Inequality Adjusted Growth Rates in Latin America
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Abstract: The pace of economic growth in developing countries in Latin America gained momentum in the 1990s. However, doubts have been expressed in some circles about the benefits to an economy deriving from higher rates of GDP growth without at the same time accounting for distributional effects. The seeming difference in the interpretation of the evidence arises because some commentators focus on the mean income, while others are concerned with the distribution around the mean. This paper offers a distribution-sensitive index, which takes both interpretations into account. It assesses the per capita income that would be needed, if income were equally distributed to reach the same level of welfare, which is available from current distribution of the per capita GDP. This approach allows for the combination of both growth and distribution in ranking the success of countries in their attempt to raise the living standard of the population.
Inequality Adjusted Growth Rates in Latin America

1. Introduction

The pace of economic growth in developing countries in Latin America gained momentum in the 1990s, but reservations began to be expressed in some circles about the benefits of growth to the economy as a whole. This paper addresses concerns about the distributional aspect of growth within the economy. The issue is of special interest because how the benefits of growth are distributed varies between policies adopted to encourage higher growth. In this paper, we measure the success of economic policy in the attempt to raise the standard of living of the population, by reference to growth and distribution taken together. For this purpose, we examine recent evidence of economic growth with a distribution-sensitive index. This measure assesses the per capita income that would be needed, if income were equally distributed, to reach the same level of welfare available from current distribution of the per capita GDP. Results are presented for all major Latin American economies in the two decades following the rather long economic crisis of the early eighties.

Some of the literature on growth and distribution examines the trickle down hypothesis, which argues that the poor become less poor as the growth rate of per capita GDP accelerates. Cross-country data on growth and poverty, where poverty is measured using some absolute income concept, is provided in support of the argument (for example, Dollar and Kraay, 2002). An income equivalent of US$ 1.00 in purchasing power parity at 1985 prices is one of the poverty lines considered in this debate. If the Dollar-Kraay (op. cit.) line of argument is followed, GDP growth will eliminate poverty. Bhalla (2002, 2003) goes even further. According to this author, growth had already by the year 2000 reduced world poverty to the target set for the Millenium Development Goal of halving world poverty rate, measured by the percentage of the world population living below US$1 per day. World poverty measurements are subject to debate about how many people have to get by with income below $1 a day, whether measured in 1985 or 1996 value of the US dollar or whether adjusted for differences between countries in their purchasing power parity.

This discussion, in our view, is not particularly helpful (see also Reddy and Pogge,
Seeking the connection between GDP growth rates and the rate of decline in the numbers of people living below some arbitrary money measure, for example a dollar or two dollars a day, is not a particularly meaningful method for counting the poor (see, for example, Angeriz and Chakravarty, 2007, Ferreira et al., 2007). What the poor can buy depends not just on their own money income but also on the distribution of income in society. The income needed even just to survive in a big urban conurbation such as Sao Paulo (Brazil) is greater than the income needed for bare survival in some small village in the same state of Sao Paulo. One aspect of the debate about growth is its impact on poverty, and this debate is marred by problems of defining poverty without reference to income distribution (Pritchett 1997; Watkins 2002). This issue is especially relevant in the context of latest trends showing growing inequality around the world (see OECD, 2008).

We bypass this debate to provide a ranking of economic trends between countries not by GDP growth rates, but by the growth rates of an equivalent income measure. The latter is the equally distributed per capita income required to reach the same level of welfare currently achieved with the actual distribution patterns. The procedure adopted here is based on an approach developed by Atkinson (1970) in deriving the Atkinson Inequality Index, which involves a corresponding view of social welfare. The welfare measure incorporates the strength of society's preference for equality through a subjective inequality aversion parameter, which appears in the welfare function. The larger is the magnitude of this parameter, the higher is the weight that society attaches to income transfers at the lower end of the distribution. Likewise, lower magnitudes of the parameter signify greater sensitivity of the welfare index to inequality caused by transfers between individuals at the top end of the distribution. A choice of the magnitude of a subjective inequality aversion parameter is then the basis for the calculation of the recommended welfare index.

