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Abstract

This paper considers the relationship between growth in real per capita GDP and the growth in real per capita GDP of the poorest 20% of a country. It uses the data set compiled by Dollar and Kraay (2002), but come to very different conclusions. We argue that if the purpose is to answer questions about the impact of growth on the poor, models are best estimated in growth rates. The empirical results show that growth's impact on the poor occurs in two episodes. First, in periods of sustained economic slowdown (negative growth over a period of at least 5 years), the poor clearly suffer more than the average. In contrast, where economies are growing, the poor do not benefit as much as the average. We also find that the poor benefit from growth less in periods of high inflation, and in countries with low average income.

Keywords: Economic Growth, Growth and Inequality, Economic Contraction, Inflation and Growth.

JEL CLASSIFICATION: O11, O40, C33.

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1. Introduction

The question of whether economic growth is good for the poor is a hotly contested one, bringing out passions and prejudices on both sides of the debate. In a recent contribution, Dollar and Kraay (2002) have constructed a large data set from various sources which includes, among other variables, the real per capita GDP of the poorest 20% for a given country and the real per capita GDP for the whole country.[1] They present empirical evidence which supports the view that there is a one-for-one relationship between overall economic growth, and growth in incomes of the poor.

In this paper we use the Dollar-Kraay data set to investigate the possibility that the relationship between overall economic growth and growth in incomes of the poor is not stable across the whole cycle of economic activity. In particular, we consider the possibility of different outcomes for the poor when an economy is growing compared to when it is experiencing contraction. Some acknowledgement has been made in the literature of the possibility that outcomes for the poor may differ in these two cases. For example, Ravallion (2001) concludes, based on some recent household survey data, that "on average, growth is poverty reducing, and contraction is poverty increasing" (Ravallion, 2001, p.1806).[2] The Dollar-Kraay data set provides an excellent opportunity to explore this question with a much more diverse set of data across longer time spans.

The empirical analysis confirms the existence of two distinct scenarios: cases where growth in real GDP per capita is positive, and cases where it is negative. In the former case, where countries are expanding, the estimated model suggests that on average, the poor do not experience all the benefits of growth – an increase in average incomes of 1% corresponds to an increase in incomes of the poor of around 0.7%. In the latter case, where countries are contracting over a five-year period (or longer), a coefficient of around 1.4 suggests that where the per capita income falls, it is the poor who suffer more than proportionately – a 1% fall in per capita income leads, on average, to a 1.4% fall in income of the poor.

A further outcome of the analysis we undertake in this paper is a critique of the methodology used in the Dollar-Kraay study. The main tool of the Dollar-Kraay analysis is a series of regressions where the dependent variable is the real per capita GDP of the poorest 20% for various countries and various time periods, and the main explanatory variable of interest is the corresponding real per capita GDP for the whole country. Different models are estimated with various other explanatory variables and dummy variables, and various estimation techniques – OLS and instrumental variables. Almost regardless of the model chosen, their

results show a close to one-for-one correspondence between income of the poor and overall income. On this basis, they conclude: "within countries, incomes of the poor on average rise equi-proportionately with average incomes… This basic finding ... holds across regions, time periods, growth rates and income levels" (Dollar and Kraay 2002, p. 196).

In section 2 of this paper we will argue that the Dollar-Kraay analysis is based on a mis-specified model, and that when an appropriate specification is used, the conclusions are quite different. The key issue is that the Dollar-Kraay estimates do not adequately allow for differing effects during contraction and expansion phases. We demonstrate that in order to explore the possibility of a different relationship in times of contraction or expansion, it is necessary to consider the relationship between growth rates in income of the poor and growth rates in overall income. This differenced model also removes the country-specific fixed effects, so that the dominant variation being modelled is within country variation. More fundamentally, we argue that the model in growth rates more closely answers the question about whether growth really does benefit the poor.

The debate over the connection between growth and inequality has been approached from many angles, and various conclusions drawn. Pioneering work by Kuznets (1955) and others suggested a complex story whereby early stages of development are accompanied by increasing inequality, but eventually this increasing disparity disappears as the benefits of development are distributed. The causality in this possible relationship between inequality and growth is ambiguous. Some authors focus on the potential effects of inequality on growth, and find results in both directions – some evidence suggests that more unequal societies tend to grow more slowly (e.g. Perotti 1996), whilst others find the opposite (e.g. Forbes 2000). Other authors explore the possibility that growth in average income might affect the well being of the poor. Again, effects go in both directions, but authors of the most recent empirical results tend towards the conclusion that the poorest share proportionately in growth in income (e.g. Deininger and Squire 1996, Dollar and Kraay 2002).

There are sound economic reasons to expect the poor to suffer more than the average in times of recession. First, consider the likely labour market implications of an economic downturn. Lower productivity will mean a lower demand for labour, and employers faced with the need to reduce their work force are likely to show a preference towards reducing numbers among their unskilled work force rather than skilled employees. This is because the employer has invested more in training of the skilled worker, and would anticipate higher costs of recruitment when their demand rises again. Consequently, when recession comes, the lower paid unskilled workers are more likely to end up unemployed, and in most cases, this has

serious consequences for their economic wellbeing. Secondly, economic downturn often has implications for the availability of credit (Agenor, 2002). Banks and other lenders will be aware of increased risk of default in times of economic contraction; this could result in a higher risk premium being built into the interest rate, and / or a degree of credit rationing. Those most vulnerable to such rationing are likely to be small and medium-size firms, which tend to be more reliant on credit than larger firms. These small and medium sized firms also often use more labour intensive means of production, particularly low skilled labour. The employment implications of the credit rationing are again likely to affect the low income, unskilled worker more than the average person. Of course, assessing the relevance or strength of these effects is an empirical question, one which we hope to address in a broad sense through the results in this paper.

While empirical evidence is very important to understanding economic realities, it is well recognised that there are many dangers in drawing sweeping conclusions from reasonably simple cross-country studies. Temple (1999) highlights problems associated with the assumption of parameter homogeneity when samples include such widely varying countries and time periods, the effect of outliers resulting from one-off catastrophic events in a specific country, sensitivity of models to the choice of regressors, potential endogeneity of regressors, measurement error, and omitted regional effects. This paper is vulnerable to most of these criticisms. We thus make rather modest claims based on the empirical results. We do not claim to have solved the mysteries surrounding the connection between growth and the wellbeing of the poor. Instead, we have highlighted some striking empirical realities, which challenge some dominant views, and hopefully prompt further more detailed research at a country-by-country level.

