Inequality and the Dynamics of Poverty and Growth

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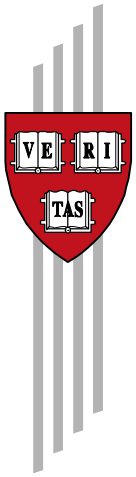
CID Working Paper No. 32
December 1999



Working Papers

Center for International Development
at Harvard University

CID Working Paper no. 32
Explaining African Economic Growth Performance Conference Series

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Ali A. Ali and Ibrahim A. Elbadawi*

Abstract

This paper models the dynamic interactions between growth and distribution in the analysis of the behavior of poverty over time. The model permits formal analysis of the factors that led to the growth collapse as well as the rise in poverty in Africa and other developing regions, except Asia, during 1975-96 period. Using indicators of average country performance during this period-- in terms of the rate of acceleration of growth, changes in poverty and extent of inequality the model suggests tentative strategies for dealing with poverty. The main policy recommendation of this analysis is that, for the majority of countries 36 out of 47 any serious strategy for poverty reduction must include both policies for accelerating growth as well as measures for effecting more equitable income distribution. Moreover, the latter must be sufficiently deep either to shake-off the transitional , though lingering, low equilibrium trap that characterizes some economies; or to more others from the bad equilibrium of stationary, but high, poverty.

JEL Classification: I32, D30, O20

Keywords: poverty, growth, inequality, distribution, strategy, Kuznets

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An earlier version of this paper was presented at the Workshop on Explaining African Economic Growth Performance, held at Harvard University, March 23-25, 1999. The workshop was sponsored by the African Economic Research Consortium and the Weatherhead Center for International Affairs.

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*The views expressed in this paper are not necessarily those of the UNECA; the World Bank, its Board of Directors or affiliated organizations. The authors are grateful to Dani Rodrik for making available his data on conflicts. We would like to acknowledge the research assistance by John Randa and Derrese Degefa.

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1. Introduction

Substantial and lasting reductions, if not complete eradication, of poverty has been and will continue to be the ultimate goal of economic and social development. The achievement of this goal has, however, so far eluded virtually all of Sub-Saharan Africa as well as many other countries in the rest of the developing world. Recent research and development experiences suggest that sufficiently high and sustained growth is a prerequisite for meaningful, and hopefully irreversible, impact on poverty. However, careful analysis of historical growth processes across the world reveals that records of sustained and sufficiently deep growth have been the exception rather than the rule (Easterly et al, 1993). Moreover, even when growth happens, its impact on poverty is not automatic. The efficiency of growth in terms of poverty reductions, as well as its sustainability over time, depend on the extent of inequality. Indeed, while the received evidence suggests that practically nothing happens without growth, depending on the extent of initial inequality, growth spells may either collapse to a grinding halt, get completely reversed, or instead, they could be the trigger for a virtuous circle from growth-to reduced poverty-to improved equality-to further sustained growth in the future. The importance of inequality for this circle can be argued on two grounds. The basic argument is that poverty is responsive to both growth and distribution, and that in the presence of high inequality growth is not likely to be broad-based and therefore, for both economic and political reasons, it cannot be sustained in the future (e.g. Bruno, Ravallion and Squire, 1998). Second, more recently Rodrik (1998a) argues that income and assets inequality, as a cause of latent social conflict in a society, can force the choice of growth retarding polices in response to external shocks. The combination of shocks, deep social divisions and weak institutions for conflict management has been shown by Rodrik to be the main factor behind the collapse of growth across developing countries in the 1980s[1].

This paper contributes to this debate by analyzing a simple model of poverty, growth and distribution, which allows poverty and growth to depend on the latter in the short-to-longer run. In the short-run the model also accounts for the joint effects on growth of shocks, social conflicts and the society s capacity for managing them. However, in a much longer horizon distribution is assumed to be endogenous to growth via a Kuznets curve. We take the view that the Kuznets hypothesis is meant to describe a long transformation process during which not only production structures change but also institutions change. In short periods of time different economies may find themselves on either side of the Kuzents curve assuming that it exists. The side on which economies find themselves will have important implication for the reduction of poverty. This feature of the model together with the growth equations allows dynamic interactions between growth and distribution. This is one of the key areas, recommended for future research, by Alesina and Rodrik (1994) in their seminal paper on this literature. Moreover, this feature also permits our model to have an important policy implication: in that it permits broad classification of countries according to

[1] See also Alesina and Rodrik (1994) and Persson and Tabellini (1994). However, a rare dissenting view is presented by Li and Zou (1998), who develop an endogenous growth model--where public consumption is allowed to enter the utility function---that predicts income inequality to lead to higher, rather than lower, growth.

whether sustained reduction of poverty would require acceleration of growth, redistributive measures or both.

The model is stated and discussed in section 2. Section 3 contains an overview of recent theoretical and empirical advances in the literature on the Kuzents thesis. This section also discuses estimation results of the Kuznets relationship, and emphasizes its relevance for explaining the reverse endogeniety of distribution relative to growth as a byproduct of, at least some if not all, development processes. Section 4 estimates the basic growth, distribution and poverty specifications. In section 5 we use the parameter estimates of section 4 to calculate the models structural parameters. These were subsequently used to identify policy strategies for poverty reduction as well as analyze the factors determining the dynamics of poverty and growth. Section 6 concludes.

2. A Model of Growth, Distribution and Poverty

We posit below a simple model of growth, poverty and distribution. While focusing on the role of inequality in the joint determination of the first two variables, the model also accounts for other non-distributional fundamentals of growth and of the direct effect of growth on poverty. In addition, we posit a formulation of the Kuznets relationship specifying inequality as an additive function of mean income and other time varying fixed effects. The steady state solution of the model allows derivation of the rate of growth consistent with stationary poverty, and the level of inequality consistent with both stationary poverty and zero rate of acceleration of growth (i.e. constant long-term rate of growth). Departure from the steady state, on the other hand, permits analysis of the phase dynamics of poverty and growth around the steady state.

2.i The basic Model

(1) $$g^* = g(G,F) = -b_0 G + b^{'} F = -b_0 G + g_F$$

(2) $$\dot{g} = -l_1 t \;\; G(1-I) + l_2 (g^* - g)_0 + l_3^{'} (Policy - Policy_0)$$

(3) $$\hat{P} = -(1-e)hg + q\hat{G}$$

(4) $$\hat{G} = n\hat{m} + n_0 = ng + n_0$$

where g is the rate of real growth; g^* is long term steady state growth; G is a measure of inequality; F= vector of other growth fundamentals(policy variables, human capital, institutions, initial income etc); l_1, l_1 are scalars and l_3 is a vector of parameters reflecting the effect due the change in the vector of policy variables $(Policy - Policy_0)$; τ is a measure of exogenous shocks; I is an index of the effectiveness of institutions for resolving social conflicts; P is an index of poverty; μ =mean income; z= poverty line; ε = elasticity of poverty line with respect to mean income; -η = elasticity of poverty index with respect to μ; θ is the elasticity of P relative to G, $\dot{x} = dx$ is absolute change over time and $\hat{x}$ indicates a rate of change $(\frac{dx}{x})$.

The above model has two major components: a growth component (equations 1 and 2) and a poverty component (equations 3 and 4). We discuss these in turn.

The Growth Component

Under the growth component equation (1) specifies long-run target growth as being determined by the degree of income inequality and a host of other fundamentals--reflecting policy variables, external factors and initial conditions. Following Alesina and Rodrik (1994) we assume growth to be negatively associated with initial degree of inequality (Gini). At the theoretical level, Alesina and Rodrik formally establish this negative link by showing that less equal societies are more prone to distributive polices, which reduces growth by introducing economic distortion. They also empirically corroborate the prediction of their model using global cross-country data. More recently, Rodrik (1998a) formally justifies the link between growth and the more general concept of distributional conflicts . According to Rodrik, such conflicts can diminish the productivity with which a society s resources are utilized in a number of ways: by delaying needed adjustment in fiscal policies and key relative prices (such as the real exchange rate or real wages), by generating uncertainty in economic environment, and by diverting activities from the productive sphere to the redistributive one. (Rodrik, 1998a: pp.2).

Equation (2) is an error-correction extension of the specification proposed by Rodrik (1998a) in which growth persistence is disrupted by external shocks in an environment of high social conflicts (G) and weak institutions (1-$\bar{I}$). The variable ($t\ G(1-I)$) accounts for the interactions of latent social conflict (in our case taken to be the degree of inequality) with external shocks on one hand, and with domestic institutions of conflict management on the other. Rodrik shows this interactions to be the main factor behind the persistence of growth in East Asia, and its collapse everywhere else in the developing world, following the external shocks of the late 1970s. Equation (2) expresses growth persistence as a weighted function of this effect, an error correction effect and the impact effects of changes in the policy fundamentals of growth. More formally, this equation can be shown to be consistent with optimizing behavior, if we assume that the government pursues a *moving* growth target by minimizing the following two period error-correction loss function:

$$l(g) = z_1(g - g_0^*)^2 + z_2[(g - g_0)^2 + (j'\Delta h)^2] + z_3'\Delta h(g - g_0),$$

where $\Delta h = (\Delta Policy, tG(1-I))$ is a vector of determinants of the dynamics of growth, which include changes in the policy fundamentals of growth in addition to the conflict variable. It is straightforward to show that equation (2) is a direct result of the above minimization problem[2].

The Poverty Component

Under the poverty component equation (3) is derived from the standard general specification of poverty index, P, as a function of the standard of living and an inequality measure, such as the Gini coefficient. Most commonly used poverty measures satisfy the requirement of being homogeneous of degree zero in the poverty line (z) and mean income (μ). Plausible restrictions on the poverty index are that (a) its partial with respect to mean income is negative implying that, for a given inequality, an increase (reduction) in mean income (the poverty line) will be expected to lead to a

[2] See Domowitz and Elbadawi (1987) for an application of this framework in the demand for money literature.

reduction in poverty, and (b) its partial with respect to the inequality index is positive implying that an increase in inequality, for a given mean income, will be expected to lead to an increase in poverty (e.g. Ali,1998)[3].

Total logarithmic differentiation of such generally formulated poverty index gives rise to equation (3) which decomposes a poverty change into a growth component and a distribution component, where h is the absolute value of the elasticity of the poverty index with respect to mean income and q is its elasticity with respect to the distribution parameter:

$$\frac{dP}{P} = -h(\frac{m}{z}, G)[\frac{dm}{m} - \frac{dz}{z}] + q(\frac{m}{z}, G)\frac{dG}{G},$$

Under appropriate assumptions about the behavior of poverty line this equation can be considered as a complete decomposition of a change in poverty between a growth component and a distribution component. Until recently, the dominant approach has been to assume that the poverty line is constant (i.e. $\frac{dz}{z} = 0$) and to add a residual component R(μ/z, G)[4]. If the poverty line is assumed to change, however, the equation could ***not*** be taken as a complete decomposition of poverty changes, without modeling the elasticity of the poverty line with respect to mean income as well[5]. Recent work has indeed confirmed that a reasonable assumption to make is that the poverty line is a function of mean income (see, for example, Ali, 1998; Foster, 1998; and Atkinson, 1998). Under such a procedure, equation (3) posits a complete decomposition of the change in poverty over time, conditional on the size of the income elasticity of the poverty line (å). As can be seen from equation (3), for a constant degree of inequality, growth will only to lead to a reduction in poverty if the poverty line is inelastic with respect to mean income (i.e. å < 1).

Equation (4) is a general specification of the inequality-development relationship (i.e. the Kuznets curve). For empirical purposes Anand and Kanbur (1993 a,b) proposed the following format as consistent with the original formulation of the hypothesis: $G = f_0 - f_1 m - f_2 \frac{1}{m}$. For the purposes of empirical estimation we add a term that depends on time to capture a time trend.

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[3] See also Kakwani (1993) and Datt and Ravallion (1992) and Ali (1996).

[4] The functional dependence of the poverty line on mean income is noted by Ravallion, Datt and van de Walle (1991: 347 & 349) who found, from a survey of local poverty lines from 33 developing countries, that there is a clear "tendency for the local poverty line to increase with mean consumption" and that "the cross-country evidence does suggest that the real poverty lines will tend to increase with growth".

[5] For example a semi-logarithmic linear poverty line such as: $Logz = a + b_1\mu - b_2\mu^2$ has an associated elasticity $\varepsilon = b_1\mu - 2b_2\mu^2$, where a and b are coefficients.

2.ii Steady State Equilibrium and Phase Dynamics

Using equation (4) in equation (3) gives the ultimate reduced form expression for the rate of change in poverty, which decomposes the change in the poverty index into a growth effect net of the distributional effect through the growth channel ($-a = -(1-e)h + qn$) and a trend distributional effect ($a_0 = qn_0$).

(5) $\hat{P} = -ag + a_0$,

For given G and g_F, steady state levels of g and P (i.e. consistent with $\dot{g} = \hat{P} = 0 = t$), can be, respectively, obtained from (1)-(2) and (5):

(6) $g = g^* = -b_0 G + b'F = -b_0 G + g_F$ (from 1 and 2), and

(7) $g^\circ = \frac{a_0}{a}$ (from 5)

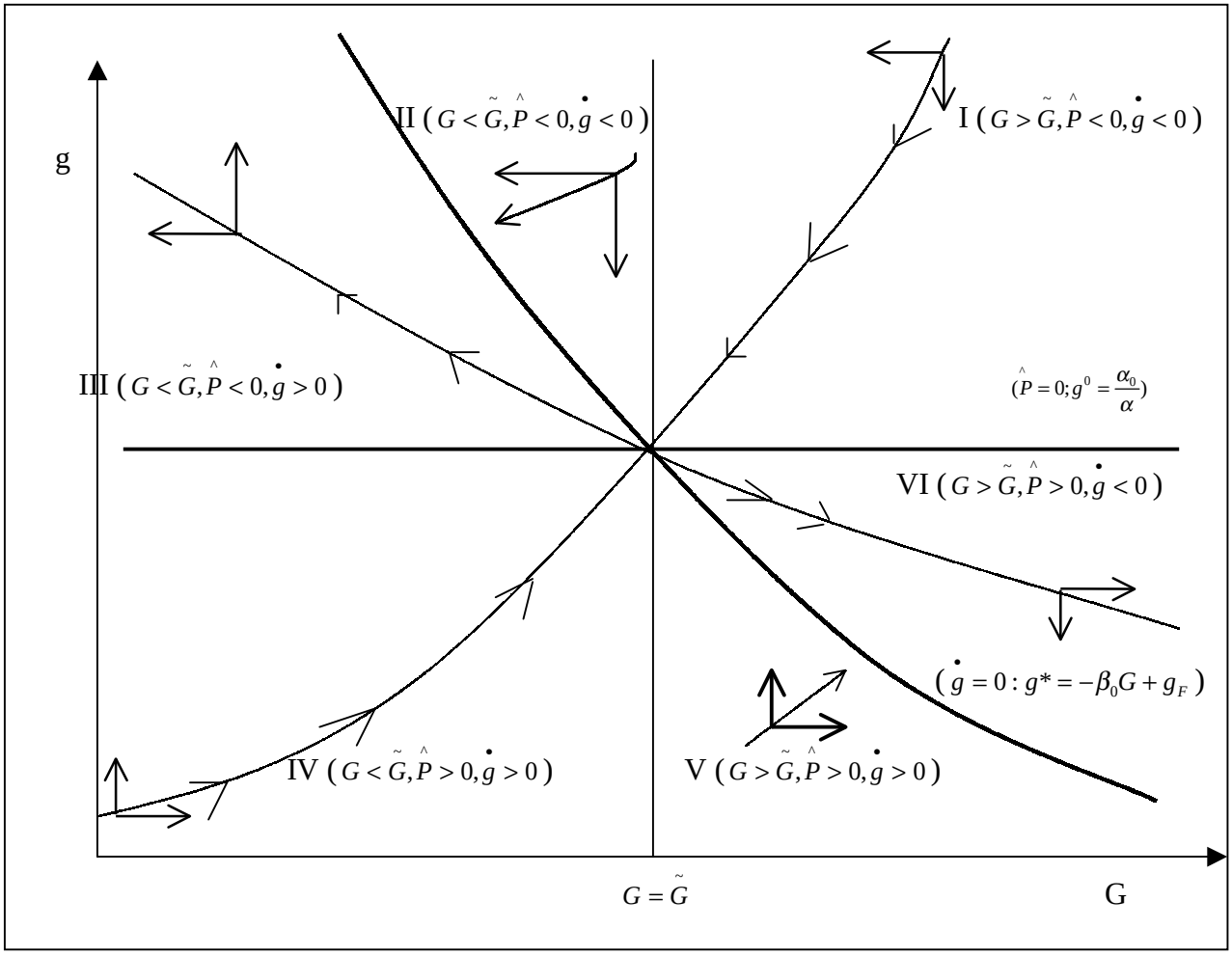
The intersection of equations (6) and (7) in the (g, G) plane solves for the stationary level of inequality ($\tilde{G}$) consistent with constant rate of long-term growth ($\dot{g} = 0$) and stationary rate of poverty growth ($\hat{P} = 0$):

(8) $\tilde{G} = \frac{1}{ab_0}(a\tilde{g}_F - a_0)$.