Following this procedure, an inequality-adjusted index is computed here in the attempt to measure an equally distributed equivalent income. Variations in this index obtained by defining inequality aversion parameters are then correlated with the GDP growth rates of Latin-American countries. This is undertaken in an attempt to test whether GDP growth goes hand in hand with inequality-sensitive welfare indices. The data used in calculating these indices are derived from World Development Index
published by the World Bank.¹ The salient features of this source of data are explained in section 4 below.

This paper is organized as follows. Section 2 outlines the proposed way of measuring poverty and discusses the link between poverty and inequality. Section 3 explains the relevance of the social welfare function implicit in deriving the Atkinson inequality index. Section 4 provides and discusses the estimates of the rate of change in the inequality-adjusted growth index for various economies. Finally, section 5 summarizes the argument and concludes.

2. Poverty, Inequality and Growth

Poverty and inequality are multi-dimensional ideas, which cannot be fully described without detailed considerations of opportunities in the life that individuals wish to lead. One of the dimensions of the idea of well-being is current access to goods and services. Though, even within this narrow framework, differences are observed about how to set the poverty level income, i.e. whether one uses income data or consumption data.²

As mentioned above, a strand in the current literature measuring the impact of growth on poverty bypasses the question of inequality and measures the number of the poor by reference to some particular amount of money income in dollars, fixed all over the world (Bhalla 2003; Dollar 2002; Chen and Ravallion 2001). In this exercise, we consider only income data, and translate income per capita as measured by gross domestic product per capita into an equivalent equally distributed income per capita. The latter would be needed to reach the same level of social welfare by considering a particular social welfare function that is distribution sensitive, as explained in section 3 below.

The income-based definition of the poor entails counting those whose income falls below some poverty datum line. There are two ways that this problem is generally approached.
i. The first is to define some minimum level by reference to physical requirements, for example, nutritional requirements, for survival.

ii. The second is "to endeavour to define the style of living which is generally shared or approved in each society and find whether there is ... a point in the scale of the distribution of resources below which as resources diminish families find it particularly difficult to share in the customs activities and diets comprising their society's style of living" (Townsend, 1979).

Both the above approaches raise difficult conceptual issues. How do we define the physical requirements for survival? (Saith, 2005; Sen, 2005). How do we define the 'style of living' approved by society? Desai and Shah (1988) attempt to resolve this problem, raised in the debate between Piachaud (1981) and Townsend (1981), by re-defining the "style of living approved by society" as the "modal behaviour" (p. 518). By doing so, the authors "make the sociological view of poverty empirically measurable" (Desai and Shah, op. cit., p. 158). Their recommended method defines the minimum requirement for survival for a good as the constant term in a linear expenditure system of equations. Then the minimum amount of money required for survival may be defined as the sum of the constant terms weighted by prices.

Suppose that there are n goods and \( x_i \) amount of good \( i \) is demanded, when income is \( M \). Suppose further that \( s_i \) is the minimum amount of the \( i^{th} \) good that is demanded and money left over after the minimum demand for each of the goods is satisfied is spent on purchasing additional amount of goods by maximizing the following utility function subject to the budget constraint as follows:

\[
U = \prod_{i=1}^{i=n} [x_i - s_i]^{\beta_i}
\]

subject to:

\[
\sum_{i=1}^{i=n} (p_i \cdot x_i) = M
\]  

The demand function resulting from the above maximisation exercise turns out to be a linear function:
\[ p_i \cdot x_i = p_i \cdot s_i + \beta_i \cdot \left[ M - \sum_{i=1}^{i=n} (p_i \cdot s_i) \right] \]  

\( \sum_{i=1}^{i=n} p_i \cdot s_i \) could now be regarded as the cost minimum survival bundle of goods, which are bought before additional amount of any good is purchased from the money that is left over (Green 1976, pp 142-143). Theil and Clements (1987, p. 10) call \( s_i \) the ‘subsistence consumption’ of the \( i \)th commodity. The data requirements in going down this route for estimating the poverty line for comparison between countries and over time are onerous.