2. Data and Preliminary Analysis

The data for this study was compiled by Dollar and Kraay (2002), and details of sources can be found in the Appendix to their paper. In this section we will briefly outline some issues with the definition and construction of the data.

First, there is a range of views on just how one should define "the poor" – some focus on relative poverty, and others on absolute poverty. Some are income based, and others are consumption-based. Some look at headcounts, others seek to capture the depth of poverty by more sophisticated measures. Since the focus of this study is on the relationship between overall economic growth and the well-being of the poorest section of society, it is natural to examine relative measures: we are interested primarily in whether the poorer portion of

society experience the same benefits of growth as those in the middle and upper sections of the income distribution. The choice of the average income among the poorest 20% is somewhat arbitrary, but also driven by data availability and the need to settle on one simple measure that indicates the distributional effects of growth. While this measure may well miss important income redistributions (for example, if a regressive government policy initiative improves the well-being of all, at the expense of the poorest 10%, it may not affect the relative position of the average person in the poorest 20% category), in such an extensive cross-country study covering a long time span, these problems are unlikely to produce any systematic difficulties.

The choice of income (or more precisely, real GDP per capita) as the metric of economic well-being rather than some consumption measure is partly driven by pragmatism, in that income data is much more readily available, allowing a much wider range of countries and time periods to be included in the sample. Real GDP per capita data were sourced primarily from the Penn World Tables, with more recent updates coming from the World Bank database.

Measuring the income of the poorest 20% is not straightforward. In most cases Dollar and Kraay were able to rely on data that use household surveys which provide quite detailed estimates of the distribution of income. However, some estimates were obtained from an income distribution based on an estimated Gini coefficient and assuming income follows a lognormal distribution. The final data set represents a combination of data from several different sources, but the majority come from UN-WIDER (2000) and Deininger and Squire (1996).

The culmination of this data collection is a set of 418 observations on real per capita GDP and real per capita GDP of the poorest 20% for 133 countries. The data set contains at least two observations per country, with at most eight. The earliest time period is 1956, and the most recent observation occurs in 1999. Each time observation is separated by at least 5 years, with a median length of time between observations of 6 years.

Figure 1 shows a scatter plot of observations on the log of real per capita GDP country-wide and log real per capita GDP of the poorest 20%. This figure reproduces Dollar and Kraay's Figure 1. From Figure 1, it is not difficult to see how a significant positive one-for-one relationship between average GDP per capita and GDP of the poor could be found. Casual empiricism would clearly indicate this relationship.

Figure 2 shows a scatter plot of observations on the average annual growth rate of real per capita GDP country-wide and average annual growth rate in real per capita GDP of the poorest 20%. Average growth rates are calculated for whatever length of time there is between consecutive observations. This figure reproduces Dollar and Kraay's Figure 2.

One impression derived from Figure 2 is that there does still seem to be a positive relationship between the two variables, although the relationship is not as clear cut – there is a lot more noise in growth rates than there is in levels of output. The other striking feature evident from Figure 2 is that there are a substantial number of observations where growth rates were negative. For 51 of the 285 observations, real per capita GDP showed negative growth over the five-year (or longer) period. These observations are particularly interesting, as they raise the question of how the poor fare in a contracting or slowing economy. It is one thing to ask how they will benefit as overall growth takes place, but it is equally interesting to examine the impact of an overall economic contraction on the poorest 20%. Again, first impressions from Figure 2 are that the poor certainly share in the pain of contraction: in 88% of the periods of negative overall growth, the poorest 20% also experienced a decline in real per capita GDP.

Table 1 presents some interesting statistics in this regard. It indicates a pattern about when the poor do particularly badly relative to the overall average. In a nutshell, when there has been serious economic contraction, indicated by average growth rates of worse than –6% per annum, the poor have suffered extremely badly – they almost always do worse than the average, with a decline in income that is, on average, 6.61% worse than that of the overall economy. At the other extreme, when economies have been growing strongly – average growth of above 6%, the poor have averaged a growth rate 2.34% below the overall average, growing more slowly in 70% of cases. In the intervening area, patterns are not as easy to identify, except possibly for the observation that when growth is in the slow and steady region of between 0% and 3% per annum, the poor do slightly better than the average. These phenomena certainly bear closer examination, and the results in section 4 will shed further light on the question.

3. Estimation Issues

The basic model on which Dollar and Kraay's (2002) analysis is built can be represented as follows:

$$y_{it}^{P} = \beta_0 + \beta_1 y_{it} + \beta_2' z_{it} + \theta_i + e_{it} \qquad (1)$$

where y_{it}^{P} is the log per capita income of country *i* at time period *t* in the poorest quintile, y_{it} is the corresponding log per capita income of the whole country, z_{it} is a *k* x 1 vector of other possible explanatory variables, and θ_i is an unobserved country-specific effect. The parameter of primary interest is β_1, the coefficient of y_{it}. If β_1 takes the value 1, then a 1% higher value of per capita income corresponds to a 1% higher value of income of the poorest 20%. A value below 1 suggests that the poor do not benefit one-for-one from overall growth.

The difficulty with estimating Equation (1) by standard ordinary least squares (OLS) is with the presence of the unobserved θ_i in the error term. θ_i captures non-time varying characteristics of individual countries which might impact the relationship between y_{it} and y_{it}^{P}. The critical issue is that θ_i is likely to be correlated with the regressor y_{it}, and possibly with other regressors in z_{it}, meaning that OLS estimation would be biased and inconsistent.

There are a number of possible solutions to this problem. A straightforward option is to estimate (1) in first differences: once Equation (1) is differenced, θ_i disappears from the model, and the β's can be estimated consistently by regressing Δy_{it}^{P} on Δy_{it} and other regressors. An alternative approach involves use of a Generalised method of moments (GMM) or instrumental variables (IV) estimator, where Equation (1) is estimated with Δy_{it-1} as the instrument for y_{it}. Provided y_{it} does not follow a random walk process, there will be correlation between y_{it} and its instrument, and it is not unreasonable to assume that Δy_{it-1} is uncorrelated with the individual effect θ_i.