The above expression suggests that a stationary level of poverty (i.e. $\hat{P}$ =0) is not necessarily inconsistent with high steady state level of inequality ($\tilde{G}$), provided that the absolute rate of reduction in poverty due to non-distributional growth fundamentals (ag_F) is higher than the rate of change (increase) in poverty due to non-growth factors (a_0) and that the effect of inequality on the rate of change of poverty through the growth channel (ab_0) is small. If, on the other hand, the latter is actually large or that the differences between the two components of the rate of change in poverty are small, a much smaller steady state level of inequality may be required to prevent poverty from rising.

Using equations (6), (7) and (8) the dynamic behavior of inequality, poverty and growth around the steady state can be analyzed with the help of a phase diagram (Figure 2.1). The diagram suggests six phases, two of which (I, IV) give rise to a stable path toward the steady state; two phases (III, VI) are unstable and the remaining two phases (II, V) diverge to unstable phases. The six phases are generated by superimposing the curve $G = \tilde{G}$ (equation 8) on the phase diagram defined by equations (6) and (7). Therefore, strictly speaking, there should be only four phases (I, III, IV,VI), where what we consider as phase II (phase V) is in fact a divergent region of phase I(phase IV). However, by adhering to this loose notion in defining the phases we can unambiguously identify the regions according to whether they are likely to lead to stable or divergent paths.

Figure 2.1: Phase Diagram of Poverty, Growth and Distribution



Notes:

P= index of Poverty

G= Gini coefficient

g^0 = level of g consistent with $\hat{P} = 0$

g = rate of per capita GDP growth

g* = level of g consistent with $\dot{g} = 0$

$\tilde{G}$ = level of G consistent with $\dot{g} = \hat{P} = 0$

First, in Phase I ($G > \tilde{G}, \hat{P} < 0, \dot{g} < 0$) the highest social benefits are derived from more equitable distribution rather than from further acceleration of growth. Therefore, this phase suggests a stable path, where en route toward the steady state (G, g) decline while the rate of change of poverty ($\hat{P}$) converges to zero at the steady state.

Second, Phase IV ($G < \tilde{G}, \hat{P} > 0, \dot{g} > 0$) suggests that the highest social benefits are derived from accelerated growth rather than from more equitable distribution, where en route toward the steady state growth accelerates, distribution worsens and the rate of change of poverty ($\hat{P}$) converges to zero at the steady state.

Third, Phases III ($G < \tilde{G}, \hat{P} < 0, \dot{g} > 0$) and VI ($G > \tilde{G}, \hat{P} > 0, \dot{g} < 0$) are both unstable. In phase III poverty will continuously decline, since all the combinations are right: growth rises over time and inequality--already lower than steady level--continuously declines. Exactly the opposite happens in phase VI, where poverty rises due to a combination of decelerating growth and worsening inequality, which is already higher than steady state levels. Both phases are, however, unstable, though they could produce a relatively sustained stint of transitional super-performance (e.g. phase III: East Asia since the 1960s) or a transitional low equilibrium trap (e.g. phase VI: Sub-Saharan Africa since 1970s).

Fourth, Phases II ($G < \tilde{G}, \hat{P} < 0, \dot{g} < 0$) and V ($G > \tilde{G}, \hat{P} > 0, \dot{g} > 0$) are divergent, in that they revert to the unstable path. In phase II improving distribution dominates the force of decelerating growth to lead to a continuously declining poverty along an unstable path. On the other hand, in phase V worsening inequality dominates accelerating growth leading to continuously rising poverty over time along the unstable path.

2.iii The Dynamics of Growth and Poverty

If $\hat{p}$ and $\dot{g}$ are not assumed to be zero, substituting (1), (5), (7) and (8) in (2); and (7) and (8) in (5) generate the following two dynamic equations:

(9) $$\dot{g} = -l_1 t(1-I)G + l_2[b_0(\tilde{G}_0 - G_0) + \frac{1}{a}\hat{p}_0] + l_3(Policy - Policy_0), \text{ and}$$

(10) $$\hat{p} = -ag + a_0 = a(g^{\circ} - g) = ab_0(G - \tilde{G}) + a(\tilde{g}_F - g_F)$$ [6]

Equation (9) suggests that the dynamic path of growth (persistence) is accounted for by four influences. First, acceleration of growth is negatively influenced by the external shock effect, with the extent of inequality and ineffectiveness of institutions determining the magnification effect of the shock. This effect is obvious and was sufficiently motivated by Rodrik (1998a). Second, it is positively influenced by the extent to which initial steady state level of inequality $\tilde{G}_0$ (consistent with $\dot{g}_0 = \hat{p}_0 = 0$) is larger than actual levels of inequality in the initial period (G_0), with the effect weighted by (the absolute value of) the elasticity of inequality on growth (b_0). This effect suggests that when inequality in the initial period was lower than the level consistent with zero rate of growth acceleration, the latter must be positive in the current period before a new steady state with higher growth and lower level of poverty is reached. Third, growth acceleration is also positively affected by the rate of change of poverty in the previous period weighted by the inverse elasticity of poverty on growth ($\frac{1}{a}$). This effect is consistent with a welfare function that targets a zero or negative change in poverty, which suggests that for given level of inequality in the initial period, a rise in poverty in the initial period requires acceleration of growth in the current period to address the poverty problem. The fourth effect suggests that a change in policy (say improvement in policy)

[6] However, in subsequent applications we drop the last terms, assuming that the component of growth due to non-distributional fundamentals remains close to its equilibrium values.

between the two period should lead to acceleration of growth. The last three channels are all generated by the error-correction extension to Rodrik s model.

Finally, equation 10 suggests that when growth rates in the initial period fall short of the rate consistent with stationary level of poverty, poverty will worsen in the current period. How far poverty rises will depend on the extent of the growth shortfall and on the size of the net growth effect on the rate of change of poverty (a). Similarly, poverty worsens in the current period, when initial inequality exceeds the level consistent with stationary level of poverty. For a given wedge between the two levels of initial inequality, the rise in poverty depends on the product ab, where the latter is the negative of the effect of inequality on long-term growth. Moreover, the net change in poverty can be expressed as an outcome of a pure income effect (negative for positive growth rates) plus a pure (positive) distributional effect.

3. Growth and Inequality in the Development Process: The Kuznets Debate

As is well known the most celebrated proposition relating to the effect of economic growth on inequality is the Kuznets (1955) hypothesis. Simply put the hypothesis asserts that as development proceeds (increase in per capita income) inequality will tend to increase at first, reaches a maximum and then decreases. The hypothesis is based on historical observations pertaining to the sectoral shifts of population from a low inequality, low productivity sector to a high productivity, high inequality sector. The hypothesis has been subjected to empirical testing using cross-section data though most of the researchers were cognizant of the fact that the best approach to such tests would be that based on time series (see, for example, Ahluwalia, 1976; and Ahluwalia, Carter and Chenery, 1979; but also see Anand and Kanbur, 1993-a and b). The obvious lack of sufficiently long historical observations prevented this from happening (but see, for example, Minami (1998) for Japan).

In recent years renewed interest in the Kuznets hypothesis has been expressed from a policy perspective, specially the perspective of the effect of economic policy reforms on the poor (see, among others, Lal and Myint, 1996; Bruno, Ravallion and Squire, 1998); but see also Horton, Kanbur and Mazumdar, 1995). In a policy related framework Bruno et al (1998:117) were interested in answering the question of "do the poor lose, either absolutely or relatively, from policies that promote aggregate economic growth?". Among their worries is the claim that growth-oriented reform policies of the kind usually advocated by International Financial Institutions have worsened the lot of the poor. In the process of responding to these concerns Bruno et al (1998:137) review the recent evidence and conclude that based on the evidence of the last three decades, there seems to be no credible support for the Kuznets hypothesis. The "stylized fact" that distribution must get worse in poor countries before it can get better turns out not to be a fact at all. Effects of growth on inequality can go either way and are contingent on a number of other factors".

Bruno et al (1998: 120) reviewed evidence based on a data set for 63 surveys spanning the period 1981-92 and covering 44 countries where they tried to replicate a number of specifications for testing the hypothesis typically found in the literature. This was done for both levels and changes over time, to eliminate the country-level fixed effect. They concluded that in no case was there evidence of an inverted U, and in no case could one reject the null hypothesis that the regression coefficients were jointly zero".

While at the empirical policy framework there was an urgency to provide evidence that the Kuznets hypothesis is not supported, a lot of theoretical political economy models were able to establish the possibility of the existence of such a relationship between growth and inequality in the long run. The

results of some models are more robust than others. Thus, for example, Acemoglu and Robinson (1997) propose a political economy model which features elite in power who could adopt redistribution policies but who could also democratize society by extending the franchise and include the masses into the political system. The masses, on their part, possess a revolution technology where revolution is partly driven by economic motives of poverty and inequality. They show that when the elite stay in power and redistribute today, there is no guarantee that redistribution will continue tomorrow. In other words, the promise of continued redistribution by the elite is non-credible. In contrast, extending the franchise by shifting the median voter changes future political equilibrium, making democratization a credible commitment to future redistribution.

The dynamic version of the model incorporates human capital and credit market imperfections. It is assumed that the industrialization process starts with the rich accumulating while the poor unable to invest in human capital. This leads to increasing inequality. When inequality reaches a critical maximum the threat of revolution intensifies forcing the elite to extend the franchise. In the new equilibrium society adopts increased redistribution and schooling and inequality starts to fall. In countries for which sufficient historical data on inequality exists, it is shown that democratization happened at the peak of the Kuznets curve. The authors are quick to note that their model does not predict that the Kuznets curve should be part of the development process of all countries. There are alternative development paths with no democratization and no Kuznets curve.

Similarly, Bourguignon and Verdier (1997) proposed a political economy growth model to explore the consequences of allowing political institutions to be endogenous. The endogeniety of political institutions was accomplished by making political participation dependent on the educational level of agents in an economy where fixed costs of education and liquidity constraints prevent poor agents to become educated in the absence of transfers from the upper income and politically active class. Equilibrium patterns of political institutions, income distribution and growth are characterized in terms of initial income levels and degree of inequality. In a linear infinite horizon framework extension of the model it is shown that for intermediate values of income and inequality a Kuznets curve does exist. Under these intermediate initial conditions, two stages are identified. In the first stage there is partial investment in skills and there is partial democratization with little redistribution resulting in increased after tax inequality. In the second stage, all individuals get educated and have their voice in the political arena with some redistribution being voted resulting in a reduction of after tax inequality.

A more conventional economic justification for the Kuznets curve based on a dual economy class of models is provided by Banerjee and Newman (1998). A two sector general equilibrium model is specified with information asymmetries between the modern sector (high asymmetries and high productivity) and the traditional sector (low asymmetries and low productivity). In a greatly simplified dynamic version of the model, where agents learn about their skill level after choosing a location, it is shown that the economy fully modernizes (but at a slow pace) and the path of inequality and income follows an inverted-U curve (Banerjee and Newman, 1998: 644). The authors, however, show that if agents learn about their skill level before making a location decision, the economy could follow an upright-U development path (see, however, Aghion and Bolton, 1997) for a robust theoretical conclusion based on a model of the economy with capital market imperfections). The implication of this is that the characteristics of those who choose to migrate may have important consequences for the evolution of inequality in developing countries.

The above brief review of recent theoretical advances should serve to illustrate the position that the Kuznets hypothesis is meant to describe a long transformation process during which not only production structures change but also institutions change. In short periods of time different

economies may find themselves on either side of the Kuzents curve assuming that it exists. The side on which economies find themselves will have important implication for the reduction of poverty.

Apart from the theoretical advances sampled above, there is also recent empirical results reported in the literature supporting the existence of a Kuznets curve (see, for example, Sarel, 1997; and Hayami, 1998). In what follows, we report our own results based on a sub-sample of the data set of Chen, Datt and Ravallion (1994). To take account of the length of the run over which the Kuznets relation is supposed to hold, we augmented the original data set of Chen, Datt and Ravallion by adding observations on developed countries. We formed a new sample from 33 developing countries from the original data set: 12 Latin American, 9 Asian and 11 African, in addition to 17 advanced countries (for which income distribution data are available from the World Development Report 1994; see Appendix Table A.1 and note that the Gini coefficient is our own calculation by fitting Lorenz curves to the data provided in the WDR). Instead of the quadratic form, we estimated Anand and Kanbur (1993) functional form where the Gini coefficient is regressed on mean income and its reciprocal. This is the functional form used by Ravallion (1995) for changes over time for a sample of 16 observations. On the basis of his results Ravallion was prepared to declare that the "rejection of the inverted U hypothesis could hardly be more convincing".

Contrary to this strong finding our cross-country regression results confirm the existence of a Kuznets curve. We estimate six versions of the above described Kuznets relation (Table 3.1), based on two dependent variables (levels and logs of Gini) and three measures of mean income (per capita private consumption, per capita GDP and per capita GNP). All six regressions strongly corroborate the existence of the Anand and Kanbur-type Kuznets curve with a time trend[7]. Given that per capita private consumption is more closely linked to poverty than the two other measures, and that the specification with Gini in levels generates more flexible Kuznets elasticities, we select regression (2) for further analysis.

Given the existence of a Kuznets relationship according to regression 2 (of Table 3.1), the implied turning point is $1110 per person per year in 1987 PPP. Not surprisingly, most of the 48 developing countries covered by the sample were found to be below the turning point except for 14 countries (see Appendix Table B.1). This group includes: four countries in Africa (Algeria with mean per capita consumption of $1243, Gabon ($2621), Mauritius ($1352) and South Africa ($1401)); two Asian countries (Jordan ($1352) and Malaysia ($1121)); and eight Latin American countries (Brazil ($1254), Chile ($1538), Jamaica ($1126), Mexico ($1230), Panama ($1378), Peru ($2613), Trinidad ($1618) and Venezuela ($1127)).

