEININGER, K., AND L. SQUIRE (1996): "A new data set measuring income inequality," *The World Bank Economic Review*, 10(3), 565–591.
- (1998): "New ways of looking at old issues: Inequality and growth," *Journal of Development Economics*, 57(2), 259–287.

- DOLLAR, D., AND A. KRAAY (2002): "Growth is good for the poor," *Journal of Economic Growth*, 7(3), 195–225.
- EASTERLIN, R. (1995): "Will raising the incomes of all increase the happiness of all?," *Journal of Economic Behavior and Organisation*, 27(1), 35–47.
- FORBES, K. (2000): "A reassessment of the relationship between inequality and transition," *American Economic Review*, 90(4), 869–887.
- GOTTSCHALK, P., AND T. SMEEDING (1997): "Cross-National comparisons of earnings and income inequality," *Journal of Economic Literature*, 35(2), 633–687.
- (2000): "Empirical evidence on income inequality in industrial countries," in *Handbook of Income Distribution*, ed. by A. B. Atkinson, and F. Bourguignon, vol. 1, pp. 261–307. Elsevier Science B.V., Amsterdam.
- GRAAF, J. D. V. (1957): *Theoretical Welfare Economics*. Cambridge University Press, London.
- GRAHAM, C., AND S. PETTINATO (2002): "Frustrated achievers: Winners, losers and subjective well-being in new market economies," *Journal of Development Studies*, 38(4), 100–140.
- GRÜN, C., AND S. KLASSEN (2001): "Growth, income distribution and well-being in transition countries," *Economics of Transition*, 9(2), 359–394.
- (2003): "Growth, inequality, and well-being: Cross-country comparisons," Mimeographed, University of Munich.
- HESTON, A., R. SUMMERS, AND B. ATEN (2001): "Penn World Table Version 6.0," Center for International Comparisons at the University of Pennsylvania (CICUP), <http://webhost.bridgew.edu/baten/>.
- (2002): "Penn World Table Version 6.1," Center for International Comparisons at the University of Pennsylvania (CICUP), <http://pwt.econ.upenn.edu/>.
- HILL, R. J. (2000): "Measuring substitution bias in international comparisons based on additive purchasing power parity methods," *European Economic Review*, 44(1), 145–162.
- HIRSCH, F. (1977): *The Social Limits to Growth*. Harvard University Press, Cambridge, MA.
- JENKINS, S. P. (1997): "Trends in real income in Britain: A microeconomic analysis," *Empirical Economics*, 22(4), 483–500.
- KAKWANI, N. (1981): "Welfare measures: An international comparisons," *Journal of Development Economics*, 8(??), 21–45.
- KAPTEYN, A., AND F. VAN HERWAARDEN (1980): "Interdependent Welfare Functions and Optimal Income Distribution," *Journal of Public Economics*, 14(??), 375–397.