Dollar and Kraay adopt a variation on this instrumental variables approach, using a systems GMM estimator, where (1) is estimated in both levels and differences, with Δy_{it-1} serving as instrument for y_{it}, and y_{it-1} being the instrument for Δy_{it}. The systems estimator is designed to exploit more orthogonality conditions than the standard IV estimator, and therefore to provide greater precision.

I would argue that the systems estimator used by Dollar and Kraay does not deliver the benefits they seek in this case, and that the differenced estimator is a more suitable choice. First, the systems estimator introduced by Arellano and Bover (1995) and Blundell and Bond (1998) was specifically designed for the dynamic panel context, where the model contains a lag of the dependent variable as a regressor. It is not invalid in the static panel context, but

there is no evidence to suggest it yields improved precision. In fact, the simulation analyses performed in the above papers demonstrate that when there are no dynamics in the data generating process, the performance of the difference estimator and the systems estimator is virtually identical. Secondly, and more fundamentally, the performance of any GMM or IV estimator is crucially dependent on the quality of the instruments. There is a wide literature on the issue of weak instruments, and the general message is that when one faces problems with weak instruments, estimates can be a long way from the true parameter values. Dollar and Kraay's choice of instruments is certainly in this category. Dollar and Kraay's Table 3 present the estimates from the first stage regressions of each regressor and its instrument. They do not include r^2 values, but when computed, we find that for the regression of y_{it} on its instrument Δy_{it-1}, the r^2 is 2.3%. This is an extremely low r^2, indicating a very weak instrument. Estimates based on this kind of instrument could be wildly inaccurate.

The third reason for preferring the differenced estimator is the difficulty in allowing for differing relationships between growth in income of the poor and overall growth in times of growth and contraction. Dollar and Kraay consider this possibility by adding to their levels model a dummy variable that allows for different effects when growth is negative. However, it is easy to demonstrate that this does not capture the effect that we are considering.

Effectively, Dollar and Kraay's approach involves adding a further regressor to Equation (1):

$$y_{it}^{P} = \beta_0 + \beta_1 y_{it} + \beta_2^{'} z_{it} + \beta_3 y_{it}^{-} \theta_i + e_{it} \ , \qquad (2)$$

where

$$y_{it}^{-} = \begin{cases} y_{it} & \text{if } \Delta y_{it} < 0 \\ 0 & \text{otherwise.} \end{cases}$$

The idea is to capture the marginal effect of overall growth on the income of the poor through β_1 when growth is positive, and through $\beta_1 + \beta_3$ when growth is negative. However, we can show by differencing Equation (2) that the interpretation is not that clear:

$$\Delta y_{it}^{P} = \beta_1 \Delta y_{it} + \beta_2^{'} \Delta z_{it} + \beta_3 \Delta (y_{it}^{-}) \theta_i + \Delta e_{it} \ .$$

Since $\Delta(y_{it}^{-}) = y_{it}^{-} - y_{it-1}^{-}$, then we can show easily that $\Delta(y_{it}^{-})$ will equal Δy_{it} only if both Δy_{it} and Δy_{it-1} are negative, and will equal zero if both Δy_{it} and Δy_{it-1} are positive. If $\Delta y_{it} > 0$ and $\Delta y_{it-1} < 0$, then $\Delta(y_{it}^{-}) = -y_{it-1}$, and if the signs of Δy_{it} and Δy_{it-1} are reversed, $\Delta(y_{it}^{-}) = y_{it}$. This rather confusing scenario makes it difficult to determine just what we learn from the parameter β_3. At its most informative, it tells us about the differential effect of overall on growth in incomes of the poor when there are two consecutive periods of negative growth, compared to two consecutive periods of positive growth. Bear in mind that each time period spans at least 5 years, and in the sample we have, there are only 6 occurrences of two consecutive periods of negative growth. Any estimate based on so few episodes will be very unreliable. Furthermore, when one takes into account the "mixed" outcomes, where growth switches from positive to negative or vice versa, it is clear that β_3 tells us little about the question we are concerned with. In the light of this discussion, it is not surprising that Dollar and Kraay found that there was no significant effect, and concluded that there is no asymmetry in growth outcomes for the poor between expansion and contraction.

In contrast, the addition of an appropriate dummy variable into the differenced equation provides for the differential effect in quite a straightforward way. Difference Equation (1) again, and augment the equation with Δy_{it}^{-}, where $\Delta y_{it}^{-} = \Delta y_{it}$ when $\Delta y_{it} < 0$, and is zero otherwise. This produces

$$\Delta y_{it}^{P} = \beta_0 + \beta_1 \Delta y_{it} + \delta \Delta y_{it}^{-} + \beta_2^{'} \Delta z_{it} + e_{it}. \qquad (3)$$

Under this model, the effects of overall growth, when that growth is positive, on growth in incomes of the poor is captured by the coefficient β_1, while when growth is negative, the impact on the incomes of the poor is captured by $\beta_1 + \delta$. This model provides a natural and straightforward way of identifying these possible differential effects. Equation (3) provides the basis for the analysis we report in section 4.

Observe that the proposed model includes other possible explanatory variables z_{it}. We consider a range of measures of policy actions and economic or social conditions which might have some impact on the income share of the poor. The variables considered in the analysis are based on those used by Dollar and Kraay. The first set of variables seek to capture what conventional economic wisdom regards as sound policy: low inflation, small government, a sizeable commercial banking sector, and openness to trade. Inclusion of these variables

allows us to test the view that many policy initiatives in these directions, while they may be helpful to growth, work against the interests of the poor, and hence increase inequality. Another set of variables are indicators of policy measures that might be regarded as more specifically pro-poor: investment in education, development of a stable society, and maintaining the agricultural sector. Their inclusion will allow us to find whether there is evidence supporting the view that these are important contributors to outcomes for the poor.