Assuming that we wish to see the Sub-Saharan African countries to get to the declining inequality phase by the year 2015, we can use the turning point of ($1110) and the number of years between the survey year (for the country in question) and 2015, to calculate the required growth of per capita consumption (see notes to Table 3.2).

With an average population growth rate of 2.8 per cent per annum for the Sub-Saharan Africa region (excluding the future impact of the AIDS epidemic) most of the above required growth rates seem to be achievable. The exceptions are Kenya, Zambia, and especially Tanzania, which would require prohibitively high GDP growth rates to achieve the desired objective.

[7] see also Fishlow (1995), who also corroborates the same specification, with an Africa dummy.

Similarly, we use the estimated Kuznets equation to calculate the elasticity of the Gini coefficient with respect to income to explore the overall effect of growth on poverty. Table 3.3 reports the results of these calculations for the Sub-Saharan Africa sample.

Once again, Tanzania s elasticity of 0.51 (and to a lesser extent those of Kenya (0.18) and Zambia (0.22)) are very high relative to other countries in the sample, where the median elasticity is about 0.13.

Table 3.1: OLS Estimation Results used to Calculate Kuznet's Elasticity

Dependent Variable	lnG (1)	G (2)	lnG (3)	G (4)	lnG (5)	G (6)
PRC	-0.00005 (-5.656)	-0.00202 (-5.714)				
$\frac{1}{PRC}$	-60.0312 (-3.959)	-2486.7 (-3.896)				
GDP			-0.00003 (-5.997)	-0.00121 (-5.932)		
$\frac{1}{GDP}$			-94.1195 (-4.279)	-3806.7 (-4.070)		
GNP					-0.00003 (-6.418)	-0.00125 (-6.347)
$\frac{1}{GNP}$					-106.207 (-4.807)	-4325.3 (-4.600)
YR	0.0020 (66.803)	0.0269 (21.300)	0.0020 (68.931)	0.0270 (21.790)	0.0020 (71.238)	0.0274 (22.711)
R-squared	0.4437	0.4376	0.4728	0.4560	0.5089	0.4922
F	17.15	16.73	19.28	18.02	22.28	20.84
N	46	46	46	46	46	46

Notes:
Source: Appendix Table B.1.
G – Gini Index(%)
LnG – Natural Logarithm of G
PRC = Per capita Private Consumption in US dollars (1987 PPP)
GDP = Per Capita Gross Domestic Product in US dollars (1987 PPP)
GNP = per capita Gross National Product (1987 PPP)
YR= Survey year

Table (3.2): Required Per Capita Consumption Growth to Reach the Turning Point of the Kuzents Curve

Country	Survey Year	Private Consumption per capita	Number of years	Required growth rate (%) *
Botswana	1986	472.1	29	3.0%
Cote d'Ivoire	1985	612.1	30	2.0%
Kenya	1992	232.7	23	6.8%
Lesotho	1987	331.0	28	4.3%
Mauritania	1988	363.9	27	4.1%
Senegal	1992	487.8	23	3.6%
Tanzania	1991	125.5	24	9.1%
Zambia	1990	208.3	25	6.7%
Zimbabwe	1990	317.2	25	5.0%

Notes:

1. Sources: Appendix Table B.1 and regression 2 of Table 3.1
2. According to regression 2 of Table 3.1, the turning point before growth and inequality become negatively correlated is at private consumption per capita of US$ 1110.76.
3. Required growth is computed from the formula

   $1110.76 = PRC(1-g)^{2015-t}$, where PRC is the level of the per capita consumption for the country in question (PPP 1987), t is the year of the survey, and g is the annual rate of per capita consumption growth

Table 3.3: The Elasticity of the Gini Coefficient with respect to income: Kuznets Elasticity

Country	Survey Year	Private Consumption per capita	Estimated Gini	Gini Elasticity w.r.t. Mean Consumption
Botswana	1986	472.1	54.2	0.080
Cote d'Ivoire	1985	612.1	36.9	0.077
Kenya	1992	232.7	57.9	0.177
Lesotho	1987	331.0	56.0	0.122
Mauritania	1988	363.9	42.5	0.143
Senegal	1992	487.8	54.1	0.076
Tanzania	1991	125.5	38.1	0.513
Zambia	1990	208.3	52.0	0.222
Zimbabwe	1990	317.2	56.8	0.127

Notes:

Source: appendix Table B.1 and regression 2 of Table 3.1

4. An Empirical Analysis of Poverty and Growth

In this section we estimate the key specifications of growth and poverty of section 2, required for calculating the structural parameters of the model. First, we estimate long-term growth as well as persistence of growth (equations 1 and 2 of section 2), using panel data drawn from 62 countries. Second, we estimate three indexes of poverty and various elasticities of poverty and other related variables, using country-specific and cross-sectional data.

4.i The Growth Estimation Results

Long-term Growth:

We estimate an endogenous growth model for a panel of 62 developing countries over six period-averages: 1970-74, 1975-79, 1980-84, 1985-89, 1990-92, 1993-96. Given the emphasis on the effect of income distribution on growth, the pivotal variable in the model is the Gini coefficient. However, our model also controls for other growth fundamentals suggested in the literature. The results for six growth regressions are shown in Table 4.1. All the regressions reported are random-effects models, which according to Hausman specification tests (refer to P values at the bottom of the Table), were all found to be superior to their fixed-effects counterparts (not reported). For primary education, initial income and income squared one period-lags were used. Therefore, these variables together with the external shock variable are assumed to be exogenous. All macroeconomic fundamentals were instrumented. However, available data on Gini poses some problems. There is a group of countries for which data is available for the early 1980s and 1970s, for this group reverse causation from growth to inequality is not likely, given that the effective regression sample covers 1986-89, 1990-93, 1994-96. For the majority of countries, however, reliable inequality data (see Deininger and Squire, 1996) is available only for the second half of the 1980s or the 1990s. Moreover, for most countries, only one or very few data points are available for the entire 1970-1996 period. To address these problems, we use instrumented one-period lagged averages of Gini (or just averages for those countries with data available for only one period), where two-periods lags of other variable in the regression were used as instruments[8].

The results for all six versions of the regression suggest that income inequality is negatively and robustly associated with growth. The P-value was 0.03 or less and the parameter estimate was fairly stable around a median of 0.075. Regression (1) accounts for basic non-policy growth fundamentals: initial income inequality, convergence effects, initial primary school enrolment, external shock and growth in labor force relative to population growth[9]. The measure of external shock we use is the standard deviation of the first log-difference of the terms of trade multiplied by the average share of total trade in GDP in the initial period. This measure captures the unexpected component of the volatility of the streams of income associated with foreign trade[10]. The results of this regression suggest that beside Gini only the relative labor growth rate is significant. One explanation for this, especially with regard to initial income variables, is the fact that our sample is essentially confined to developing countries. Regression (2) accounts for investment as well as the above basic fundamentals. As expected, investment was positively and significantly associated with growth (at a P value of 0.02). However, the inclusion of investment did not change the results for the original set of variables. In particular, the effect of Gini remains very significant (at P value of 0.007) and the magnitude of its effects on growth (in absolute terms) only modestly declined (from

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8 Alesina and Rodrik (1994) also chose instrumentation as one option for addressing reverse causation from growth to inequality.

9 This variable is given by (growth rate of workers minus overall rate of population growth). Bloom and Sachs (1998) recommended adding this variable as an explanatory variable in empirical growth regressions, when, as usually the case, per capita GDP growth, rather than the theoretically-consistent GDP per worker growth rate was used as a dependent variable.

10 Assuming that the terms of trade follow a random walk (possibly with a drift) Rodrik (1998b) shows that this measure is the theoretically appropriate measure of external volatility. Moreover, Rodrik argues that the fact that this measure treats positive terms-of-trade shocks identically as negative shocks is justified, since positive income shocks could also trigger the same kind of distributional conflicts that obtain under negative shocks.

0.09 to 0.08). To the extent that instrumentation of the investment variables has successfully addressed its potential endogeniety, the effects of investment could be interpreted to account for overall economic reforms. However, in the presence of other macroeconomic variables (such as financial depth, government consumption and openness) investment may be capturing the effects of other *structural reforms* such as the privatization of public enterprises, the resolution of debt-overhang problems, or liberalization of foreign direct investment regimes (Easterly, Loayza and Montiel, 1996).

The joint effects on growth of these variables are accounted for by regression (3). However, when simultaneously introduced with the three macroeconomic fundamentals, investment became only very marginally significant (with a P value of 0.25). Moreover, openness and financial depth were also only marginally significant (at P values of 0.24 and 0.12, respectively). However, government consumption was highly significant (with a P value of 0.01), and was, as expected, negatively associated with growth. Again, as in regression (2) the Gini remains significant, even though the magnitude of its effect (in absolute terms) declined to 0.06. However, regression (3) (as well as regressions (1) and (2)) have clearly over-fitted the growth process, given the large number of insignificant variables. Removing insignificant variables from the three regressions gives rise to three parsimonious regressions (4-6). The three regressions confirm the stability of the association between Gini and growth, and the effect of Gini on growth now hovers around -0.07.

We choose regression (6) for further analysis, because, in addition to initial inequality, it accounts for two pivotal macroeconomic growth variables (investment and government consumption). These two variables, could arguably, account for, or at least reflect, all the macroeconomic effects that matter for growth.

Persistence of Growth:

Using regression (6), we estimate the determinants of growth persistence before and after 1975, which marked the beginning of major episodes of external shocks that affected most of the developing world. The regression was based on the error-correction persistence model of equation (2). The estimation results are contained in Tables 4.2. Following Rodrik (1998a), the key variable in this regression is Conflict , which reflect the capacity (or the inability rather) of a society for managing external shocks. External shocks can be economically costly, when social divisions run deep (due, for example, to high income-inequality) and the societies institutions for conflicts management are weak. Therefore, this variable suggests that the combination of deep social conflicts and weak social and political institutions tends to magnify the effects of external shocks on growth, by leading to growth-retarding policies. We construct six versions of Rodrik-type index of conflicts (Conflict). The precise definition of Conflict is provided in the notes to Table 4.2 and Appendix Table C.1. Our results corroborate the earlier findings by Rodrik in that the conflict variable is negatively and robustly associated with growth persistence. In all of the six regressions reported in Table 4.2 (and the 18 regressions of the Appendix Table) the effect of Conflict falls within a range of (-0.0007, -0.0001) and has a P value of 0.06 or less.

Table 4.1 Growth Regression (Random Effects GLS Regression)

Dependent Variable = Period average Rate of Growth of Real per capita GDP						
	1	2	3	4	5	6
Initial income	2.1238 (0.817)	1.6731 (0.710)	1.6147 (0.684)			
Initial income Squared	-0.1127 (-0.628)	-0.1087 (-0.672)	-0.1226 (-0.750)			
Schooling	0.0013 (0.129)	-0.0006 (-0.062)	0.0037 (0.377)			
TOT Shock	-0.0010 (-0.022)	-0.0334 (-0.734)	-0.0130 (-0.280)			
Labor	0.4916 (1.804)	0.6315 (2.436)	0.4917 (1.828)	0.6271 (2.429)	0.6668 (2.754)	0.5101 (2.050)
Lagged Gini*	-0.0904 (-2.870)	-0.0783 (-2.730)	-0.0640 (-2.172)	-0.0775 (-2.523)	-0.0725 (-2.673)	-0.0711 (-2.652)
Investment*		0.1074 (2.418)	0.0573 (1.163)		0.1149 (3.188)	0.1156 (3.241)
Opn*			0.0059 (1.183)			
Gcon*			-10.4407 (-2.587)			-9.3620 (-2.359)
Financial Depth*			0.0252 (1.578)			
Constant	-2.8764 (-0.328)	-2.2805 (-0.288)	-1.2957 (-0.163)	6.1111 (4.169)	3.4129 (2.172)	4.3080 (2.691)
R-squared	0.1281	0.1837	0.213	0.1016	0.1759	0.1934
Wald test $\chi 2(6)$	19.11	31.14	42.33	13.47	29.31	35.57
Hausman Specification test ($\chi 2$) Pvalue	23.13 (0.0008)	70.27 (0.0000)	66.87 (0.0000)	11.57 (0.0031)	29.09 (0.0000)	31.37 (0.0000)
No. of Observation	236	236	236	236	236	236
Period of estimation: 1970-74, 1975-79, 1980-84, 1985-89, 1990-1992, 1993-1996						

Notes:
t-values in parenthesis
*- denotes variable has been instrumented
Opn= openness defined as exports plus imports as a ratio of GDP
Gcon = government consumption as a percentage of GDP
Financial Depth = financial depth defined as M2/GDP
Labor = labor force growth net of population growth
Initial income = per capita GDP in previous period (in logarithms)
Schooling = primary school enrolments
TOT Shock = Terms of trade shock given by std deviation of $\Delta \ln(TOT)_{70\text{-}79}$ x openness $_{70\text{-}79}$

The results of Table 4.2 are based on two measures of conflict: Conflict4 (and Conflict41), where Democracy70 (80) was used in the construction of the first (second), while the same shocks and inequality values are used in both measures (see notes to the Table). First, we estimate a basic model, which accounts only for the conflict s effect on growth (regressions 1 and 1). The estimated coefficients for Conflict4 and Conflict41 were, respectively, -0.0007 (at P value of 0.007) and -0.0006 (at P value of 0.04). Regressions 2 and 2' accounts, as well, for error-correction effects, which suggest that growth in the current period must accelerate, if growth in the previous period was lower

than the rate consistent with long-term equilibrium growth. The estimated error-correction effects were found to be highly significant as well as consistent with theoretical predictions, with estimates of 0.59 for regression 2 and 0.62 for regression 2', and both have a P value of zero. The estimated coefficients of the conflict variables converged to about -0.0006 and both have approximately the same significance level (P value at .006). Finally, in regressions 3 and 3' we account, in addition to these two effects, for the potential role of changes in policy in the dynamics of growth, by adding the instrumented change in government consumption to the set of explanatory variables. The latter variable could be interpreted as an indicator for recent macroeconomic reforms adopted by many countries, following the external shocks of the second half of the 1970s. We chose not to assign this interpretation to changes in investment, because unlike government consumption, it is not a direct policy instrument. In both regressions the change in government consumption was found to be, as expected, negatively and significantly associated with acceleration of growth (P values at about 0.01). Again the coefficients of the two conflict variables (as well as the error-correction coefficient) remain highly stable, both in terms of size and significance level.

In section five below we use regressions 6 of Table 4.1 and 3 of Table 4.2, together with other behavioral distribution and poverty equations, to analyze the sources of the observed growth collapse as well as the rise in poverty in many developing countries during the post-1975 period relative to the earlier period (equations 9 and 10). For the remainder of this section, we briefly analyze some of the poverty parameters that will be used in the decomposition analysis of the following section.

Table 4.2: Persistence of Growth Regression (average annual rate of growth in 1975-96 minus average annual rate of growth for 1965-74)

	1	1′	2	2′	3	3′
Confl4	-0.00074 (-2.811)		0.00060 (-2.875)		-0.00069 (-3.403)	
Confl41		-0.0055 (-2.103)		-0.00057 (-2.834)		-0.00062 (-3.170)
Error correction term			0.59339 (5.792)	0.62354 (6.121)	0.72405 (7.211)	0.75347 (7.406)
Macro policy					-15.88385 (-2.540)	-17.16335 (-2.710)
Constant					0.85866 (2.033)	0.81935 (1.909)
Adjusted R- Squared	0.1031	0.0539	0.4681	0.4459	0.5548	0.5431
F-test	7.9	4.42	23.32	23.13	22.18	21.20
No. of Observation	61	61	56	56	52	52

Notes:

1. t-values are in parenthesis
2. Macro policy: is defined as change in government consumption as a ratio of GDP in 1975-96 relative to 1965-74
3. Confl4: is defined as std deviation of $\Delta \ln(TOT)_{70\text{-}79}$ x $\text{openness}_{70\text{-}79}$ x $\text{gini}_{65\text{-}74}$ x democracy_{70s} .
4. Confl41: is defined as conflict4 with the measure of democracy in the 1980s rather than 1970s.
5. Error correction term: is defined as predicted growth in 1965-74 period minus actual growth in the same period.