Instead, poverty measures used in the trickle down approach are based on some arbitrary dollar value of survival income (Dollar and Kraay, 2002), such as one or two dollars a day per person. This approach aims to express in money terms some view of basic survival requirements for food and shelter. However, malnutrition and hunger impacts on the quality of life in other ways than by causing immediate death or recorded illness. Atkinson (1983), for example, points out that there is no unique level of food intake defining the subsistence level of nutrition. Instead, physical efficiency declines in a number of ways due to malnutrition of different kind. There is an additional difficulty in attempting to set the minimum survival requirements in money terms, such as dollar a day or two dollars a day. Prices of survival necessities are not identical between different regions that are at very different stages of development.

On reflection, it appears that the distinction between relative and absolute poverty is not as sharp as it might seem at first sight. Relative prices are not independent of the distribution of income. As more people acquire cars and buses run with empty seats, those who have to depend on buses for transport have to carry a greater fraction of the fixed cost of bus service. Changes in income distribution may thus lead to changes in relative prices. This, in turn, may lead to a change in what and how much the poor can buy with a fixed sum of money. Thus, the subsistence level of income, often thought of as some absolute level, is itself a concept that is not independent of the distribution of income.\(^4\)
These views support our choice for proposing to examine the impact of growth on poverty. In the next section, we provide the theoretical underpinnings of this method, which compares growth rates in GDP per capita with growth rates in a distribution-adjusted welfare index following from the Atkinson inequality index.

### 3. A Welfare Index

To understand the nature of the welfare index reported here, it is necessary to highlight some salient features of the Atkinson inequality index (Atkinson, 1970). We begin with a standard utility function $U(y)$, where $y$ stands for income. If utilities are assumed to be additively separable, then a social welfare function might be constructed by taking a weighted average of the individuals’ utility functions. The weights are taken from the frequency density function of income $y$, $f(y)$, where income is allowed to fluctuate from the minimum ($\geq 0$) to some maximum levels of income, be it infinity, so that:

$$W = \int_{0}^{\infty} U(y) \cdot f(y)dy$$

(3.1)

where $W$ is the welfare index and the rest of the variables are as defined above.

Next define the cumulative density $F(y)$ as follows:

$$F(y) = \int_{0}^{y} f(x)dx$$

(3.2)

A preference for less inequality is embedded in $U$, implying that the utility function exhibits diminishing marginal utility of income and it is thus concave, i.e. $U' > 0$ and $U'' < 0$, the first and second derivatives of the utility of income, $U$, respectively. Then a distribution $f(y)$ will provide a higher value of $W$ than a distribution $g(y)$ if and only if the following conditions are satisfied (Atkinson 1970, p. 246):

$$\int_{0}^{z} [F(y) - G(y)]dy \leq 0 \quad \text{for } \forall z \geq 0 \leq z \leq \text{max}$$

(3.3)
and there exists some value of \( y \) at which

\[
F(y) \neq G(y)
\]  

(3.4)

Note that \( F(y) \) and \( G(y) \) are cumulative density functions (see Equation 3.2 above for a definition) associated with the distribution functions \( f(y) \) and \( g(y) \), respectively.

Atkinson provides an interpretation of the condition in Equation (3.3) in terms of the Lorenz curve. The Lorenz curve plots on the vertical axis the percentage of total income accruing to the poorest \( x \) percentage of the population recorded on the horizontal axis. For each value of \( F(y) \), as defined by equation (3.2) above, we can write the Lorenz curve as follows:

\[
\Phi(F) = \left(1/\mu\right) \int_0^y x \cdot f(x)dx
\]  

(3.5)

where the parameter \( \mu \) is the mean of the distribution of income. The condition in equation (3.3) will be satisfied for two distributions of identical mean value, for any concave utility function as described above, if the Lorenz curve associated with \( f(y) \) is nested inside, i.e. lies above the Lorenz curve for distribution \( g(y) \), as shown in Figure 1 below.