Most data is found in the World Bank's various databases, with some coming from a range of other sources. Details can be found in the Appendix to Dollar and Kraay (2002). The variables, each of which fall into one of seven categories, are:

- Regional dummy variables (there are seven regions: East Asia and Pacific, Europe and Central Asia, Middle East and Northern Africa, Latin America and Caribbean, Sub-Saharan Africa, South Asia, and North America),
- Indicators of sound policy: inflation rate, government consumption, commercial bank assets as a proportion of total bank assets,
- Measures of openness: trade volume (exports plus imports) as a proportion of GDP, Sachs-Warner index of openness, import tax revenue as a share of imports, a dummy variable equalling one if the country is a member of the WTO, and a dummy variable equalling one if the International Monetary Fund judges that the country has restrictions on international capital flows,
- Indices of social stability: an index of rule of law, an index indicating strength of formal democratic institutions,
- Measures of educational outcomes: years of secondary schooling per worker, years of primary education per capita,
- Indicators of agricultural output: amount of arable land per worker, labour productivity in agriculture relative to economy-wide labour productivity,
- Measures of income level: Real GDP per capita in 1990, five-year lag of Real GDP per capita.

4. Results

The estimation results are given in Table 2. In Columns (1) and (2) we consider the simpler model where no extra explanatory variables are included in the model besides the growth in income. The estimates in Column (1) appear to support the general claims made by Dollar and Kraay (2002) and others that the poor benefit at least proportionately from economic growth. However, the story changes when we allow for the possibility of a structural break. Column (2) presents estimates when we allow the response of income of the poor to changes

in per capita GDP to be different depending on whether growth is positive or negative. Results indicate that the estimated impact of positive growth on the poor is somewhat below 1. They suggest that an increase in growth rate of GDP by 1% will see an increase in growth rate of average income of the poor of around 0.78%. In contrast, when growth is negative, its impact on the poor is substantially higher, suggesting that a drop of 1% in real per capita GDP leads to a fall in real per capita GDP of the poorest 20% of around 1.7%, on average. That is, in times of economic crisis – periods where an economy contracts over 5 or more years – the poor suffer around a 70% greater loss than the overall average.

The remaining columns of Table 2 present a selection of results where we include the various other explanatory variables in the model. We will not show results for all the various combinations of variables: there are 22 possible variables, and therefore a vast number of possible combinations. Column (3) of Table 2 shows an all-encompassing model including the regional dummies (excluding North America as the base), the three indicators of sound policy, the two indices of social stability, and the two indicators of agricultural output. For the other three categories, we include the variable from each category which has the *t* statistic farthest from zero, these being primary education, the WTO membership dummy variable, and lag of real GDP per capita. It is apparent from Column (3) that not many variables are significant. Apart from the GDP growth variable, only the inflation measure has a significant *t* statistic. Of course, as some variables are eliminated, certain other variables which are currently not significant may become significant. Consequently, a range of different paths were followed to eliminate selected variables and then re-estimate. The results of these steps appear in column (4) of the table. This model includes only statistically significant variables. In fact, no other variables were significant in any of the many alternative specifications tried. The preferred model thus includes only the inflation rate and the lag of real GDP per capita as additional variables[3]. We state the estimated equation as follows:

$$\Delta\hat{y}_{it}^{p} = \underset{(6.5)}{0.71}\,\Delta y_{it} + \underset{(3.3)}{0.69}\,\Delta y_{it}^{-} - \underset{(-4.1)}{0.035}\,inflation + \underset{(3.2)}{0.0015}\,\log\left(y_{it-1}\right) \qquad (4)$$

It is of some relevance that so many of the other variables considered were not significant. This implies there is no evidence that these variables have an influence on the share of growth which is claimed by the poorest 20% of societies. For example, none of the measures of openness were significant. We find no connection between the degree of openness of an economy and the extent to which the poor reap the benefits of growth. This finding is relevant to much of the public debate about so-called pro-growth policies. It is often claimed that such policies have detrimental impact on the poor. This study has been unable to find

such impact on the economic situation of the poor. Of course, such a connection may exist, but this analysis is unable to find any significant evidence for it.

Turning to the coefficients in equation (4), we see first that when growth is positive, the model predicts that an improvement in growth of 1% will see an improvement in growth for the poor of only 0.71%. In other words, the poor benefit less than the average in times of growth. Now consider times of negative growth[4]. In this case, a coefficient of 1.41 suggests that a decline in growth of 1% will lead to a greater decline in growth of incomes of the poor of around 1.41%. In other words, the poor suffer more than the average in times of contraction. The negative coefficient on the inflation variable suggests that higher inflation has detrimental implications for the poor: a period of 10% inflation, for example, corresponds to a 0.35% per annum lower growth rate in incomes of the poor relative to overall income.[5] This result is not surprising: there are several reasons to believe that inflation tends to increase inequality. First, the poor tend to spend a higher proportion of their income on consumption spending, particularly food, and hence can suffer more immediately the effects of inflation. Secondly, inflation tends to favour those who own property and other appreciating assets, and the poorest 20% rarely find themselves in this category. Instead, the poor are often wage earners or in informal self-employment, where increases in income often lag inflation. Thirdly, high inflation often has a detrimental effect on export revenue in the local currency, which could hurt the poor in a number of ways. For example, consider a low income worker producing a raw commodity (e.g. Coffee) for export in an international market. The price they receive for their commodity is determined in this international market, in US dollars. If their local economy experiences high inflation, this will lead to a depreciation of their currency, and reduced earnings from their commodity, in their local currency. The net effect is that they face higher prices and lower income.

The final variable in the model is lagged GDP. It has a positive coefficient in the estimated equation, suggesting that the higher a country's level of GDP per capita, the more the poor benefit from growth. Specifically, if a country has a GDP per capita which is double that of another, this corresponds to a difference in logs of around 0.69, and hence means the poor in the wealthier country will experience growth which is 0.1% higher per annum than those in the poorer country. While this effect is small in magnitude, it is not surprising. A wealthier country will most likely have a more developed social welfare system, and a progressive tax structure, whereby their low income earners can benefit from growth. In less developed countries, whether the poor benefit may depend much more on which sectors are driving the growth, and on other political factors.

Figure 3 presents various scenarios for the model's predictions of the relationship between overall growth and growth in incomes of the poor, given particular values for inflation and GDP. In each case, when the fitted model line is above the "inequality neutral" 45 degree line, the poor are expected to fare better than the average. Conversely, values below the line indicate a worse performance for the poor compared to the average. The worst outcome for the poor is shown in Figure 3b, where the model predicts that, regardless of the overall growth rate, the poor never do as well as the average. This is a situation of a low income country ($400) with quite high inflation (40%). In this case, sometimes the poor can fare very badly relative to the average: for example, with average growth of 2%, the model predicts growth for the poor of just over 1%; when average growth is 5%, the model predicts a 3.3% outcome for the poor. Likewise during contraction, a 2% decline sees a 3% decline for the poor, and the gap widens for more drastic periods of recession.