4.ii. Poverty Indexes and Related Elasticities

As noted in the context of formulating the model in section (2) the elasticity of the poverty line with respect to mean income (or consumption) plays an important role in the decomposition of poverty changes over time. The convention of holding the poverty line constant over time, popularized largely by the work of Ravallion, implies a zero elasticity and as such leads to an overestimation of the impact of economic growth on poverty reduction and an underestimation of the role played by distribution in this process. On the other hand, the assumption of proportionality between the poverty line and mean income, as used in most European countries, implies a unitary elasticity which leads to poverty changes exclusively dependent on distributional changes with growth having no effect. These extreme cases have serious implications for policy design, especially for low-income countries such as those of SSA.

Most recent work in the area of poverty analysis has argued for an intermediate formulation that allows for poverty lines to change with the standard of living (see, for example, Foster, 1998; and Atkinson, 1998). In what follows we report poverty results for a sample of countries where the poverty line is allowed to change with the standard of living (defined as per capita consumption expenditure: hereafter referred to as mean income (u)). We estimated the poverty line equation from information available for 21 African countries and 7 advanced countries.[11]

The estimated equation used in generating the poverty results is as follows, where figures in brackets are t-ratios, z is the poverty line and u is mean income:

(11) $\text{Log } z = 1.3719 + 0.00303\ u - 0.000001886\ u^2$; $R^2 = 0.96$[12]
(57.00) (10.96) (-5.25)

The above equation gives rise to an elasticity of the poverty line which is quadratic in form as follows:

$$(12)\ \frac{\partial \log z}{\partial \log u} = e = (0.00303m - 0.000003772m^2)$$

The elasticity attains a maximum of 0.61 at per capita income level of $403. The calculated elasticities at the mean income of the various regions are as follows: 0.411 for Latin America; 0.2701 for Asia and 0.225 for SSA.

Using the above poverty line, poverty results for the countries in our sample are generated by POVCAL and reported in Appendix Table B.1. A summary of these results is reported in Table 4.3, where figures between brackets are standard deviations. Without getting involved in the details, given the objective of the paper, we note that the above poverty measures are significantly different

[11] We note in passing that the original data set used by Ravallion, Datt and van de Walle (1991) was not used due to a number of counter intuitive poverty lines. But this is a debate we do not wish to pursue in this paper, however, we only note that this set influenced the way poverty analysis was handled for less developed counties over the past eight years or so giving rise to $1 per day international poverty threshold.

[12] Relevant diagnostic LM tests were performed on the residuals with the following results: the test for normality is given by an LM statistic, equals to 2.7 and distributed as a chi square with 2 degrees of freedom; and the corresponding LM test for heteroscedasticity equals 1.2 and distributed as chi-square with 1 degree of freedom.

among regions. According to the above, Africa is reported to have the highest poverty in terms of three measures: incidence, depth and severity. Latin America ranks second highest while Asia is characterized by relatively low poverty. This seems to confirm an emerging pattern of stylized facts about poverty in the world regions.

For the purposes of this paper, however, we are more concerned with the elasticity of the various poverty measures with respect to mean income (reflecting growth:-h) and the Gini Coefficient (reflecting distribution: q). These elasticities are reported for the countries of the sample in Appendix Table B.1. A summary is reported in Table 4.4.

A general observation on the above results is that poverty is relatively more sensitive to distributional changes than to growth. This observation, however, does not apply to the head-count ratio in Africa, which exhibits more sensitivity to mean income than to the Gini coefficient. The second observation is that poverty in Asia exhibits greater sensitivity to its two determinants compared to Latin America where poverty is relatively more responsive than in Africa.

Table 4.3: Poverty Measures by Region: A Summary (percentages)

Region	Head Count ratio (H)	Poverty Gap ratio (P1)	Squared Poverty Gap ratio (P2)
L. America	34.40 (8.57)	14.40 (5.04)	7.94 (3.59)
Africa	45.55 (18.03)	19.54 (10.18)	11.16 (6.90)
Asia	24.10 (11.58)	6.68 (4.07)	2.76 (1.98)
Overall Sample	37.96 (16.33)	15.42 (9.1)	8.51 (6.08)

Source: see Appendix Table B.1.
Standard deviation in parenthesis

Table 4.4: Growth and Distribution Elasticities. Sample Averages by Region

Region	$-h_H$	$-h_{P1}$	$-h_{P2}$	q_H	q_{P1}	q_{P2}
L. America	-1.17 (0.37)	-1.52 (0.59)	-1.92 (0.86)	1.52 (0.59)	4.32 (0.96)	7.04 (1.37)
Africa	-1.27 (0.78)	-1.80 (1.14)	-2.21 (1.57)	0.10 (1.24)	3.2 (2.15)	5.23 (3.05)
Asia	-2.42 (1.05)	-3.43 (1.99)	-4.33 (3.05)	2.62 (1.54)	5.85 (3.04)	9.00 (4.62)

Source: Appendix Table B.1.
Standard deviation in parenthesis

5. Dynamics of Poverty and Growth and Strategies for Poverty Reduction

We are now ready to put all the pieces together, following the estimation of various behavioral equations, elasticities and indexes related to growth, distribution and poverty. Computations related to the latter are the most extensive. These include: estimates of elasticities for three indexes of poverty with respect to mean income and distribution (Gini); the elasticity of the poverty line with respect to mean income; the elasticity of the Gini with respect to mean income; and the income-invariant component of the rate of change in the Gini. Appendix Table B.1 provides a detailed description of these computations. Appendix Table D.1 computes the key structural parameters and indexes of the model, based on the poverty-gap ratio (P1). Further analysis will be confined to this index of poverty. The main parameter estimates and indexes reported in the Table include: α_0, the component of the rise in poverty attributed to inequality; $-\alpha$, the poverty reducing effect of growth net of the partial inequality effect on poverty operating through the growth channel (i.e. the pure growth effect on poverty); the component of the rate of growth explained by non-distributional fundamentals (g_F); the rate of growth consistent with stationary poverty (g^*); the steady state level of Gini ($\tilde{G}$); and the rate of change in poverty ($\hat{P}$).

Using these estimates together with the parameter estimates for growth (see Tables 4.1 and 4.2) we illustrate, in this section, some of the key predictions of the theoretical model. First, we undertake a decomposition analysis of the factors that led to the collapse of growth in the post-1975 period across the developing world, except in Asia. The post 1975 era is characterized with various episodes of massive external shocks, mostly in terms of negative terms of trade shocks, but also spells of positive shocks as well. Second, we also undertake a similar analysis of the behavior of poverty before and after 1975. Third, guided by the phase dynamics framework of section 2, and based on country performance in 1990s in terms of the growth acceleration, changes in poverty and extent of inequality, we classify the countries in the sample according to the six phases suggested by Figure 2.1 of the model. This allows identification of broad strategies for dealing with poverty, depending on the phase in which the country is predicted to be located[13].

5.i The Collapse of Growth in the Post 1975 Era

Persistence of growth (average annual rate of growth in 1975-96 minus the rate for 1965-74) is explained by four potential determinants (equation 9 of section 2). These factors are the capacity of a society to manage the impact of exogenous shocks (both negative or positive: see footnote 9), represented by the variable Conflict ; the change in macroeconomic policy, perhaps due to economic reforms in response to shocks; the extent to which society is equal relative to the level consistent with steady state equilibrium (stationary poverty and zero acceleration/deceleration of growth); and the extent of poverty in the initial period. The results by regional median are shown in Figure 5.1. Appendix Table D.2 contains detailed country by country results. Notwithstanding possible country-specific anomalies, the main regional story, however, bodes quite well with other stylized facts on cross-regional performances.

First, between the two periods median average rates of growth decelerated by 2.5% in Africa (continental Africa) and by 1.7% in Latin America & the Caribbean (LAC), while growth accelerated by 0.4% in Asia. These observed rates of changes were, by and large, explained by the

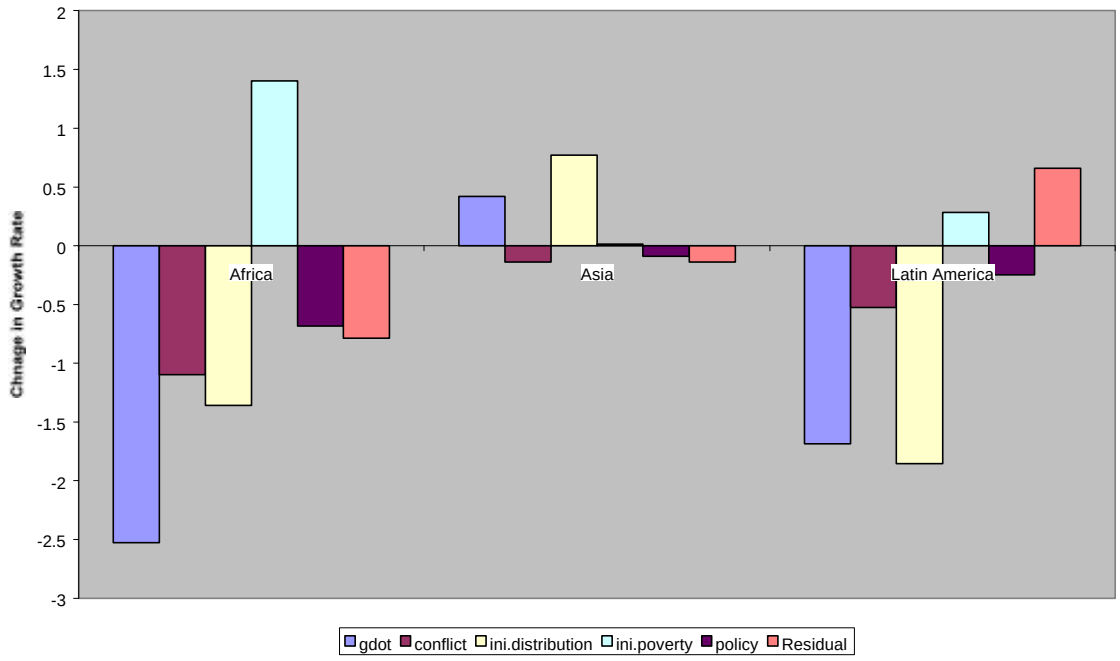
[13] The computed parameters as well as the country classifications of Table 5.1 appear to be fairly robust for different specifications of the Kuznets relation and the poverty indexes.

four channels identified above, where the diversion between the actual and predicted change in the rate of growth does not exceed 40% for any of the three regions.

Second, the role of capacity for managing conflicts following external shocks, was one of the main factors behind this outcome in Africa and to a lesser extent in LAC and Asia. The failures of Africa and LAC on this area contributes 1.1 and 0.5%, respectively, to the collapse of growth in the two regions; while it would have decelerated growth by 0.1% in Asia, if others factors remain at their 1965-74 levels.

Third, the nature of income distribution in the previous period plays the most dominant role in setting Asia apart from the other two regions. This factor could be interpreted as the absolute conflict effect. A more equitable initial income distribution (relative to levels consistent with steady state) in Asia has had a partial contribution of 0.8% per annum to subsequent growth acceleration in the post 1975 period; while the less equitable income distributions in Africa and LAC (relative to their respective thresholds) have, respectively, accounted for 1.4 and 1.9% of the deceleration of growth in the two regions during the post 1975 era.

Figure 5.1: Determinants of Growth Dynamics in Africa and Other Regions in the 1975-96 Relative to 1965-74 (average annual % Change)



Notes:

Source: Appendix Table D.2

gdot = average annual rate of growth in 1975-96 minus average annual rate of growth in 1965-74

Conflict ≡ component of change due to conflict (confl4 is used: see notes to table 4.2)

Inequality ≡ component of change due to initial inequality (lagged Gini)

Ini.poverty ≡ component of change due to behavior of poverty in the initial period (rate of change of poverty in 1965-74)

Policy ≡ annual average rate of change in government consumption between the two periods

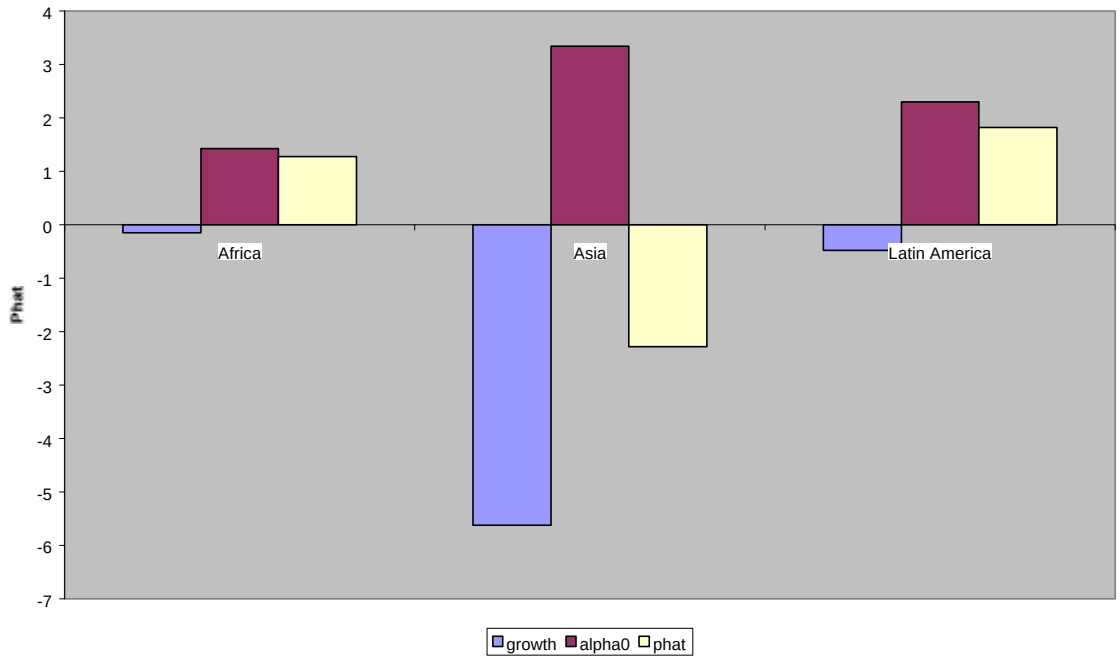
Fourth, rising poverty in the previous period appear to matter, as a trigger factor, for generating concerns about the need to accelerate growth in the current period. The motivation for policy makers, for example, to be concerned about growth when poverty was high or rising could be justified by ultraistic political motives on the part of the ruling elites. This effect would have led to acceleration of growth by 1.4% in Africa, if other factors remain at their initial levels. However, the effects of this factor were small for the other two regions: about 0.3% for LAC and a negligible 0.01% for Asia. The results for Asia appear consistent with the sustained growth acceleration and relatively better performance of poverty over time.

Finally, the direct effect of change in policy was generally of a lesser order of magnitude compared to the others. However, while it only accounted for a miniscule part of growth in Asia (-0.09%) and to some extent LAC (-0.3%), worsening policy environment have had caused a higher growth reducing effect in Africa (at 0.7%).