where the parameter \( \mu \) is the mean of the distribution of income. The condition in equation (3.3) will be satisfied for two distributions of identical mean value, for any concave utility function as described above, if the Lorenz curve associated with \( f(y) \) is nested inside, i.e. lies above the Lorenz curve for distribution \( g(y) \), as shown in Figure 1 below.
Thus, if the Lorenz curve for $f(y)$ is above that of $g(y)$, for two mean preserving distributions, social welfare (see equation 1) is higher for distribution $f(y)$. If the Lorenz curves are not nested, i.e.: when they cross as shown in Figure 2 below, then the welfare functions associated with the distributions $f(y)$ and $g(y)$ cannot be ranked.
A way around this problem, if we retain the additively separable welfare function given by equation (3.1), is to impose a particular concave functional form on the utility function \( U(y) \). To arrive at a functional form, we start by asking for the level in per capital income \( X_e \) needed, if income were equally distributed, to achieve the same level of welfare obtained given the current distribution \( f(y) \) of income. We can write the current level of welfare as:

\[
U(X_e) = \int_{0}^{\infty} U(y) \cdot f(y) dy
\]  

where \( X_e \) is analogous to a certainty equivalent income when income is randomly distributed. To compare this certainty equivalent income level with the actual mean of the per capita income, \( \mu \), Atkinson (1970) derives a functional form of a concave utility function, consistent with a view of inequality aversion:
\[ U(y) = A + B \cdot \left[ y^{(1-\varepsilon)} / (1 - \varepsilon) \right] \] if \( \varepsilon \neq 1 \)

or

\[ U(y) = \ln(y), \] if \( \varepsilon = 1 \)

(3.7)

Note that A and B are constants. Also note that the assumption of concavity of the utility function entails holding \( \varepsilon \geq 0 \) in the above expression for \( U(y) \), where \( \varepsilon \) is positive, which is indicative of aversion to inequality. The parameter \( \varepsilon \) can be interpreted as a measure of the degree of inequality aversion. For discrete distributions of income, the equivalent income is as follows (Atkinson 1970, p. 257):

\[
X_{\varepsilon} = \mu \cdot \left[ \sum_{i=1}^{n} \left( \frac{y_i}{\mu} \right)^{(1-\varepsilon)} \cdot f(y_i) \right]^{\frac{1}{1-\varepsilon}}
\] (3.8)

Equation (3.8) above is not directly presented in Atkinson (op. cit.), but in the context of an inequality index, which is defined as follows:

\[
I = 1 - \frac{X_{\varepsilon}}{\mu}
\] (3.9)

An interpretation, which may be emerge by reference to equations (3.5) and (3.9) is that the value of \( I \) allows us to ascertain how much greater the mean income has to be than the equally distributed equivalent income, in order to obtain the same level of welfare. For example, if \( I = 0.3 \), “it allows us to say that if incomes were equally distributed, then we should need only 70% of the present national income to achieve the same level of welfare (according to the particular welfare function [chosen here])” (Atkinson 1970, p. 250). Referring to equations 3.8 and 3.9, we may note that \( I \) depends on the inequality aversion parameter, i.e. \( \varepsilon \).

4. Growth Trends Adjusted for Inequality

In this section we compare growth rates in GDP between different periods for some countries and between countries for similar periods with the corresponding growth rates of computed values of welfare preserving equally distributed equivalent
incomes. We find that periods of higher GDP growth are not necessarily periods of higher growth in the above equivalent incomes. Some of the countries have achieved higher growth rates at the expense of not only reducing the share of the lower quintile groups, but sometimes by also reducing the absolute per capita income corresponding to some of these groups.

The data on GDP and quintile distributions are obtained from the World Development Indicators, an extensive dataset published by the World Bank (see footnote 1), which covers economic, social and financial data, along with information about natural resources and environmental indicators. GDP growth comparisons with welfare-equivalent income growth are produced by selecting a group of countries from Latin America for the period 1980-2004. This span is long enough to cover the experience of recovering from the 1982 financial crisis in the region, and the years of expansion, which took place in the 1990s; followed by the crisis in the early 2000s. For most of larger economies various data points are available in these years, thereby providing a good coverage of what happened in the period, although only until 2004.

For each of these countries we calculate the welfare-equivalent equally distributed income, $X_e$. The latter is defined as per capita GDP in constant dollars. Data for GDP and quintile distribution are not available for all years, but the growth rates are annualized growth rates between the years for which data are available\textsuperscript{5}. All the results reported in this paper are computed for the inequality aversion parameter $\varepsilon = 1.5$. Such magnitude is a large enough value to ensure that the inequality index and also the welfare-equivalent equally distributed income are particularly sensitive to changes in the share of income accruing to the poor, the lowest quintile.