Being a higher income country slightly alleviates the impact on the poor (compare Figure 3d with Figure 3b), however a lower inflation rate is the more influential factor. For example, Figure 3a shows that for an equally poor country whose inflation rate is only 10%, there is a range of values for which the poor grow slightly faster than the average: -1.4% to 2.0% growth. However, the pattern remains of inferior outcomes for the poor whenever contractions are sizeable, or whenever growth is significant.

There is some discussion in the introduction to this paper as to why one might expect the poor to suffer more in times of sizeable economic downturn. Essentially, the poor are the most vulnerable to the associated tightening that comes with recession – lower demand for labour will often squeeze out the low paid unskilled worker, credit becomes more costly or scarce as the risk of default increases, and falls in Government tax revenue can lead to a decline in government spending oriented towards supporting the poor. It is striking to note that in addition, the estimated model predicts that the poor will not benefit as much as the average in times of rapid economic growth. Table 1 supports this finding, showing that among those countries which experienced growth in excess of 6% per annum, the average overall growth rate was 7.47%, while the poor in these countries experienced average growth of only 5.13%. What this result suggests is that different sources of growth can have varying implications for the poor. In general, sustained real per capita growth of 5% or even higher cannot come from steadily growing, broad based expansion in economic activity. Growth of this magnitude would usually require some large external stimulus (such as a resource boom), or possibly a significant shift in the domestic economic and political environment that allows previously restricted potential economic activity to be released (for example, dramatic opening up of a previously closed economy and political system). It is quite plausible that growth driven from

such sources will by its nature not benefit a broad cross-section of the economy, at least in the short term.

As an example of the former, consider the experience of Botswana. Botswana has experienced excellent growth over the last 30 years (the average GDP growth rate between 1961 and 1997 was 7.5%), mostly driven by the emergence of diamond mining industry. In 2002, more than 45% of the country's GDP was associated with diamonds. At the same time, many of Botswana's inequality and poverty measures have at best remained steady at unsatisfactory levels and in some cases are worsening. The Gini coefficient is currently at a very high 0.60. It seems that the growth induced by diamond mining has not created a sufficiently broad base of employment and other growth to benefit many of the country's poor (Clover 2003).

China's economic experience presents another striking example. Dollar and Kraay's estimates of China's Gini coefficient show an increase from 27.9 in 1980 to 41.5 in 1995. This represents a massive increase in inequality, during a period where growth was extremely healthy. Evidence suggests this trend has continued since 1995. Decomposition of the sources of inequality highlights the fact that most of the growth has come through the boom in the manufacturing sector, centred largely in urban areas, particularly in the coastal provinces, as China embarked on its economic reform agenda (Chang 2002). Little growth has been experienced among the vast rural population, who mostly continue as peasant farmers, with large supplies of surplus labour. This is the critical factor in seeing such large increases in inequality.

These observations raise some important implications for how periods of economic contraction and rapid expansion are managed, in terms of their impact on society's most economically vulnerable. Clearly further analysis is needed before one could claim to have categorically identified the structural causes of any possible increased inequality. Hopefully, the empirical regularities we have highlighted here might give some impetus to further research in this direction, at both the theoretical and empirical level.

The final observation concerning the model estimated in this paper is a comment on model accuracy: the preferred model has a standard error of 0.037, suggesting that "average" errors are quite high. Growth in income for the poorest 20% typically ranges from –10% to +10%, so to be able to predict this dependent variable to within only 3.7% on average is not a great outcome. There are clearly many other factors influencing outcomes for the poor other than those considered in this study. There is still much to learn about the mechanisms of how

income distributions vary between countries and across time; meanwhile, predictions for what might happen in response to specific policy initiatives need to be made with great caution.

5. Conclusions

In a recent insightful analysis, Kanbur (2001) seeks to bring some understanding of the differences in viewpoint held by various stakeholders in the development world. Kanbur categorises the stakeholders into two groups: Group A comprises mostly economic analysts and policy managers, those who work in finance ministries in the developed world, and policy makers in the multilateral banks and international financial institutions. Group B comprises mostly non-government aid and lobbying organisations, some UN specialised agencies, and academics in non-economic disciplines. Whilst he acknowledges that any such categorisation is an over-simplification, Kanbur highlights significant points of disagreement between the two schools of thought. In the arena of economic growth, Group A members will often accuse Group B of being "anti-growth", while Group B characterises Group A as believing that "growth is everything". Policies seen as "growth oriented" by Group A are described as "economic policies which hurt the poor" by Group B.

Kanbur urges both sides of this debate to take the time to listen to and understand the other's point of view. He considers the debate as the "Growth Red Herring" (Kanbur 2001, section 7). There is little doubt that both sides of the debate favour economic growth *per se* (subject to its possible environmental or social / cultural externalities). Instead, "The real debate to be engaged is on the policy package and the consequences of different elements of it for distribution and poverty" (Kanbur 2001, p.13). It is the policies for how growth is achieved around which the real disagreements centre.

What we believe this paper has contributed to this debate is a reminder that simply pursuing growth, as defined by increases in average income, will not necessarily reap benefits for the poor. Dollar and Kraay (2002, p. 219) draw strong policy implications from their econometric analysis: "… growth on average does benefit the poor as much as anyone else in society, and so standard growth-enhancing policies should be at the centre of any effective poverty reduction strategy". We have demonstrated that such conclusions are not warranted by the data. The link between within country growth and inequality can best be understood by models of growth, rather than models of income levels. Our results suggest a few important findings: first, that the poor suffer more than proportionately in times of economic crisis. This point alone needs further investigation and policy attention. Secondly, the only direct link we can find between policy and inequality is with the role of inflation: there is

strong evidence that high inflation is bad for the poor. Thirdly, there is some evidence that the poor in low income countries – undoubtedly the most vulnerable of the world's poor - are likely to benefit less from growth than those in high income countries.