5.ii The Behavior of Poverty Since 1975

The behavior of poverty over time (rate of change in poverty between 1965-74 and 1975-96) is explained by the net effects on poverty of growth and distribution (equation 10 of section 2). The results by regional median are shown in Figure 5.2. Appendix Table D.3 contains detailed country by country results. Like the case of growth, and not withstanding some possible country-specific anomalies, the main regional story bodes quite well with other stylized facts on cross-regional performances.

Figure 5.2: Dynamics of Poverty in Africa and Other Regions: (Predicted annual average change in Poverty for 1975-96)



Notes:
Source: Appendix Table D.3
Growth: component of change in poverty due to growth
alpha0: Component of change due to distribution
phat: net change in poverty

First, between the two periods median poverty rose by about 1.3% for Africa and 1.9% for LAC, while it declined by 2.3% for Asia.

Second, the income-invariant distributional effect would have led to a rise in poverty in all regions: by 1.4% for Africa, 2.3% for LAC and 3.3% for Asia. However, unlike the former two regions the pure growth effect in Asia substantially dominate the distributional effect. While for unchanged distribution, sustained growth acceleration would have reduced poverty in Asia by about 5.6%, growth was rather inconsequential in the other two regions (it would have reduced poverty by 0.1 for Africa and 0.5% for LAC). Therefore, it is not surprizing that Asia experienced an overall decline in poverty, while the reverse happened in Africa and LAC.

Third, the results for Asia appears to support the Kuznets thesis, where growth was associated with rising inequality, even though the former was sufficiently deep to lead to overall poverty reduction despite worsening income distribution. On the other hand, the results of the other two regions describe cases of both decelerating growth and worsening income distribution, with the latter determining the net effect on poverty.

5.iii Strategies for Dealing with Poverty

In section 2 we discuss the dynamic behavior of inequality, poverty and growth around the steady state, where six phases were identified, two of which give rise to stable paths toward the steady state (Figure 2.1). Based on average growth, poverty and distribution performance (Appendix Table D.4), Table 5.1 provides classifications of countries according to the phase they are likely to be associated with during the 1975-96 period. We discuss very briefly this classification and the implied strategy for poverty reduction.

First, eight countries (seven from Africa and LAC, in addition to The Philippine from Asia) are characterized by rising poverty, decelerating growth and higher inequality than levels consistent with the steady state. According to our model these countries are located in Phase VI, and in all likelihood they are in a transitional low equilibrium trap , driven by an unstable path of rising poverty. For these countries both low growth and bad distribution are constraints on sustainable poverty reduction. However, redistributive measures are particularly important to move the economies of these countries to Phase IV (to the left of the $G = \tilde{G}$ schedule: Figure 2.1), where the rise in poverty will come to a halt at the steady state along a stable path. Moreover, a combination of growth acceleration and efficient distributional measures could push these countries further to Phase III, where poverty declines continuously along a transitional unstable path of super-performance .

Second, Phase V contains a group of 22 countries (all from Africa and LAC), which have similar characteristics to the above countries, except that they were able to accelerate growth on average. Nevertheless, these countries will eventually diverge to Phase VI and therefore, they are likely to be located in the region characterized by transitional low equilibrium trap . Even though growth may be less of a constraint for these countries, they would however, need the same redistribute measures recommended for the countries of Phase VI.

Third, three African countries (Nigeria, Rwanda, Tanzania) are characterized by rising poverty, accelerating growth and equitable distribution relative to steady state levels. These countries are located in Phase IV, where poverty rises, though at a decreasing rate, until it becomes stationary at the steady state along a stable path. However, this is not a desired equilibrium, given initial levels of poverty in these countries. As in the first two groups of countries, a combination of growth

acceleration and efficient distributional measures could push these countries to Phase III, where they can enjoy spells of poverty reduction.

Fourth, a group of seven countries---including four Asian countries (Pakistan, Sri Lanka, Bangladesh, Malaysia), in addition to Chile from LAC and the two African countries of Mauritius and Uganda---are judged to be located in Phase III, which produces an unstable path of continuously declining poverty. This is probably the phase consistent with the good side of the Kuznets curve, where only growth matters for simultaneously reducing poverty as well as improving distribution over time. This would happen if this phase also produces a relatively sustained era of transitional super-performance . However, and as the recent Asian crisis attests, it appears that the real challenge for keeping this potentially unstable phase as long as possible is avoiding a sudden collapses of growth.

Fifth, four countries (China, Indonesia, Egypt, India: located in Phase II) have similar characteristics to the countries of Phase III, except that they were unable to accelerate growth as did the others. Nevertheless, these countries will eventually diverge to Phase III and therefore, they are likely to enjoy a relatively long period of prosperity, provided that they manage to sustain moderately positive growth.

Sixth, three more countries (Tunisia, Botswana, Jordan) are predicted to be located in Phase I, where growth was decelerating, inequality was higher than steady state levels, yet poverty was declining. The latter could be accounted for by high and efficient, though decelerating, growth rates. However, for this group, poverty is predicted to declines at a decreasing rate along a stable path and, will therefore, come to a halt at the steady state. For this group, both distribution and growth are important. For example, a collapse of growth (negative rates of real growth) might push these countries into a transitional low equilibrium trap , where poverty rises over time (as believed to be the case of Jordan since the late 1980s). On the other hand, more equitable distribution and positive growth could move these countries into a transitional super-performance phase, and hence produce a more sustained era of declining poverty.

Finally, it is important to point out that the above analysis depends on the estimated (or assumed) initial performance of countries in terms of growth acceleration, poverty and distribution. The simulated strategies for dealing with poverty are, therefore, contingent on the choice of the initial period. However, and despite that the predictions could have over-stated the performance of a few countries, overall, the analysis appears to be strongly corroborated by the recent development experiences of the majority of the countries.

Table 5.1: Policy Strategies for Poverty Reduction (Based on Average Performance in 1975-96)

Phases	Performance in the post 1975 (appendix Table D.4)	Countries	Predicted Performance/ Recommended Strategy
Phase I $G > \tilde{G},\ \hat{P} < 0,\ \dot{g} < 0$	1. declining poverty 2. decelerating growth 3. Inequality higher than levels consistent with steady state	Tunisia, Botswana, Jordan	1.Poverty would decline at a decreasing rate along a stable path toward the steady state. 2.Avoiding growth collapse and achieving more equitable distribution would prolong the cycle of declining poverty (shift to Phase III)
Phase II $G < \tilde{G},\ \hat{P} < 0,\ \dot{g} < 0$	1 Declining poverty 2 Decelerating growth 3 Inequality lower than steady state levels	China, Indonesia, Egypt, India.	1.Divergent phase into an unstable path of continuously declining poverty. 2.Distribution is not a constraint. Accelerating growth, and especially avoiding growth collapse (East Asia recent experience), should be the key element of the strategy
Phase III $G < \tilde{G},\ \hat{P} < 0,\ \dot{g} > 0$	1. Declining poverty 2. Accelerating growth 3. Inequality lower than steady state levels	Pakistan, Sri Lanka, Bangladesh, Chile, Malaysia, Mauritius, Uganda.	1.Unstable path, though could produce a sustained era of posterity. 2. Strategy as in phase II
Ph IV $G < \tilde{G},\ \hat{P} > 0,\ \dot{g} > 0$	1. Rising poverty 2. Accelerating growth 3 Inequality lower than steady state levels	Rwanda, Nigeria, Tanzania.	1.Poverty would rise at a decreasing rate along a stable path toward the steady state. 2.Growth is the key constraint, where higher growth could shift the economy to Phase III.
Phase V $G > \tilde{G},\ \hat{P} > 0,\ \dot{g} > 0$	1. Rising poverty 2. Accelerating growth 3. Inequality higher than steady state levels	El-Salvador, Bolivia, Madagascar, Panama, South Africa, Zambia, Mauritania, Venezuela, Gabon, Peru, Nicaragua, Zimbabwe, Kenya, Guinea, Honduras, Brazil, Costa Rica, Trinidad, Jamaica, Morocco, Mexico, Nigeria.	1.Divergent phase of continuously rising poverty: "transitional low equilibrium trap" 2.growth is not an immediate constraint, but redistributive measures will be required to shift the economy to Phase IV, and possibly Phase III
Phase VI $G > \tilde{G},\ \hat{P} > 0,\ \dot{g} < 0$	1. Rising poverty 2. Decelerating growth 3. Inequality higher than steady state levels	Senegal, Philippines, Guinea Bissau, Colombia, Guatemala, Dominican Rep., Algeria, Cote d'Ivoire.	1.Unstable path towards continuously rising poverty: "transitional low equilibrium trap" 2. Both growth and distribution are constrains but redistributive measures will be required to shift the economy to phase IV , and possibly Phase III

Source: Appendix Table D.4

6. Conclusions

This paper is concerned with modeling the dynamic interactions between growth and distribution in the analysis of the behavior of poverty over time, and the determination of the level of income inequality consistent with steady state stationary level of poverty and constant long term rate of growth. To address these issues, we specify a simple model of growth, poverty and distribution. In addition to accounting for the role of inequality in the joint determination of the first two variables, the model also controls for other non-distributional fundamentals of growth and of the direct effect of growth on poverty. In addition, in the very long run the model assumes distribution to be endogenous to growth via a Kuznets curve. We take the view that the Kuznets hypothesis is meant to describe a long-term transformation process during which not only production structures change but also institutions change. In short periods of time different economies may find themselves on either side of the Kuzents curve assuming that it exists. The side on which economies find themselves will have important implication for the reduction of poverty. This feature of the model, together with the growth equations, allow dynamic interactions between growth and distribution.

As inputs to the calculation of the models structural parameters, we estimate a long-run cross-country model for the Gini, which strongly supports the Kuznets thesis of a non-monotonic relationship between growth and inequality. The two variables are positively related at income levels less than a certain threshold (estimated at $1110 per person per year in 1987 PPP), while they are negatively related for income levels higher than this threshold. We also estimate long-term growth as well as persistence of growth. The long-run endogenous growth model was estimated using panel data drawn from 62 countries over six periods: 1970-74, 1975-79, 1980-84, 1985-89, 1990-93, 1994-96. Our results suggest that, controlling for other fundamentals, initial inequality is negatively and robustly associated with growth. The estimation of the persistence of growth (measured as the difference between average growth rate in 1975-1996 and 1965-74) corroborates the theoretical model in that: the key Conflict variable was found to be robustly and negatively associated with persistence of growth, even after controlling for other important determinants. This channel accounts for the interaction between external shocks, social conflicts (in our case high income-inequality) and the capacity of institutions for managing conflicts. The other variables, found to be robustly associated with growth, are an error-correction effect and the influence due to change in policy. The former effect suggests that if growth in the previous period was lower than the rate consistent with the fundamentals, growth will accelerate in the second period. Finally, we estimate a poverty line, which is subsequently used to compute three poverty indexes (Head Count Ratio (H), Poverty Gap ratio (P1) and Squared Poverty Gap Ratio (P2)). The poverty line, the longer term behavioral specification for the Gini, in addition to the three poverty indexes allow derivation of the key elasticities required for the calculation of the model s structural parameters. The results confirm the widely held view that Sub-Saharan Africa have the highest poverty in terms of the three measure: incidence, depth and severity. In addition, the estimated elasticities suggest that with the exception of the Head Count Index for Sub-Saharan Africa, poverty is relatively more sensitive to distribution than to growth; and that poverty in Asia tend to be more responsive to these two determinants than in other regions.

Using the growth and poverty estimates (the latter are based on the Poverty Gap index: P1) we illustrate some of the key predictions of the theoretical model. First, we undertake a decomposition analysis of the factors that led to the collapse of growth in the post-1975 period across the developing world, except in East Asia. The post 1975 era is characterized by various episodes of massive external shocks, mostly in terms of negative terms of trade shocks, but also spells of

positive shocks as well. Our results suggest that the initial level of inequality was the major factor behind the collapse of growth in (Continental) Africa and LAC in the post 1975 period, and its acceleration in Asia during the same period. Initial inequality affect growth persistence through two channels. First, because it s among the determinants of long-term growth, it affects growth persistence through the error-correction effect. Second, by being a cause of social conflicts, it affects growth persistence through its magnification effects of the impact of external shocks. Our results also show that while rising poverty in the initial period provides an important motivation for accelerating growth in the current period, the direct effects of policy changes are relatively small. Second, we also undertake a similar analysis of the behavior of poverty during 1975-96. Our results suggest that the marginal effect of increased inequality between the two periods has led to rising poverty in all three regions. However, unlike Africa and LAC, sufficiently deep and sustained growth in Asia more than compensated for poverty-worsening distributional effects, thus leading to an overall decline of poverty at a rate of 2.36% per annum. On the other hand, due to low or negative growth rates in Africa and LAC, poverty rose in both regions: by 1.3% for Africa and 1.9% for LAC.

Finally, guided by the phase dynamics framework suggested by the paper s model, we use indicators of country performance during 1975-96-- in terms of the rate of acceleration of growth, changes in poverty and extent of inequality to classify the countries in the sample according to the six phases suggested by the model. This allows identification of broad strategies for dealing with poverty, depending on the phase in which the country is predicted to be located. The main policy recommendation of this analysis is that, for the majority of countries 36 out of 47 any serious strategy for poverty reduction must include both policies for accelerating growth as well as measures for effecting more equitable income distribution. Moreover, the latter must be sufficiently deep either to shake-off the transitional , though lingering, low equilibrium trap that characterizes some economies; or to more others from the bad equilibrium of stationary, but high, poverty. Despite the illustrative nature of our analysis and that it is contingent on the selection of the initial period, we believe however, that it does suggest sensible policy implications, which are also corroborated by recent development experiences of the majority of the countries.

References

Acemoglu, D. and J. Robinson, (1997), why did the west extend the franchise? democracy, inequality and growth in historical perspective ; Discussion Paper no. 1797, CEPR, London.

Aghion, P., and P. Bolton, (1997), a theory of trickle-down growth and development ; *Review of Economic Studies*; vol. 64, pp. 151-172.

Ahluwalia, M. , (1976), "inequality, poverty and development"; *Journal of Development Economics*, vol 3:307-42.

Ahluwalia, M., Carter, N., and H. Chenery, (1979), "growth and poverty in developing countries"; *Journal of Development Economics*, vol. 6: 299-341.

Alesina, A. and D. Rodrik, (1994), "distributive politics and economic growth"; Quarterly *Journal of Economics*, vol. 109 (2).

Ali, A.A.G., (1998), "Dealing with poverty and income distribution issues in developing countries: cross regional experience ; AERC, Nairobi.

Ali, A.A.G., (1996), "Structural Adjustment Programs and Poverty in Sub-Saharan Africa, CODESRIA, Dakar.

Anand, S. and R. Kanbur, (1993-a), "inequality and development: a critique*"; Journal of Development Economics*, vol. 41:19-43.

Anand, S. and R. Kanbur, (1993-b), "the Kuznets process and the inequality-development relationship"; *Journal of Development Economics*, vol. 40:25-52.

Atkinson A. B., (1998) *Poverty in Europe*, Oxford, UK ; Malden, Mass. : Blackwell, 1998

Banerjee, A. and A. Newman, (1998), "information, the dual economy and development"; *Review of Economic Studies*, vol. 65: 631-53.

Bloom, D. and J. Sachs (1998), Geography, Demography and Economic Growth in Africa, (forthcoming), *Brookings Papers on Economic Activity*, 2.

Bourguingnon, F. and T. Verdier, (1997), oligarchy, democracy, inequality and growth ; document 97-10, Delta, Paris.