Due to increasing inequality during many of the intervals, the growth rate of the equality equivalent income is found to be lower than the growth rate in per capita GDP over much of the period. In a quarter of the cases, equivalent income even declines despite per capita GDP growth being positive. For large values of the inequality aversion parameter $\varepsilon$, lowering inequality is no less important in improving the standard of living of the poor than faster economic growth. An illustration is provided in Table 4.1 using data for Argentina.
In the table below, we report $X_e$, per capita GDP in constant (Year 2000) dollars, and also the Atkinson inequality index for Argentina, calculated for the available years. An inequality index of 0.46 in 1992 means that, if income were equally distributed, we could achieve the same level of welfare as we do with the given per capita GDP for less than a half of that income.

**Table 4.1: Per Capita Income and Inequality**

<table>
<thead>
<tr>
<th>Year</th>
<th>Argentina</th>
<th>GDP (Yr 2000 dollars)</th>
<th>Equality Equivalent Income</th>
<th>Inequality index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>6543</td>
<td>4173</td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>6860</td>
<td>3675</td>
<td>0.46</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>7489</td>
<td>4268</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>8213</td>
<td>4524</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>7288</td>
<td>3677</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>6431</td>
<td>3240</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>6932</td>
<td>3508</td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>7486</td>
<td>3838</td>
<td>0.49</td>
<td></td>
</tr>
</tbody>
</table>

Notice that the equality equivalent index suggests a negative rate of growth between 1986 and 1992 notwithstanding an increase of 5 per cent in the per capita GDP during the same period. In this emblematic case, certain distinctive periods can be identified after 1992. Up to 1996, and following historical trends, high per capita GDP growth rates are concurrent with decreasing inequality indices. Then, inequality starts increasing, but such escalation is not enough to prevent a rise in the equally distributed equivalent income until the onset of the 1999 economic downturn. Argentina observed a dramatic economic crisis starting in 1999, which clearly distinguishes the subsequent period. Note that this time there is a drop in almost 10% in the per capita GDP, which coincides with an associated increase in the inequality index, culminating in a trend of reduced equally distributed equivalent income until 2002. Then both per capita GDP and the above equivalent income begin to recover. The recovery in the equivalent income is, however, slower than it might have been if inequality had also decreased to the levels seen in the earlier years of the same decade.

We note from Table 4.1 that, between 1992 and 2003, per capita GDP in Argentina
only increased marginally, whilst, at the same time, the equality equivalent income declined as inequality increased. Equally, notice that there was virtually no change in per capita income between 1996 and 2004, but equivalent income declined by 10 per cent. If poverty were to be addressed in Latin America, these results would indicate that a more active policy for income redistribution was needed. Indeed it is not the case that income inequality is essential for higher growth.

Table 4.2: Per Capita GDP (Yr 2000 dollars) and Equality Equivalent Income

<table>
<thead>
<tr>
<th>Year</th>
<th>Brazil GDP</th>
<th>Brazil Equality Equivalent</th>
<th>Brazil Inequality Index</th>
<th>Chile GDP</th>
<th>Chile Equality Equivalent</th>
<th>Chile Inequality Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>3175</td>
<td>1438</td>
<td>0.55</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1985</td>
<td>3355</td>
<td>1422</td>
<td>0.58</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1990</td>
<td>3374</td>
<td>1346</td>
<td>0.60</td>
<td>3093</td>
<td>1554</td>
<td>0.50</td>
</tr>
<tr>
<td>1992</td>
<td>3285</td>
<td>1416</td>
<td>0.57</td>
<td>3616</td>
<td>1840</td>
<td>0.49</td>
</tr>
<tr>
<td>1993</td>
<td>3386</td>
<td>1433</td>
<td>0.58</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1995</td>
<td>3613</td>
<td>1353</td>
<td>0.63</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1996</td>
<td>3634</td>
<td>1496</td>
<td>0.59</td>
<td>4543</td>
<td>2297</td>
<td>0.49</td>
</tr>
<tr>
<td>1997</td>
<td>3699</td>
<td>1499</td>
<td>0.59</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>1998</td>
<td>3644</td>
<td>1816</td>
<td>0.50</td>
<td>4862</td>
<td>2407</td>
<td>0.51</td>
</tr>
<tr>
<td>1999</td>
<td>3601</td>
<td>1526</td>
<td>0.58</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2000</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>4917</td>
<td>2499</td>
<td>0.49</td>
</tr>
<tr>
<td>2001</td>
<td>3695</td>
<td>1558</td>
<td>0.58</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2002</td>
<td>3738</td>
<td>1621</td>
<td>0.57</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2003</td>
<td>3733</td>
<td>1639</td>
<td>0.56</td>
<td>5215</td>
<td>2719</td>
<td>0.48</td>
</tr>
<tr>
<td>2004</td>
<td>3892</td>
<td>1748</td>
<td>0.55</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2005</td>
<td>3951</td>
<td>1833</td>
<td>0.54</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