Finally, despite an extensive analysis of the possible factors influencing outcomes for the poor, we have ended up with a model which still leaves much unexplained. Any suggestion that the pursuit of growth via "growth-enhancing policies" will inevitably lead to beneficial outcomes for the poor is certainly not supported by the data: there are many possible factors which will lead to a range of possible outcomes. It would seem essential to accompany such growth oriented policies with other measures that seek to ensure that the poor benefit from this growth, and that protect the poor in times of economic crisis.

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Table 1
Comparison of Growth in Incomes of the Poor with Growth in Overall Income

Range of Growth in Overall Income	Number in Range	Mean Growth in Overall Income	Mean Growth in Incomes of the Poor	Proportion where Poor do Worse
Below -6%	9	-8.57%	-15.18%	0.89
-6% to –3%	15	-4.04%	-4.09%	0.33
-3% to 0%	27	-1.13%	-2.56%	0.63
0% to 3%	138	1.61%	1.98%	0.47
3% to 6%	76	4.49%	4.28%	0.50
Above 6%	20	7.47%	5.13%	0.70

Table 2
Estimation Results

Variable	(1)	(2)	(3)	(4)
Constant	-0.0066 (-2.46)	0.0065 (1.67)	0.0194 (0.32)	
GDP Growth	1.1839 (16.61)	0.7785 (6.87)	0.6810 (3.98)	0.7143 (6.51)
Incremental Effect when GDP Growth is Negative		0.9388 (4.50)	0.6886 (1.63)	0.6907 (3.28)
East Asia & Pacific			-0.0093 (-0.82)	
Europe & Central Asia			-0.0193 (-1.16)	
Latin America & Caribbean			0.0002 (0.02)	
Middle East & North Africa			-0.0095 (-0.78)	
South Asia			-0.0028 (-0.17)	
Sub-Saharan Africa			-0.0253 (-1.46)	
Government Consumption			-0.0671 (-0.80)	
Inflation Rate			-0.0330 (-2.62)	-0.0350 (-4.12)
Commercial Bank Assets			-0.0317 (-1.50)	
Rule of Law			0.0061 (0.81)	
Voice			-0.0041 (-0.67)	
Agricultural Production			-0.0150 (-1.37)	
Arable Land			-0.0019 (-0.62)	
Primary Education			-0.0031 (-0.66)	
WTO Membership			0.0074 (0.90)	
Lag GDP			0.0052 (0.72)	0.0015 (3.16)
r^2	0.494	0.528		0.586

Figures in parentheses are *t* statistics.