Bruno, M., Ravallion, M. and L. Squire, (1998), "equity and growth in developing countries: old and new perspectives on the policy issues"; in V. Tanzi and K. Chu, (eds.), (1998), *Income Distribution and High Quality Growth*; MIT Press, Cambridge.

Chen, S., Datt, G. and M. Ravallion, (1994), "is poverty increasing in the developing world?"; *Review of Income and Wealth*, vol. 40:359-76.

Chen, S., Datt, G. and M. Ravallion, (1993), "statistical addendum to 'is poverty increasing in the developing world?'"; Policy Research Department, World Bank, Washington DC.

Datt, G. and M. Ravallion, (1992), "Growth and Redistribution Components of changes in Poverty Measures: A Decomposition with Applications to Brazil and India in the 1980s, *Journal of Development Economics*, vol. 38, no. 2.

Deininger, K. and L. Squire, (1996), "a new data set measuring income inequality"; The *World Bank Economic Review*, vol. 10 (3): 565-91.

Domowitz, I. and I. Elbadawi (1987), "An Error Correction Approach to Money Demand: The Case of the Sudan," *Journal of Development Economics*, 26(2), pp. 257-75, August.

Easterly, W., N. Loayza and P. Montiel (1996), Has Latin America s Post-reform Growth Been Disappointing, The World Bank.

Easterly, W., M. Kremer, L. Pritchett, and L. Summers (1993), Good Policy or Good Luck? Country Growth Performance and Temporary Shocks, *Journal of Monetary Economics*, 32: 459-483.

Fishlow, A. (1995) Inequality, poverty and growth : where do we stand Paper presented for the World Bank's Annual Bank Conference on Development Economics, Washington, D.C., May 1 and 2, 1995

Foster J.E. (1998) Absolute versus relative poverty *American Economic Review*, Papers and Proceedings; 88:335-41, May

Hayami, Y., (1998), Development Economics: From the Poverty to the Wealth of Nations; Clarendon Press, Oxford.

Horton, S., Kanbur, R. and D. Mazumdar, (1995), "openness and inequality"; invited paper presented to the IEA World Congress, Tunis.

Kakwani N. (1993) Statistical inference in the measurement of poverty Review of Economics and Statistics; 75:632-39 November 1993

Kuznets, S., (1955), "economic growth and income inequality"; *American Economic Review*, vol 45 (1):1-28 .

Lal, D. and H. Myint, (1996), The Political Economy of Poverty, Equity and Growth: A Comparative Study; Clarendon Press, Oxford.

Li, H. and H. Zou (1998), "Income Inequality is not harmful for Growth: Theory and Evidence," *Review of Development Economics*, 2(3), 318-334.

Minami, R., (1998), economic development and income distribution in Japan: an assessment of the Kuznets hypothesis ; Cambridge Journal of Economic, vol. 22.

Persson, T. and G. Tabellini (1994), "Is inequality Harmful for Growth? Theory and Evidence," *American Economic Review*, 84: 600-21.

Ravallion, M., (1995) Growth and poverty: evidence for developing countries in the 1980s. *Economic Letters*; 48, Nos. 3-4:411-17

Ravallion, M., Datt, G., and van de Walle, (1991), "quantifying absolute poverty in the developing world"; *Review of Income and Wealth*, series 37, no. 4: 345-61.

Rodrik, D. (1998a). Where Did All the Growth Go? External Shocks, Social Conflict, and Growth Collapses, Harvard University, John F. Kennedy School of Government, mimeo.

Rodrik, D. (1998b). Why Do More Open Economies Have Bigger Governments?, *Journal of Political Economy*, October.

Sarel, M., (1997), how macroeconomic factors affect income distribution: the cross-country evidence ; WP/97/152, IMF, Washington.

World Bank, (1994), *World Development Report*, Oxford University Press, Oxford.

Appendix Table (A.1): Mean Expenditure and Gini Coefficients for a Sample of Countries

(mean expenditure in 1987 PPP dollars and Gini coefficients in percentages)

Country (year)	Mean Exp. $/pers./year	Gini Coeff. (%)	Country (year)	Mean Exp. $/pers./year	Gini Coeff. (%)	Country (year)	Mean Exp. $/pers./year	Gini Coeff. (%)
Bolivia (90)	1034.3	42.04	Bangladesh (89)	630.2	26.92	Spain (88)	4576.9	28.16
Brazil (85)	1474.8	59.54	India (83)	322.0	32.2	Australia (85)	7939.3	37.83
Chile (89)	1590.4	57.88	Nepal (85)	474.2	30.06	UK (88)	7752.4	39.83
Colombia (88)	2462.6	53.11	Pakistan (91)	797.0	31.15	Italy (86)	7220.7	34.03
Costa Rica (89)	1168.4	46.07	Sri Lanka (90)	585.5	32.47	Netherlands (88)	6880.8	28.78
Dominican (89)	1148.3	50.46	Botswana (86)	929.2	54.21	Canada (87)	9275.0	34.59
Guatemala (87)	527.9	58.26	Cote d Ivoire (85)	839.5	44.63	Belgium (79)	7034.9	28.08
Honduras (89)	539.4	59.49	Ethiopia (82)	568.2	35.90	Finland (81)	6241.8	31.91
Jamaica (90)	1540.4	43.16	Ghana (88)	875.5	36.74	France (89)	7179.9	36.05
Mexico (84)	1158.6	50.71	Kenya (92)	703.3	57.46	Germany (88)	6806.2	33.29
Panama (89)	1313.9	56.57	Lesotho (87)	722.4	56.02	USA (85)	12195.4	37.35
Peru (86)	937.7	45.72	Mauritania (88)	663.0	42.53	Norway (79)	7338.2	30.92
Venezuela (89)	1003.7	44.08	Senegal (92)	550.0	54.12	Denmark (81)	7241.3	33.62
China (85)	888.2	32.96	Tanzania (91)	873.6	59.01	Sweden (81)	6690.4	29.19
Indonesia (84)	537.0	34.15	Zambia (91)	242.8	43.51	Japan (79)	6898.1	28.70
Philippines (88)	792.6	40.68	Zimbabwe (90)	939.6	56.83	Switzerland (82)	10096.9	38.99
Thailand (88)	1210.4	43.81	New Zealand (82)	6165.0	39.50	Average	3151.6	41.67

Source: Chen, Datt and Ravallion (1993) and World Bank (1994).

Appendix Table B.1: *Poverty Line, Inequality and Poverty Measures and associated Elasticities*

	Country	Year	μ	PRC	Z	G	H	P1	P2	$-\eta_H$	$-\eta_{P1}$	$-\eta_{P2}$	θ_H	θ_{P1}	θ_{P2}	ε	V	v0
1	Algeria	88	118.00	1243.76	50.40	39.281	16.870	4.210	1.710	-2.670	-3.000	-2.930	3.570	6.350	8.590	0.305	-0.013	0.0007
2	Botswana*	86	53.67	472.10	33.81	54.209	54.460	25.630	15.020	-0.750	-1.120	-1.410	0.440	2.250	4.000	0.152	0.080	0.0005
3	Cote d'Ivoire	88	65.00	612.08	36.38	36.893	30.100	8.860	3.520	-1.740	-2.400	-3.030	1.370	3.670	5.960	0.181	0.077	0.0007
4	Egypt	91	88.77	659.49	42.27	32.006	13.880	2.080	0.420	-3.540	-5.670	-7.840	3.900	8.340	12.820	0.239	0.076	0.0008
5	Gabon	77	133.04	2621.09	55.16	62.872	46.220	21.640	12.710	-0.800	-1.140	-1.400	1.130	4.020	6.810	0.336	-0.069	0.0004
6	Guinea	95	28.42	299.73	28.61	46.870	63.680	34.430	23.360	-0.650	-0.850	-0.950	0.000	0.999	1.980	0.083	0.164	0.0006
7	Guinea Bissau	91	37.27	143.24	30.35	56.168	61.860	34.810	24.430	-0.620	-0.780	-0.850	0.140	1.410	2.650	0.108	0.304	0.0005
8	Kenya	92	49.95	232.65	33.00	57.891	59.400	28.420	17.020	-0.740	-1.090	-1.340	0.380	2.070	3.710	0.142	0.177	0.0005
9	Lesotho	87	80.79	331.00	40.21	56.011	45.770	21.790	13.160	-0.820	-1.100	-1.310	0.830	3.120	5.340	0.220	0.122	0.0005
10	Madagascar	93	31.72	183.84	29.25	43.459	65.480	27.970	15.100	-0.820	-1.340	-1.700	0.070	1.200	2.310	0.092	0.303	0.0006
11	Mauritania	88	51.00	363.90	33.23	42.535	38.720	18.190	13.330	-1.260	-1.130	-0.730	0.670	2.140	3.460	0.145	0.143	0.0006
12	Mauritius	91	278.79	1352.70	117.50	36.555	16.010	4.240	1.750	-2.390	-2.770	-2.840	3.280	6.180	8.640	0.552	-0.024	0.0007
13	Morocco	91	110.77	691.00	48.35	39.200	21.340	4.970	1.540	-2.130	-3.290	-4.440	2.750	6.540	10.320	0.289	0.056	0.0007
14	Niger	92	32.40	211.88	29.38	36.243	61.060	21.590	10.150	-1.130	-1.830	-2.250	0.120	1.290	2.440	0.094	0.312	0.0007
15	Nigeria	93	62.85	139.57	35.88	44.893	40.030	17.530	10.010	-1.010	-1.280	-1.500	0.760	2.720	4.630	0.176	0.391	0.0006
16	Rwanda	83	36.34	329.57	30.17	29.066	50.030	13.120	4.570	-1.670	-2.810	-3.740	0.340	1.780	3.170	0.105	0.237	0.0009
17	Senegal	91	63.04	487.82	35.93	54.117	49.660	22.670	13.080	-0.840	-1.190	-1.470	0.630	2.650	4.610	0.176	0.076	0.0005
18	South Africa	93	229.20	1401.39	92.75	61.060	45.610	23.500	14.970	-0.680	-0.940	-1.140	1.000	3.860	6.620	0.496	-0.017	0.0004
19	Tanzania	93	26.00	125.54	28.15	38.102	70.950	30.500	16.340	-0.740	-1.330	-1.730	0.060	0.820	1.710	0.076	0.513	0.0007
20	Tunisia	90	184.24	784.44	73.47	40.001	19.140	5.320	1.990	-1.860	-2.600	-3.340	2.810	6.430	10.050	0.430	0.040	0.0007
21	Uganda	93	30.18	445.99	28.95	40.740	67.420	27.640	14.120	-0.800	-1.440	-1.910	0.030	1.100	2.170	0.088	0.115	0.0007
22	Zambia	76	52.13	208.27	33.48	51.998	52.420	24.240	14.190	-0.830	-1.160	-1.430	0.460	2.200	3.900	0.148	0.222	0.0005
23	Zimbabwe	90	58.52	317.20	34.89	56.834	57.560	26.070	14.270	-0.670	-1.210	-1.650	0.460	2.450	4.480	0.164	0.127	0.0005
	Africa	**Average**	**82.70**	**593.84**	**43.55**	**45.96**	**45.55**	**19.54**	**11.16**	**-1.27**	**-1.80**	**-2.21**	**1.10**	**3.20**	**5.23**	**0.21**	0.148	**0.0006**
		σ	**66.96**	**581.34**	**22.45**	**9.84**	**18.03**	**10.18**	**6.90**	**0.78**	**1.14**	**1.57**	**1.24**	**2.15**	**3.05**	**0.13**	0.144	**0.0001**
1	Bangladesh	86	45.45	143.00	32.04	38.976	41.670	12.860	5.900	-2.050	-2.240	-2.360	0.860	2.360	3.830	0.130	0.439	0.0007
2	China	92	132.06	169.90	54.85	37.256	18.750	7.260	3.910	-1.470	-1.580	-1.720	2.080	4.630	7.230	0.334	0.384	0.0007
3	India	92	44.21	238.59	31.78	32.044	40.840	10.370	3.650	-1.930	-2.940	-3.680	0.760	2.540	4.220	0.127	0.310	0.0008
4	Indonesia	93	107.72	361.12	47.47	31.688	10.680	1.190	0.180	-4.590	-8.010	-11.450	5.820	12.440	19.070	0.283	0.194	0.0008
5	Jordan	91	139.09	1352.86	57.13	40.656	19.190	4.260	1.270	-2.280	-3.510	-4.730	3.260	7.460	11.650	0.348	-0.022	0.0007
6	Malaysia	89	182.51	1121.98	72.79	48.351	28.430	9.370	4.060	-1.420	-2.030	-2.610	2.140	5.570	8.950	0.427	-0.001	0.0006
7	Pakistan	91	80.29	238.94	40.09	31.143	15.130	3.420	1.300	-3.120	-3.420	-3.250	3.120	5.430	7.260	0.219	0.319	0.0009
8	Philippines	88	104.00	418.95	46.41	46.665	29.310	9.230	4.080	-1.640	-2.180	-2.520	2.040	4.940	7.610	0.274	0.109	0.0006
9	Sri Lanka	90	85.10	321.75	41.31	30.098	12.940	2.180	0.510	-3.300	-4.930	-6.630	3.500	7.290	11.140	0.231	0.235	0.0009
	Asia	**Average**	**102.27**	**485.23**	**47.10**	**37.43**	**24.10**	**6.68**	**2.76**	**-2.42**	**-3.43**	**-4.33**	**2.62**	**5.85**	**9.00**	**0.26**	0.219	**0.0007**
		σ	**44.85**	**439.15**	**13.06**	**6.83**	**11.58**	**4.07**	**1.98**	**1.05**	**1.99**	**3.05**	**1.54**	**3.04**	**4.62**	**0.10**	0.163	**0.0001**
1	Bolivia	90	71.57	559.90	37.94	42.038	34.460	11.500	5.040	-1.380	-1.200	-2.560	1.220	3.660	6.040	0.198	0.079	0.0006
2	Brazil	89	282.15	1254.23	119.31	60.662	48.050	23.420	13.930	-0.670	-1.050	-1.360	0.920	3.800	6.590	0.555	-0.009	0.0004
3	Chile	94	226.66	1538.71	91.57	56.493	38.100	14.950	7.530	-1.070	-1.550	-1.970	1.570	4.760	7.860	0.493	-0.026	0.0005
4	Columbia	91	226.43	786.69	91.47	50.293	28.340	11.810	6.680	-1.250	-1.400	-1.540	1.840	4.540	7.220	0.493	0.031	0.0005
5	Costa Rica	89	191.14	1020.60	76.23	46.116	25.690	10.420	5.700	-1.270	-1.470	-1.660	1.910	4.720	7.510	0.441	0.008	0.0006
6	Dom. Rep.	89	124.93	651.40	52.60	50.789	32.800	11.900	5.730	-1.270	-1.760	-2.160	1.740	4.790	7.720	0.320	0.049	0.0005
7	El Salvador	77	91.97	1073.20	43.11	47.462	39.720	13.440	5.650	-1.060	-1.950	-2.760	1.210	4.350	7.400	0.247	0.003	0.0006
8	Guatemala	89	155.93	719.53	62.88	59.899	40.840	20.510	13.220	-0.830	-0.990	-1.100	1.230	3.950	6.590	0.381	0.033	0.0004
9	Honduras	92	77.12	640.73	39.30	51.752	41.050	16.940	9.410	-1.120	-1.420	-1.600	1.070	3.330	5.470	0.211	0.050	0.0005
10	Jamaica	93	120.71	1126.84	51.31	37.916	17.630	4.020	1.240	-2.300	-3.390	-4.480	3.120	6.930	10.760	0.311	-0.002	0.0007
11	Mexico	89	300.86	1230.72	129.66	55.278	38.200	16.450	9.340	-1.030	-1.320	-1.520	1.360	4.070	6.650	0.570	-0.008	0.0005
12	Nicaragua	93	59.83	692.82	35.19	50.072	47.020	19.820	10.720	-0.970	-1.370	-1.700	0.680	2.660	4.590	0.168	0.044	0.0005
13	Panama	89	140.35	1378.10	57.54	56.822	38.190	19.870	13.410	-0.840	-0.920	-0.960	1.210	3.770	6.260	0.351	-0.017	0.0005
14	Peru	94	155.22	2613.93	62.63	45.106	24.860	8.210	3.750	-1.550	-2.030	-2.380	2.300	5.480	8.470	0.379	-0.096	0.0006
15	Trinidad**	81	233.12	1618.46	94.57	41.565	24.350	11.740	7.650	-1.080	-1.070	-1.070	1.580	4.040	6.500	0.501	-0.042	0.0006
16	Venezuela	90	304.78	1127.06	131.88	53.836	38.050	15.390	8.020	-1.050	-1.470	-1.840	1.380	4.240	7.030	0.573	0.007	0.0005
	L. America	**Average**	**172.67**	**743.22**	**73.58**	**50.38**	**34.83**	**14.40**	**7.94**	**-1.17**	**-1.52**	**-1.92**	**1.52**	**4.32**	**7.04**	**0.39**	0.007	**0.0005**
		σ	**82.01**	**515.16**	**32.66**	**6.69**	**8.57**	**5.04**	**3.59**	**0.37**	**0.59**	**0.86**	**0.59**	**0.96**	**1.37**	**0.14**	0.042	**0.0001**
	Overall	**Average**	109.05	751.21	52.003	45.833	37.958	15.416	8.513	-1.452	-2.014	-2.511	1.523	4.070	6.541	0.263	0.114	0.0006
		σ	78.64	591.16	27.75	9.39	16.33	9.10	6.08	0.86	1.37	1.94	1.25	2.24	3.26	0.15	0.146	0.0001