- KLASEN, S. (1994): "Growth and well-being: Introducing distribution-weighted growth rates to reevaluate U.S. post-war economic performance," *Review on Income and Wealth*, 40(3), 251–272.
- (2002): "Low schooling for girls, slower growth for all? Cross-Country evidence on the effect of gender inequality in education on economic development," *World Bank Economic Review*, 16(3), 345–373.
- LIS (2000): "Luxembourg Income Study," <http://www.lisproject.org/>.
- LUNDBERG, M., AND L. SQUIRE (2001): "The simultaneous evolution of growth and inequality," Mimeographed, World Bank, Washington, DC.
- NORDHAUS, W., AND J. TOBIN (1972): "Is growth obsolete?," *Economic Growth*, Fiftieth Anniversary Colloquium V, National Bureau of Economic Research, New York.
- OSBERG, L., AND A. SHARPE (2001): "The indices of economic well-being: An overview," Mimeographed, Paper presented at the National Conference on Sustainable Development Indicators, Ottawa, Canada.
- (2002): "An index of economic well-being for selected OECD countries," *Review of Income and Wealth*, 48(3), 291–316.
- PERSSON, T., AND G. TABELLINI (1994): "Is inequality harmful for growth?," *American Economic Review*, 84(3), 600–621.
- RAVALLION, M. (1997): "Good and bad growth: The Human Development Reports," *World Development*, 25(5), 631–638.
- (2002): "Have we already met the millenium development goal for poverty?," Article published in *The Economic and Political Weekly*, November 16, 2002.
- RAWLS, J. (1971): *A Theory of Justice*. Harvard University Press, Cambridge, MA.
- SAMUELSON, P. A. (1947): *Foundations of Economic Analysis*. Harvard University Press, Cambridge, MA.
- SCHWARZE, J., AND M. HÄRPFER (2002): "Are people inequality averse, and do they prefer redistribution by the State? Evidence from German Longitudinal Data on life satisfaction," IZA Discussion Paper No. 430.
- SEN, A. (1973): *Collective Choice and Social Welfare*. Harvard University Press, Cambridge, MA.
- (1982): "Real National Income," in *Choice, Welfare and Measurement*, ed. by A. Sen, chap. 18, pp. 388–415. Basil Blackwell, Oxford.
- (1984): "The Welfare Basis of Real Income Comparisons," in *Resources, Values, and Development*, ed. by A. Sen, chap. 17, pp. 389–551. Harvard University Press, Cambridge, MA.
- (1987): *Commodities and Capabilities*. Harvard University Press, Cambridge, MA.

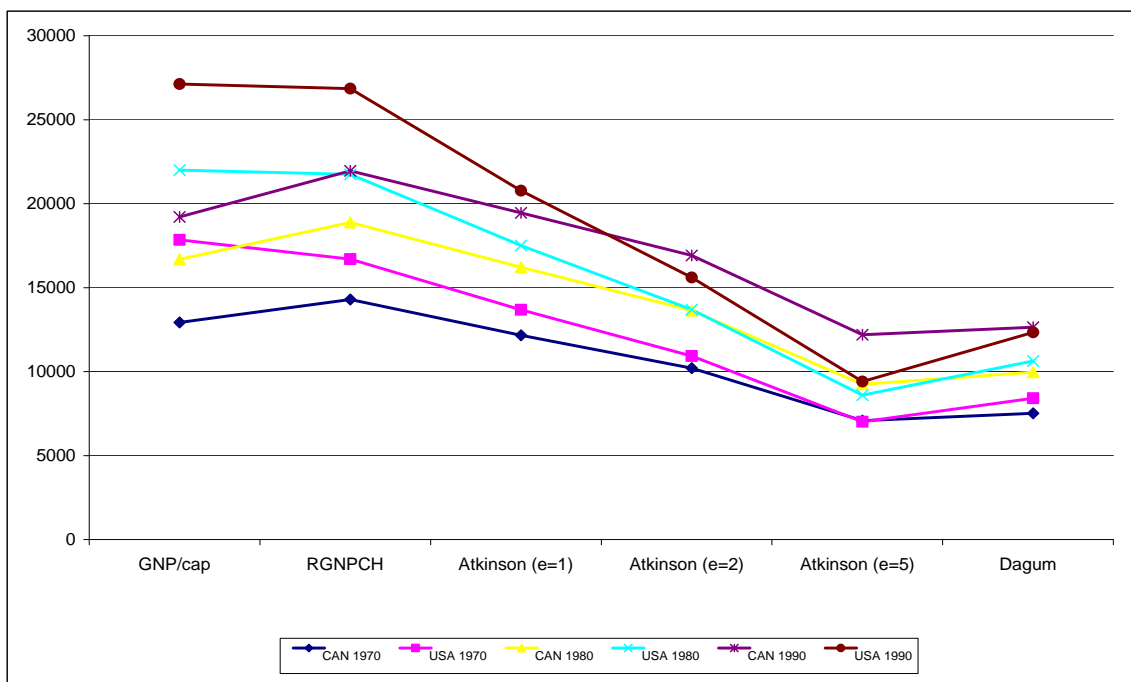
- (1997): *On Economic Inequality*. Clarendon Press, Oxford.
- (1999): *Development as Freedom*. Alfred A. Knopf, New York.
- STODDER, J. (1991): “Equity-Efficiency preferences in Poland and the Soviet Union: Order-Reversals under the Atkinson Index,” *Review of Income and Wealth*, 37(3), 287–299.
- SUMMERS, R., AND A. HESTON (1991): “The Penn World Table (Mark 5): An expanded set of international comparisons, 1950-1988,” *Quarterly Journal of Economics*, 106(2), 327–368.
- TRANSMONEE (1999): “Monitoring social conditions and public policy in Central and Eastern Europe,” UNICEF, <http://eurochild.gla.ac.uk/Documents/monee/>.
- UN (1992): *Handbook of the International Comparison Programme*. United Nations Publication, Department of Economic and Social Development, Statistical Division, New York.
- UNDP (1995): *Human Development Report 1995*. Oxford University Press, Oxford and New York, United Nations Development Programme.
- (2002a): “Human Development Report 2002,” Oxford University Press, New York, United Nations Development Programme.
- (2002b): *Human Development Report 2002*. Oxford University Press, Oxford and New York, United Nations Development Programme.
- WANSBEEK, T., AND A. KAPTEYN (1983): “Tackling hard questions by means of soft methods: The use of individual welfare functions in socio-economic policy,” *Kyklos*, ??(??), 249–269.
- WDI (1999): “World Development Indicators 1999,” The World Bank, Washington, DC.
- (2001): “World Development Indicators 2001,” The World Bank, Washington, DC.
- (2002): “World Development Indicators 2002,” The World Bank, Washington, DC.
- WIID (2000): “World Income Inequality Database Version 1.0,” World Institute for Development Economics Research, <http://www.wider.unu.edu/wiid/wiid.htm>.
- WORLD BANK (2002a): “Global Poverty Monitoring,” The World Bank, Washington, DC, <http://www.worldbank.org/research/povmonitor/>.
- (2002b): “World Development Report 2002,” Oxford University Press, New York, The World Bank, Washington, DC.