We now turn our attention to Brazil and Chile (relevant data reported in Table 4.2) between 1992 and 2003. Brazil performed worse on both counts, growth in per capita GDP and also in the growth of equivalent income. Inequality remained high all across this period in this country. There was also a similar resistance in the movement in the inequality index for Chile during this time, although the level of inequality was lower in Chile. Furthermore, a combination of lower GDP growth and no relief from inequality ensured that the equivalent income between Brazil and Chile continued to diverge during this decade. Brazilian per capita GDP rose by 14 per cent and the equivalent income increased by 16 per cent during this period. The corresponding figures for Chile are 44 and 48 per cent, respectively. It is worth pointing out that, despite registering lower growth rates over the decade, Brazil could have managed to
keep the percentage difference in equivalent income unchanged with Chile if at least it had lowered the inequality index from 0.57 to the Chilean figure of 0.48 by 2003. If that improvement in the distribution of income had taken place, the equivalent income in Brazil would have gone up by 37 per cent, instead of the meager 16 per cent that was witnessed, during the 1992-2003 period.

For an illustration of the general point, consider the separate effects of growth and distribution in the gap between the equivalent income for both countries and the two periods of time. A country that maintains a higher level of inequality has to grow faster to keep up with the rate of growth in equivalent income for countries that enjoy a lower level of inequality. Consider the following example as an illustration of the point. Suppose that in 1992, the per capita GDP in countries A and B were equal, say at $1000. The inequality index (for an inequality aversion parameter $\varepsilon =1.5$) in the case of Country A is 0.5, but it is 0.6 for Country B. Assume identical per capita growth rates in both countries, at 5 per cent per annum for 10 years. In such case, per capita GDP levels are identical between the countries, but the difference in $X_e$ increases from $100 to $163. For this disparity to shrink, the difference in inequality between the countries will have to narrow over time. If inequality falls from 0.6 to 0.575 in Country B, whilst the index remains at its original value of 0.5 in Country A, then the above initial difference of $100 in the initial year goes up to only $122 at the end of the period. This difference, however, continues to widen over time if Country B remains more unequal. A corollary of the point raised above is that the countries, which start out with a higher level of inequality and continue to remain more unequal, would have to grow faster for their equivalent income not to fall further behind. This is consistent with the findings reported in Watkins (2002): “Countries with low levels of income inequality can expect to register far higher rates of poverty reduction than highly unequal countries”.

While economies with higher levels of per capita GDP also sometimes exhibit higher levels of equivalent income (Figure 4.1), this correspondence disappears when a comparison of the growth rates of per capita GDP and $X_e$ is made, as in Figure 4.2.
Figure 4.1. GDP per capita and Xe

Note: Individual cases are identified by country abbreviation, corresponding year and difference in years with previous period.
The individual cases in the above figures are identified by country abbreviation, corresponding year and difference in years with previous period. Whilst the details in the figures are not immediately obvious to the naked eye, the point that emerges is that higher rates of aggregate growth are not necessarily related to higher rates of growth in income for the poor.

There is no room for complacency about poverty reduction through the benefit of economic growth trickling down to the poor. We compare growth rates in GDP between different periods for some countries and between countries for similar periods with the corresponding growth rates of computed values of welfare preserving equally distributed equivalent incomes. We note that periods of faster growth are not necessarily periods of higher growth in the alternative measure of equivalent per capita income. Indeed, the correlation coefficient for the rates of growth of per capita GDP and equality equivalent income is only 0.14 in the data examined here.