Notes:

μ = mean income
PRC = per capita private consumption
Z = poverty line, based on below equation
G = measure of inequality
H = an index of poverty (head count ratio)
P1: an index of poverty
P2: an index of poverty
$-\eta_H$ = elasticity of poverty index (H) relative to mean income
$-\eta_{P1}$=elasticity of poverty index (P1) relative to mean income
$-\eta_{P2}$= elasticity of poverty index (P2) relative to mean income
θ_H= elasticity of poverty index (H) relative to income distribution
θ_{P1}= elasticity of poverty index (P1) relative to Income distribution
θ_{P2}= elasticity of poverty index (P2) relative to income distribution
ε = elasticity of poverty line with respect to mean income (based on the below equation)
v = Elasticity of Gini Index to per capita private consumption (based on regression 2 of Table 3.1)
v_0 = component of the rate of change in Gini that doe not depend on income (or consumption) level (based on regression 2 of Table 3.1)

Poverty Line Estimation Equation:

$\text{LogZi} = 1.3719 + 0.00303\mu i - 0.000001886(\mu i * \mu i)$;R square = 0.97, adj. R Square = 0.96; and $\varepsilon = [0.00303\mu - 0.000003772(\mu * \mu)]$

(56.76) (10.96) (-5.25)

Appendix Table C.1 : Persistence of Growth Regression (rate of Growth in 1975-96 minus rate of growth for 1965-74)

	Confl1	**Confl11**	**Confl2**	**Confl21**	**Confl3**	**Confl31**	Error Correction Term	Macro Policy	Constant	Adjusted R-squared	F-test	N
A1	-0.0004 (-2.746)								-0.9073	9.27	7.54	65
B1		-0.0004 (-2.416)							-1.0193 (-2.386)	0.0703	5.84	65
C1			-0.0005 (-2.867)						-0.9264 (-2.175)	0.1107	8.22	59
D1				-0.0004 (-2.454)					-1.0181 (-2.336)	0.0797	6.02	59
E1					-0.0004 (-2.347)				-1.1698 (-2.927)	0.0699	5.51	61
F1						-0.0003 (-1.910)			-1.2877 (-2.927)	0.0423	3.65	61
A2	-0.0003 (-2.539)						0.6126 (5.909)		0.0819 (0.213)	0.4396	22.96	57
B2		-0.0003 (-2.637)					0.6223 (6.054)		0.0863 (0.227)	0.4641	23.38	57
C2			-0.0004 (-2.928)				0.5860 (5.728)		0.1101 (0.288)	0.4546	23.50	55
D2				-0.0004 (-3.149)			0.6124 (6.105)		0.1846 (0.480)	0.4664	24.60	55
E2					-0.0003 (-2.566)		0.6128 (5.932)		0.0171 (0.044)	0.4324	21.95	56
F2						-0.0004 (-2.854)	0.6389 (6.275)		0.2016 (0.493)	0.4469	23.22	56
A3	-0.0003 (-2.576)						.7017 (6.637)	-15.981 (-2.447)	0.5370 (1.308)	0.5145	19.02	52
B3		-0.0003 (-2.759)					0.7144 (6.856)	-16.854 (-2.605)	0.5725 (1.405)	0.5230	19.64	52
C3			-0.0005 (-3.950)				0.7303 (7.368)	-18.981 (-2.692)	0.8685 (2.174)	0.5785	23.87	51
D3				-0.0005 (-3.941)			0.7589 (7.647)	-19.615 (-2.776)	0.8966 (2.221)	0.5780	23.83	51
E3					-0.0004 (-3.476)		0.7601 (7.594)	-20.584 (-3.255)	0.8387 (2.021)	0.5585	22.50	52
F3						-0.0005 (-3.604)	0.7896 (7.884)	-21.359 (-3.384)	0.9028 (2.159)	0.5651	23.09	52

Notes:

Confl1: standard deviation of $\Delta\ln(TOT)_{70\text{-}79}$ x $openness_{70\text{-}79}$ x $gini_{65\text{-}74}$ x $democracy_{70s}$.

Confl11: is defined as confl1 with the measure of democracy in the 1980s rather than in 1970s.

Confl2: is defined as std deviation of $\Delta\ln(TOT)_{70\text{-}74}$ x $openness_{70\text{-}74}$ x $gini_{65\text{-}74}$ x $democracy_{70s}$.

Confl21: is defined as confl2 with the measure of democracy in the 1980s rather than in 1970s.

Confl3: is defined as std deviation of $\Delta\ln(TOT)_{70\text{-}89}$ x $openness_{70\text{-}79}$ x $gini_{65\text{-}74}$ x $democracy_{70s}$.

Confl31: is defined as confl3 with the measure of democracy in the 1980s rather than in 1970s.

Error Correction term = predicted annual rate of growth (1965-74) – actual average annual rate of growth (1965-74)

Macro Policy = is defined as the "instrumented" change in government consumption as a ratio of GDP in 1975-96 relative to 1965-74

Appendix Table D.1: Structural Parameters and Variables

Country	α_0	α	β_0	g	g_0	g_{F0}	G	$\tilde{G}_0$	G_0	$\dot{g}$	$\hat{P}_0$	$\hat{P}$	Confl4	$\dot{gcon}$
Algeria	4.344	2.167	0.071	0.045	2.571	2.7479	39.281	22.486	38.00	-2.5260	-1.226	4.248	2672	0.079
Botswana*	1.115	0.771	0.071	5.293	11.708	9.1350	54.209	28.040	54.00	-6.4151	-7.911	-2.965	1026	na
Cote d'Ivoire	2.673	1.684	0.071	-1.200	4.162	1.7312	36.893	28.040	41.21	-5.3623	-4.336	4.695	3633	0.020
Egypt	7.003	3.677	0.071	3.673	1.305	6.3768	32.006	28.040	38.00	2.3687	2.205	-6.506	1478	-0.072
Gabon	1.718	1.034	0.071	-0.774	8.496	3.7205	62.872	22.486	63.18	-9.2698	-7.063	2.519	4850	0.041
Guinea	0.573	0.615	0.071	1.299	na	4.1479	46.870	37.433	40.04	na	na	-0.227	na	na
Guinea Bissau	0.675	0.267	0.071	0.730	0.591	4.7226	56.168	37.433	56.12	0.1394	0.517	0.479	na	0.007
Kenya	0.961	0.570	0.071	0.480	4.454	4.3493	57.891	37.433	54.39	-3.9741	-1.577	0.687	4459	0.043
Lesotho	1.497	0.476	0.071	2.983	5.852	6.9680	56.011	28.040	56.02	-2.8693	-1.291	0.076	4528	0.086
Madagascar	0.742	0.853	0.071	-2.198	1.101	0.8922	43.459	37.433	43.44	-3.2995	-0.197	2.617	413	0.007
Mauritania	1.352	0.660	0.071	-0.320	-0.996	2.7060	42.535	28.040	42.53	0.6764	2.009	1.563	1796	0.045
Mauritius	4.543	1.392	0.071	4.310	2.155	7.3456	36.555	22.486	42.67	2.1545	1.542	-1.458	274	0.009
Morocco	4.484	1.970	0.071	2.089	3.681	4.8775	39.200	28.040	39.19	-1.5918	-2.768	0.367	411	0.064
Niger	0.957	1.255	0.071	-1.894	-3.902	0.6740	36.243	37.433	36.10	2.0079	5.854	3.334	1416	0.144
Nigeria	1.628	-0.007	0.071	-0.311	3.576	2.3226	44.893	37.433	37.02	-3.8867	1.654	1.626	2223	0.055
Rwanda	1.646	2.093	0.071	0.132	2.026	2.1883	29.066	28.040	28.90	-1.8941	-2.596	1.369	1638	0.068
Senegal	1.316	0.779	0.071	-0.037	-1.503	3.8133	54.117	28.040	54.12	1.4659	2.487	1.345	1553	0.018
South Africa	1.699	0.540	0.071	-0.567	3.246	3.8650	61.060	22.486	62.30	-3.8132	-0.053	2.005	504	0.052
Tanzania	0.578	0.808	0.071	0.120	na	na	38.102	37.433	38.10	na	na	0.481	na	na
Tunisia	4.320	1.226	0.071	2.469	4.492	5.5282	40.001	28.040	43.00	-2.0232	-1.188	-0.0367	593	0.016
Uganda	0.726	1.187	0.071	1.405	na	3.7523	40.740	28.040	33.00	na	na	-0.942	na	na
Zambia	1.137	0.501	0.071	-2.793	0.591	0.8350	51.998	37.433	51.00	-3.3843	0.841	2.537	3954	-0.002
Zimbabwe	1.158	0.701	0.071	-0.707	3.262	3.0211	56.834	28.040	52.40	-3.9689	-1.127	1.654	1557	0.161
Bangladesh	1.627	0.913	0.071	2.055	-0.814	4.5599	38.976	37.433	35.21	2.8688	2.371	-0.250	na	0.000
China	3.340	0.725	0.071	8.028	3.189	10.1720	37.256	37.433	30.14	4.8387	5.651	-2.194	143	-0.013
India	2.130	1.780	0.071	3.217	1.731	5.4418	32.044	37.433	31.28	1.4852	-0.951	-3.595	120	0.020
Indonesia	10.55	3.329	0.071	5.349	4.275	7.6643	31.688	28.040	32.54	1.0744	-3.680	-7.256	277	0.029
Jordan	4.931	2.450	0.071	2.940	na	5.6461	40.656	22.486	38.04	na	na	-2.271	na	na
Malaysia	3.096	1.168	0.071	4.815	4.325	8.2424	48.351	28.040	48.18	0.4899	-1.954	-2.526	217	0.014
Pakistan	4.686	0.940	0.071	2.711	2.362	5.0000	31.143	37.433	32.18	0.3483	2.464	-07391	183	0.007
Philippines	2.845	1.043	0.071	0.624	2.109	3.8902	46.665	28.040	45.91	-1.4849	0.645	2.194	505	0.004
Sri Lanka	6.509	2.079	0.071	3.224	2.979	6.4380	30.098	28.040	45.18	0.2449	0.317	-0.192	523	-0.029
Bolivia	2.340	0.675	0.071	0.106	-0.892	3.0969	42.038	28.040	42.04	0.9986	2.942	2.268	1067	0.015
Brazil	1.683	0.502	0.071	0.956	7.454	5.0058	60.662	22.486	56.93	-6.4987	-2.057	1.204	529	-0.005
Chile	2.264	0.911	0.071	3.537	0.754	7.7020	56.493	22.486	58.55	2.7831	1.578	-0.958	1484	-0.022
Colombia	2.426	0.568	0.071	2.064	3.209	5.8238	50.293	28.040	52.85	-1.1445	0.603	1.254	337	0.018
Costa Rica	2.751	0.782	0.071	0.934	3.878	4.1185	46.116	28.040	44.77	-2.9449	-0.284	2.020	300	-0.007
Dom. Rep.	2.535	0.961	0.071	1.446	5.335	4.7801	50.789	28.040	46.86	-3.8882	-2.593	1.144	766	0.001
El Salvador	2.463	1.455	0.071	0.235	1.093	3.6780	47.462	28.040	48.40	-0.8578	0.874	2.121	1549	0.020
Guatemala	1.772	0.481	0.071	0.190	3.345	4.0449	59.899	28.040	54.19	-3.1548	0.164	1.681	544	0.016
Honduras	1.729	0.953	0.071	0.513	1.371	4.6524	51.752	28.040	58.18	-0.8574	0.422	1.240	2439	0.007
Jamaica	4.912	2.348	0.071	-0.318	1.367	2.8077	37.916	28.040	43.94	-1.6849	1.703	5.659	261	0.057
Mexico	1.979	0.601	0.071	1.085	3.658	4.8394	55.278	22.486	52.78	-2.5730	-0.220	1.327	561	0.017
Nicaragua	1.428	1.024	0.071	-3.504	1.693	0.0757	50.072	28.040	50.32	-5.1973	-0.306	5.015	2156	0.115
Panama	1.783	0.662	0.071	1.421	4.043	5.1186	56.822	22.486	51.97	-2.6212	-0.892	0.842	na	0.177
Peru	3.265	1.784	0.071	-0.260	1.269	3.0157	45.106	22.486	46.05	-1.5295	1.000	3.729	1524	0.024
Trinidad**	2.612	0.701	0.071	0.325	2.238	3.2925	41.565	22.486	41.72	-1.9130	1.043	2.384	940	0.040
Venezuela	2.117	0.600	0.071	-0.478	0.425	2.6335	53.836	22.486	43.73	-0.9027	1.862	2.403	750	0.011

Notes:

1. $a_0 = qv_0$ where v_0 is multiplied by 1000 so that α and α_0 are comparable in scale; $a = (1-e)h - qv$, where estimates of θ v_0, ε, η, and v are obtained from Appendix Table B.1 (column for P1)
2. Estimates for $\beta 0$ is obtained from the coefficient of G of regression 6 of Table 4.1.
3. g = average annual per capita GDP growth rate in the 1975-96
4. g_0 = average annual per capita GDP growth rate in the 1965-74
5. G ≡ level of inequality in the 1975-96 period,
6. G_0= level of inequality in the 1965-74 period
7. $g_{F0} = g_0 + bG_0$, where g_{F0} = average growth explained by non-distributional fundamentals in the 1965-74 period
8. $\tilde{G}_0 = \frac{1}{ab_0}(ag_{F0} - a)$; initial level of inequality (1965-74) consistent with steady state equilibrium ($\hat{g} = \hat{p} = 0$). The data in the column reflect the median value 37.43 for the lower quartile, 28.04 for the second and third quartile, and 22.486 is the fourth quartile (classification according to mean consumption)
9. $\dot{g} = g - g_0$
10. $\hat{p} = -ag + a_0$, where g is the average growth rate in the 1975-96 period
11. $\hat{p}_0 = -ag_0 + a_0$ where g_0 is the average growth rate in 1965-74 period.
12. Confl4 = conflict variable (see footnote to Table 4.2)
13. $\dot{gcon} = (gcon_{75-96} - gcon_{65-74})$