Figure 1: Welfare Comparison: Indonesia versus Peru, 1980-1998



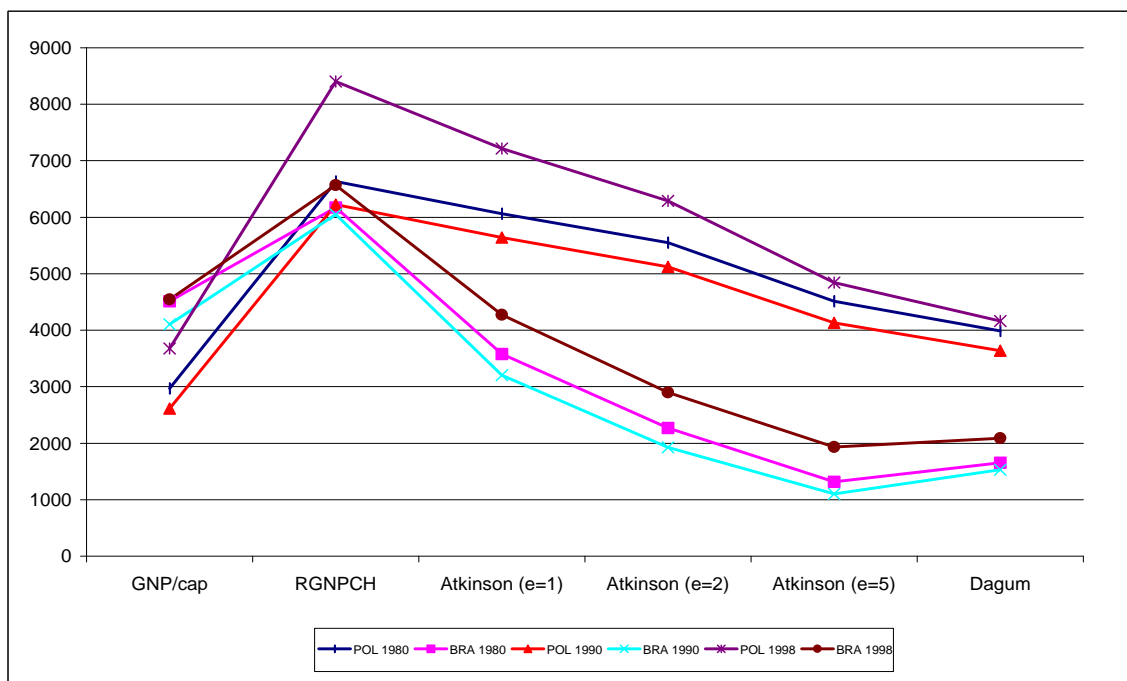
Notes: GNP/cap: GNP per capita, constant 1996 US-Dollars (WDI, 1999, 2001). GNI/cap: Real GNI per capita, 1996 prices (WDI, 2002). RGNPCH: Real GNP per capita, 1996 prices (Summers and Heston, 1991; Heston, Summers, and Aten, 2002).