Figure 1
Levels Relationship

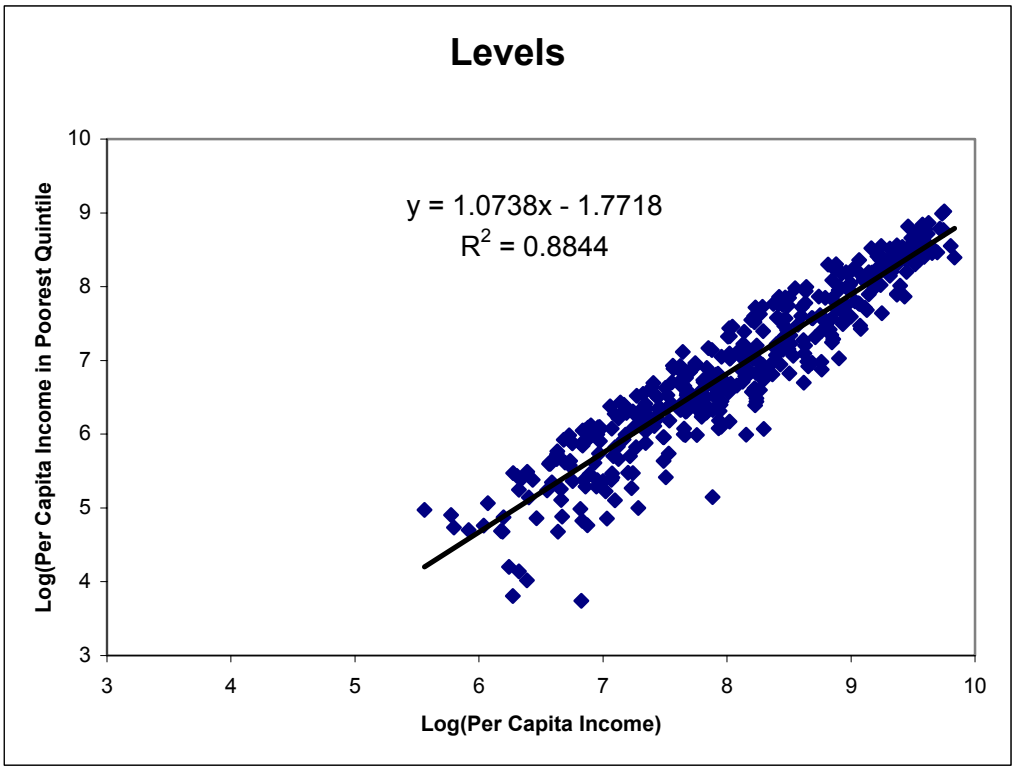


Figure 2
Relationship between Growth Rates

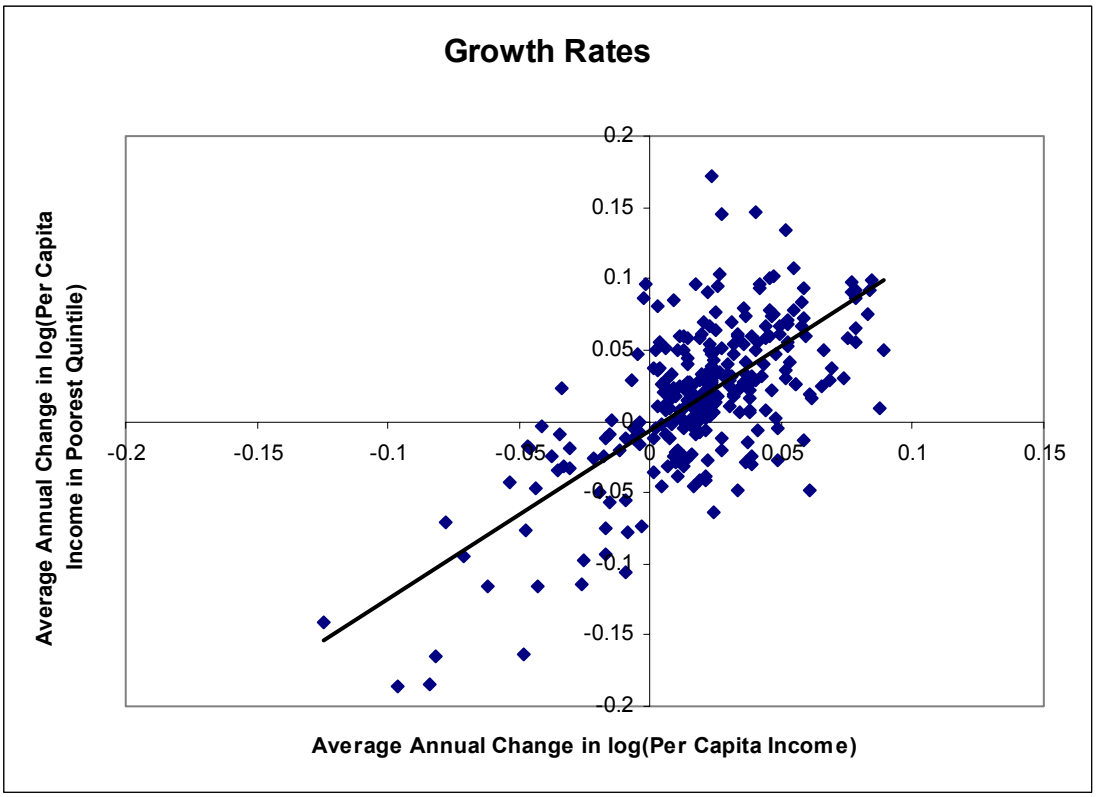
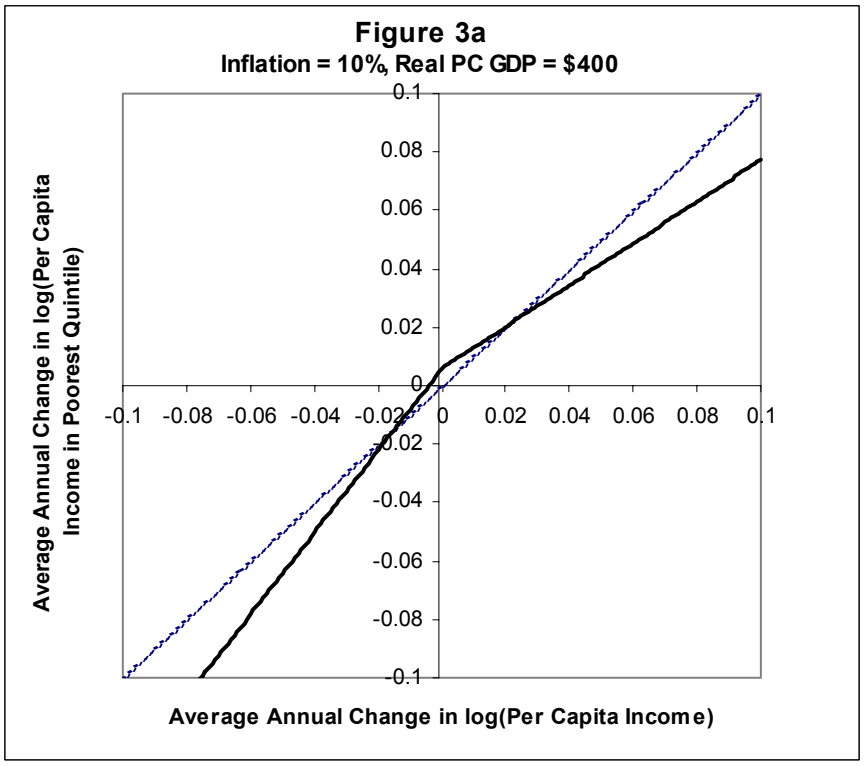
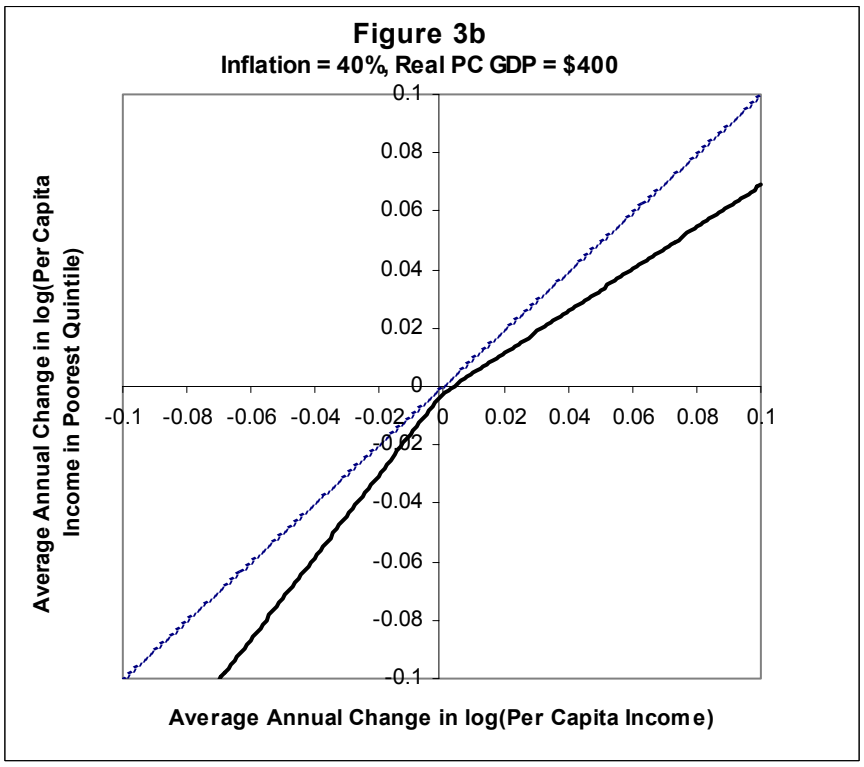


Figure 3
Model Predictions for How the Poor Benefit from Growth:
Fitted Model *vs* Inequality Neutral 45^{o} line