Appendix Table D.2: Determinants of Growth Dynamics in Africa and Other Regions (Annual Average in 1975-96 Relative to 1965-74)

Country/Region	(1) $\dot{g} = g - g_0$	(2) Effect due to shock and Social Conflict	(3) Effect due to Equitable initial Income Distribution	(4) Effect due to initial poverty	(5) Effect due to Macroeconomic Policy	(6) Residual
Algeria	-2.5260	-1.8384	-1.4193	1.4329	-1.2546	0.5533
Cote d'Ivoire	-5.3623	-2.4989	-2.0185	1.1192	-0.3108	-1.6532
Egypt	2.3687	-1.0164	1.2809	1.3694	1.1362	-0.4014
Gabon	-9.2698	-3.3360	-1.7641	1.1421	-0.6493	-4.6626
Guinea Bissau	0.1394	na	-1.2977	1.8221	-0.1087	-0.2763
Kenya	-3.9741	-3.0673	-0.8734	1.1887	-0.6830	-0.5390
Lesotho	-2.8693	-3.1149	-0.1151	2.2323	-1.3706	-0.5010
Madagascar	-3.2995	-0.2843	-2.2214	0.6219	-0.1156	-1.3002
Mauritania	0.6764	-1.2354	-1.7157	1.4915	-0.7224	2.8585
Mauritius	2.1545	-0.1884	0.7580	2.3471	-0.1454	-0.6167
Morocco	-1.5918	-0.2826	-0.1350	1.6212	-1.0183	-1.7771
Niger	2.0079	-0.9742	-1.9233	0.5801	-2.2827	6.6080
Nigeria	-3.8867	-1.5291	na	na	-0.8788	na
Rwanda	-1.8941	-1.1266	-0.4735	0.5546	-1.0843	0.2356
Senegal	1.4659	-1.0683	-1.2497	1.2339	-0.2854	2.8354
South Africa	-3.8132	-0.3468	-2.6892	2.2551	-0.8271	-2.2052
Tunisia	-2.0232	-0.4080	-0.7633	2.5186	-0.2539	-3.1166
Zambia	-3.3843	-2.7199	-3.6647	1.6381	0.0282	1.3340
Zimbabwe	-3.9689	-1.0713	-1.7088	1.1735	-2.5645	0.2022
Africa (median)	**-2.5260**	**-1.0989**	**-1.3585**	**1.4012**	**-0.68297**	-0.7867
Bangladesh	2.87	na	-0.353	-1.019	na	na
China	4.8387	-0.0984	9.0749	-4.5905	0.2048	0.248
India	1.4852	-0.0828	1.4756	-2.2287	-0.3163	2.637
Indonesia	1.07	-0.190	1.614	na	-0.460	na
Jordan	na	-0.189	0.671	-1.674	na	na
Malaysia	0.4899	-0.1495	1.5664	0.2093	-0.2182	-0.918
Pakistan	0.3483	-0.1256	-1.6443	2.0803	-0.1138	0.152
Philippines	-1.4849	-0.3471	-1.6087	-0.1820	-0.0649	0.718
Sri Lanka	0.2449	-0.3597	0.0670	0.4431	0.4600	-0.365
Asia (median)*	**0.4191**	**-0.1376**	**0.7713**	**-0.01365**	**-0.0894**	**0.1117**
Bolivia	0.9986	-0.7342	-2.4346	-2.8858	-0.2333	7.2865
Brazil	-6.4987	-0.3636	-1.9376	1.8834	0.0829	-6.1639
Chile	2.7831	-1.0210	0.7970	-0.5235	0.3460	3.1845
Columbia	-1.1445	-0.2319	-1.5450	0.2842	-0.2803	0.6284
Costa Rica	-2.9449	-0.2066	-1.9765	-1.3170	0.1166	0.4386
Dom. Rep.	-3.8882	-0.5272	-0.9541	1.1181	-0.0186	-3.5064
El Salvador	-0.8578	-1.0652	-1.0076	-1.1957	-0.3239	2.7346
Guatemala	-3.1548	-0.3743	-2.5953	1.6763	-0.2483	-1.6132
Honduras	-0.8574	-1.6776	-0.8715	0.3237	-0.1176	1.4856
Jamaica	-1.6849	-0.1794	-1.6278	-1.1337	-0.9118	2.1679
Mexico	-2.5730	-0.3862	-1.8535	1.1568	-0.2652	-1.2249
Nicaragua	-5.1973	-1.4834	-3.5341	-1.9172	-1.8286	3.5660
Peru	-1.5295	-1.0485	-1.5797	-0.2951	-0.3891	1.7829
Trinidad**	-1.9130	-0.6469	-2.4540	2.3891	-0.6425	-0.5587
Venezuela	-0.9027	-0.5158	-2.9010	0.7346	-0.1786	1.9581
Latin America (median)	**-1.68485**	**-0.5272**	**-1.8535**	**0.2842**	**-0.24833**	**0.6600**

Source: Table 4.2, Appendix Table D.1, equation (9)

Notes:

g= average annual per capita growth rate in the 1975-96

g_0=average annual per capita growth rate in 1965-74

Effect due to shocks and social conflicts = $-l_1 t\,(1-I)G$ = -λ_1*confl4 (see notes to Table 4.2), where λ_1=0.00069

Effect due to equitable initial income distribution = $b_0 l_2(\tilde{G}_0 - G_0)$, where $\tilde{G}_0$ is given by the appropriate median for the country in question (see Appendix D.1.) where $\beta 0$=0.071 and λ_2=0.72405

Effect due to poverty dynamics in the initial period = $l_2 \frac{1}{a} \hat{P}_0$, where α and $\hat{P}_0$ are as in Appendix Table D.1.

Effect due to macroeconomic policy = $l_3 \times \dot{gcon}$, where $l_3 = -15.88385$ and $\dot{gcon}$ as in Appendix Table D.1* Bangladesh, Indonesia and Jordan are excluded.

Appendix Table D.3: Dynamics of Poverty in Africa and Other Regions (Predicted annual average change in Poverty for 1975-1996)

Country	Growth = -αg	α_0	$\hat{P}$
Algeria	-0.0966	4.3443	4.248
Botswana*	-4.0807	1.1154	-2.965
Cote d'Ivoire	2.0218	2.6734	4.695
Egypt	-13.5084	7.0028	-6.506
Gabon	0.8002	1.7183	2.519
Guinea	-0.7997	0.5728	-0.227
Guinea Bissau	-0.1953	0.6746	0.479
Kenya	-0.2735	0.9609	0.687
Lesotho	-1.4212	1.4970	0.076
Madagascar	1.8751	0.7421	2.617
Mauritania	0.2108	1.3521	1.563
Mauritius	-6.0009	4.5434	-1.458
Morocco	-4.1162	4.4835	0.367
Niger	2.3773	0.9565	3.334
Nigeria	-0.0022	1.6283	1.626
Rwanda	-0.2770	1.6458	1.369
Senegal	0.0287	1.3160	1.345
South Africa	0.3061	1.6989	2.005
Tanzania	0.1454	0.578	0.481
Tunisia	-3.0273	4.3199	-0.0367
Uganda	-1.6673	0.7256	-0.942
Zambia	1.4001	1.1370	2.537
Zimbabwe	0.4951	1.1585	1.654
Africa	**-0.1459**	**1.4245**	**1.345**
Bangladesh	-1.8772	1.6272	-0.250
China	5.8174	3.3398	-2.194
India	-5.7249	2.1302	-3.595
Indonesia	-17.8060	10.5502	-7.256
Jordan	-7.2025	4.9311	-2.271
Malaysia	-5.6219	3.0959	-2.526
Pakistan	-2.5494	4.6857	-07391
Philippines	-0.6510	2.8449	2.194
Sri Lanka	-6.7010	6.5091	-0.192
Asia	**-5.6219**	**3.3398**	**-2.271**
Bolivia	-0.0716	2.3398	2.268
Brazil	-0.4796	1.6834	1.204
Chile	-3.2220	2.2644	-0.958
Columbia	-1.1724	2.4260	1.254
Costa Rica	-0.7304	2.7506	2.020
Dom. Rep.	-1.3903	2.5345	1.144
El Salvador	-0.3416	2.4631	2.121
Guatemala	-0.0912	1.7722	1.681
Honduras	-0.4895	1.7292	1.240
Jamaica	0.7472	4.9118	5.659
Mexico	-0.6521	1.9787	1.327
Nicaragua	3.5869	1.4276	5.015
Panama	-0.9405	1.7830	0.842
Peru	0.4645	3.2649	3.729
Trinidad	-0.2276	2.6121	2.384
Venezuela	-0.4796	2.1165	2.403
L. America	**-0.4796**	**2.3021**	**1.8505**

Source: Appendix Table D.1 and equation (10)

Notes:

1. $a = (1-e)h - qv$ reflect the elasticity of the growth effect on poverty net of the influence of inequality operating through the growth channel (Appendix Table D.1.).
2. α_0 = component of change in poverty due to distribution (Appendix Table D.1.)
3. g= average annual growth rate in 1975-96 (Appendix Table D.1).
4. $\hat{P} = -ag + a_0$ (from Appendix Table D.1)

Appendix Table D.4: Predicted Performance in the Post 1975:Behaviour of Poverty, Growth and Distribution

Country	$\dot{g}$	G	g_F	$\tilde{G}$	$\hat{P}$	$\dot{g}>0$	$\dot{g}<0$	$G>\tilde{G}$	$G<\tilde{G}$	$\hat{P}>0$	$\hat{P}<0$
Algeria	-0.0186	39.2813	3.0870	24.26	2.155		X	X		X	
Botswana	0.4380	54.2085	9.5349	36.90	-3.025	X		X			X
Cote d'Ivoire*	-0.0498	36.8926	1.6108	22.62	3.685		X	X		X	
Egypt	-0.1791	32.0057	6.0978	36.90	-1.351		X		X		X
Gabon	-0.6891	62.8718	4.2314	24.26	2.815		X	X		X	
Guinea	0.3354	46.8700	4.9185	40.93	0.124	X		X		X	
Guinea Bissau	-0.0461	56.1678	4.6553	40.93	0.529		X	X		X	
Kenya	0.2112	57.8910	4.6197	40.93	0.707	X		X		X	
Lesotho	1.2555	56.0109	7.2812	36.90	-0.638	X		X			X
Madagascar	0.0189	43.4587	1.1146	40.93	2.613	X		X		X	
Mauritania	0.4499	42.5346	2.6514	36.90	2.775	X		X		X	
Mauritius**	0.2400	36.5548	6.8509	96.25	-1.284	X			X		X
Morocco	0.2878	39.2002	5.0707	36.90	0.285	X		X		X	
Niger	0.2673	36.2425	0.8220	40.93	2.397	X			X	X	
Nigeria	0.5518	44.8928	2.3346	40.93	1.270	X		X		X	
Rwanda	0.5904	29.0658	2.9101	36.90	2.308	X			X	X	
Senegal	-0.0781	54.1173	3.7643	36.90	2.483		X	X		X	
South Africa	0.0954	61.0600	3.7731	24.26	2.648	X		X		X	
Tanzania	0.0680	38.1023	2.8305	40.93	0.481	X			X	X	
Tunisia	0.0255	40.0013	5.1804	36.90	-0.107	X		X			X
Uganda***	0.1965	40.7400	5.2394	40.93	0.993	X			X	X	
Zambia	0.4443	51.9982	1.3863	40.93	3.037	X		X		X	
Zimbabwe	0.4730	56.8337	3.9649	36.90	3.175	X		X			
Bangladesh	0.3301	38.9758	4.8540	40.93	-0.413	X			X		X
China	0.1331	37.2560	10.2844	40.93	-4.664	X			X		X
India	-0.0603	32.0436	5.5540	40.93	-1.240		X		X		X
Indonesia	0.1130	31.6877	7.4742	36.90	-3.083	X			X		X
Jordan	-0.0956	40.6564	5.4433	24.26	-0.180		X	X			X
Malaysia**	0.3634	48.3505	7.9309	111.44	-2.531	X			X		X
Pakistan	0.0569	31.1428	5.2660	40.93	-0.880	X			X		X
Philippines	0.0261	46.6650	4.0926	36.90	1.800	X		X		X	
Sri Lanka	-0.0845	30.0980	5.4566	36.90	-0.887		X		X		X
Bolivia	0.2426	42.0378	2.4412	36.90	2.335	X		X		X	
Brazil	-0.0660	60.6624	5.7386	24.26	1.420		X	X		X	
Chile**	0.8983	56.4927	7.6817	107.94	-0.661	X			X		X
Columbia	0.0091	50.2926	5.5090	36.90	0.312	X		X		X	
Costa Rica	-0.0670	46.1160	4.1034	36.90	1.480		X	X		X	
Dom. Rep.	0.1349	50.7888	5.2577	36.90	0.950	X		X		X	
El Salvador	-0.0396	47.4619	3.2543	36.90	2.202		X	X		X	
Guatemala	0.0481	59.8991	4.6342	36.90	2.248	X		X		X	
Honduras	0.0575	51.7519	4.3309	36.90	1.914	X		X		X	
Jamaica	-0.0343	37.9159	2.1540	36.90	2.773		X	X		X	
Mexico	0.1347	55.2783	4.8068	24.26	1.316	X		X		X	
Nicaragua	1.3335	50.0717	0.8606	36.90	6.065	X		X		X	
Panama	0.0919	56.8215	4.9116	24.26	1.045	X		X		X	
Peru	0.0045	45.1065	2.9385	24.26	2.400	X		X		X	
Trinidad	-0.0771	41.5652	4.5341	24.26	1.929		X	X		X	
Venezuela	-0.0917	53.8359	3.0181	24.26	2.575	X		X		X	

Notes:

g = average annual growth, 1975-1996

$\dot{g}$ = average annual change for the rate of growth for 1975-96

G= level of Inequality in 1975-76

$g_F = g + b_0 G$ is the average annual growth explained by non-distributional fundamentals (1975-96)

$\tilde{G} = \frac{1}{ab_0}(ag_F - a_0)$; where the parameters are obtained from Appendix Table D.1. The data in the column reflects the median value 24.26 for fourth quartile, 36.9 for second quartile and 40.93 for the lower quartile (Classification according to mean consumption)

*-since $G \cong \tilde{G}$ (median), in this case G is compared to the Country-Specific $\tilde{G}$, which is smaller at about 23.

**-Actual G's are compared to country- specific $\tilde{G}'s$ rather than the corresponding quartile median $\tilde{G}'s$. This is because for those countries individual $\tilde{G}'s$ are much larger than the median $\tilde{G}'s$: Mauritius (96); Malaysia(111); and Chile (108), perhaps due to this very high share of growth explained by non-distributional fundamentals ($\tilde{G}$ is positively associated with g_F)

**- for Uganda, actual G is compared to the median $\tilde{G}$ for the lower quartile rather than the middle quartile as the computed mean consumption would suggest. This is because the latter is not consistent with classification based on mean income.