Figure 2: Welfare Comparison: Canada versus USA, 1970-1990



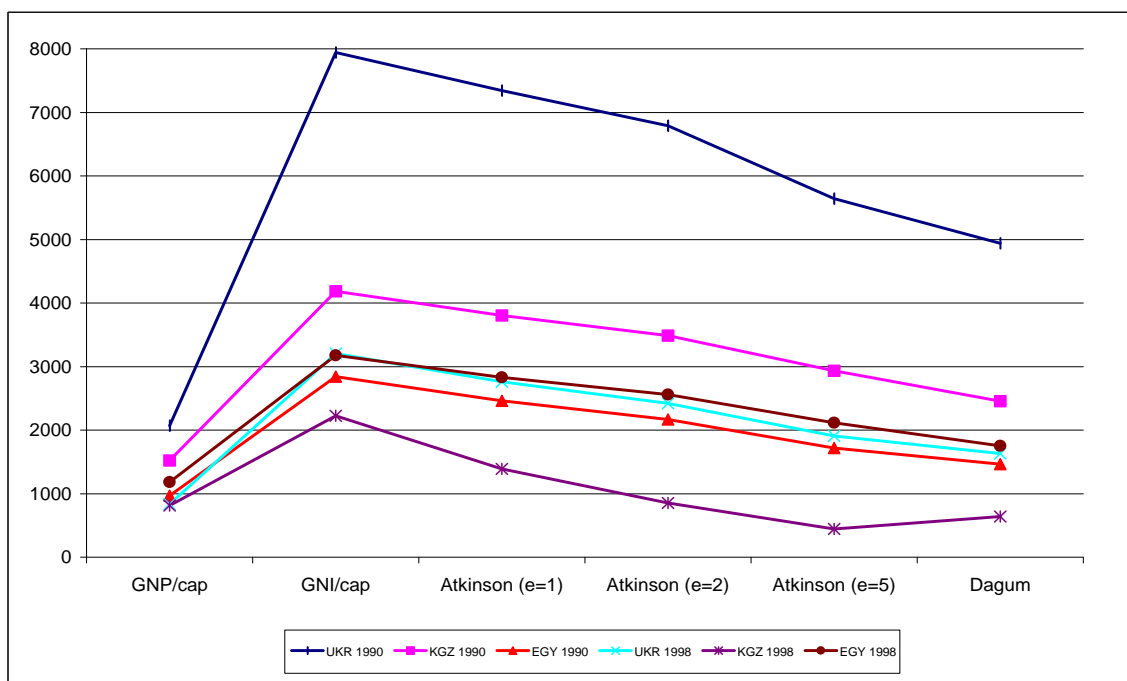
Notes: For definition of incomes, see Figure 1.

Figure 3: Welfare Comparison: Poland versus Brazil, 1980-1998



Notes: For definition of incomes, see Figure 1.

Figure 4: Welfare Comparison: Ukraine, Kyrgyzstan, and Egypt 1990-1998



Notes: The income data used are from WDI (2002). See text for details.