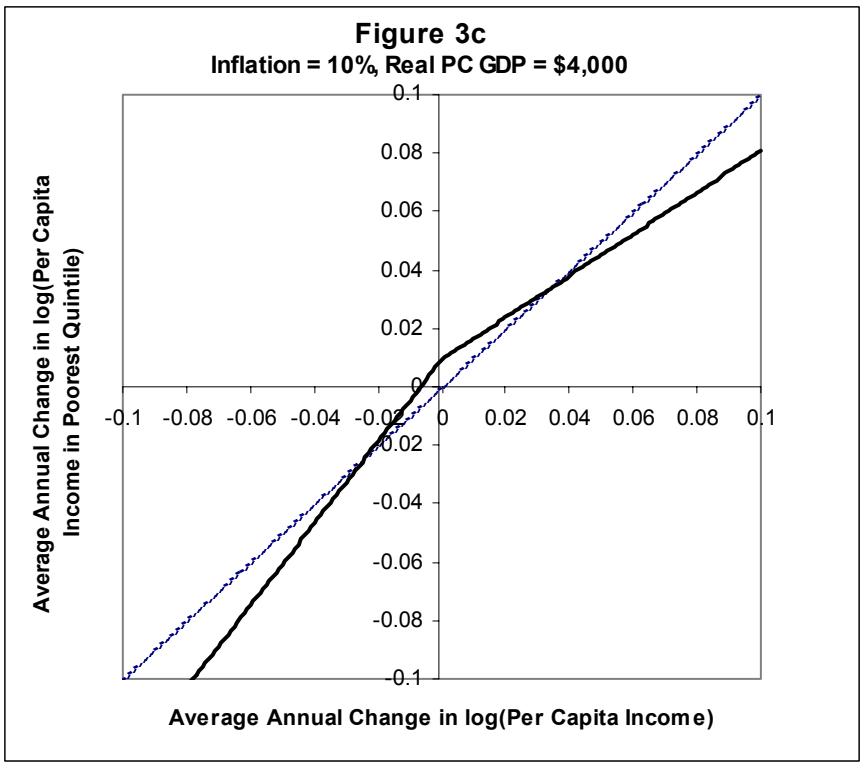


Figure 3c
Inflation = 10%, Real PC GDP = $4,000
Average Annual Change in log(Per Capita Income in Poorest Quintile)
0.1
0.08
0.06
0.04
0.02
0
-0.1 -0.08 -0.06 -0.04 -0.02 0 0.02 0.04 0.06 0.08 0.1
-0.02
-0.04
-0.06
-0.08
-0.1
Average Annual Change in log(Per Capita Income)

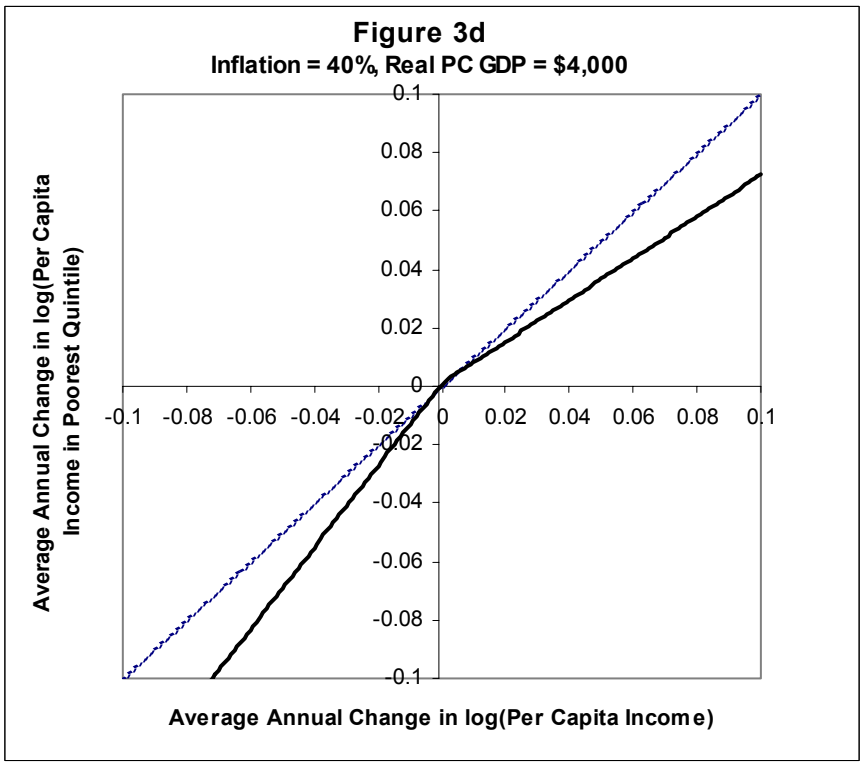


Figure 3d
Inflation = 40%, Real PC GDP = $4,000
Average Annual Change in log(Per Capita Income in Poorest Quintile)
0.1
0.08
0.06
0.04
0.02
0
-0.1 -0.08 -0.06 -0.04 -0.02 0 0.02 0.04 0.06 0.08 0.1
-0.02
-0.04
-0.06
-0.08
-0.1
Average Annual Change in log(Per Capita Income)

Footnotes

[1] The data set covers 133 countries, and includes over 400 observations. For some countries, data is available for only one year, whilst other countries have up to 8 observations. No two observations are less than 5 years apart.

[2] In a related example, Easterly (2001) finds some evidence that in cases where an economy is contracting, the effect of structural adjustment loans on the poor is different to those cases where the economy is expanding.

[3] Note that the preferred model does not include a constant term. The constant term was not significant, and there are reasons to believe that it ought not be included in a growth rate model. When the constant term is added to the model presented in equation (4), the coefficient is –0.004, with a very small *t* statistic of 0.18, and other coefficients are almost identical to those shown in equation (4).

[4] Recall that Δy_{it} is growth in GDP over a period of at least 5 years, so a negative value reflects a period of sustained poor economic performance.

[5] The data set includes some rather extreme values of the inflation measure. For example, certain Latin American countries had sustained periods of hyperinflation during the early 1990s. I was concerned that the significance of the inflation variable may have been driven by just a few very influential observations on this variable. To examine this, the model was rerun omitting seven observations with particularly high inflation values. This produced a similar coefficient, although the *t*-statistic dropped from 4.12 to 2.23. We thus conclude that the effect of inflation is somewhat influenced by these extreme values, but does seem to also be present in more modest inflationary periods.