In most countries, the inequality index is over 0.5, indicating that the actual level of welfare could be achieved, if we were to take a strong aversion to inequality and poverty, with less than half the reported per capita income. Periods of higher growth rates in per capita GDP are not necessarily accompanied by periods of higher growth in equivalent income within a country. Between 1984 and 1985, Brazil witnessed per capita growth in GDP of 5.7 per cent per annum, but the equivalent income fell by 2.7 per cent in that year. Yet between 2003 and 2004, when per capita GDP growth rate was lower, only 4.3 per cent, equivalent income rose by 6.1 per cent. Likewise, countries that record faster rates of growth in per capita GDP do not necessarily register higher rates of growth in the inequality adjusted income than countries where the per capita growth rates in GDP are slower.

**Table 4.3: Per Capita GDP (Yr 2000 dollars) and Equality Equivalent Income**

<table>
<thead>
<tr>
<th>Year</th>
<th>Bolivia</th>
<th>Honduras</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GDP</td>
<td>Equality Equivalent</td>
</tr>
<tr>
<td>1986</td>
<td>2909.623</td>
<td>1348.838</td>
</tr>
<tr>
<td>1997</td>
<td>3480.55</td>
<td>1085.622</td>
</tr>
<tr>
<td>2002</td>
<td>3537.809</td>
<td>883.3714</td>
</tr>
<tr>
<td>2003</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Finally, Table 4.3 includes two cases representative of low income per capita countries. The issues are the same as those observed for middle income countries that are examined earlier. Bolivia managed to register a greater increase in per capita GDP between 1986 and 2002 than Honduras managed in the slightly longer period between 1986 and 2003. However, while per capita GDP rose by 22 per cent but equivalent income declined by 35 per cent during 1986-2002 in Bolivia. Honduras, on the other hand, registered only 16 per cent growth in per capita GDP between 1986-2003, but could only manage a slow growth rate of 21 per cent in equivalent income during that period. Faster rates, per se, of growth in the GDP do not filter down to improvements in the income of the poor.

5. Summary and Conclusions

Whilst it is widely recognized that an aggregate measure such as the GDP leaves out many relevant variables indicative of well being, growth rates in per capita GDP remains popular as an index of success of economic policy. Consider the following statement by Michael Camdessus, one time Managing Director of the IMF:

“Our primary objective is growth. In my view, there is no longer any ambiguity about this. It is towards growth that our programs and their conditionality are aimed” (as reported in Prezeworski and Vreeland, 2000, p. 385).

In recent years there has also been heightened concern about poverty reduction. Whilst higher rates of growth and higher rates of poverty reduction are not incommensurate, growth does not necessarily address the distributional issues entailed in reducing poverty. In this paper, we propose an alternative to per capita GDP, an index, which is sensitive to income distribution. Figures for GDP are modified following an approach that is derived from Atkinson’s seminal paper on income inequality (Atkinson, 1970). Using a subjective inequality aversion parameter, a measure of equivalent income is obtained from the published data on per capita GDP and its quintile distribution. The parameter is chosen high enough for the equivalent income to be especially sensitive to distribution towards or away from the poorest quintile. This method allows us to compare not just the growth rate of GDP over time
or between countries, but also the rate of growth of the equivalent income. This measure allows us to combine growth rates and inequality of income, and thus to comment on the success of the twin objectives of growth and poverty reduction using one single measure.

Examining recent data on Latin America until 2004, we notice that some of the countries reduced inequality, if only marginally, but the general picture was at the time not encouraging. In some countries, inequality has even worsened as austerity measures, following fiscal and monetary crises that appear to be endemic in the region, have been introduced. These trends are captured in our equivalent income measure of economic well-being.

References


Awareness has been raised with respect to the distinction between measures of poverty and inequality derived using income and consumption data. The issues raised here, however, are independent of that distinction.

The setting of the British supplementary benefits in levels after the war was informed by the Beveridge Report of 1942. It provided an estimation of the subsistence level of income needed for survival. This approach, though, presents a problem in that people can remain alive for quite a number of years even with incredibly low levels of nutrition.

Arrow (1982) provides an illustration. He explains how the sudden engagement of hitherto unemployed workers into the labour force and the consequent changes in income distribution caused meat prices to rise even though supply increased.

The available data can be obtained on request from the authors.