Relationships between Household Consumption and Inequality in the Indian States

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Current evidence on the relationships between growth and inequality is predominantly based on cross-country data sets or panel data sets covering a small number of time periods. But these relationships, being fundamentally dynamic in nature, need to be considered over a much longer time horizon. Available state level results from the National Sample Surveys in India provide such an opportunity. This paper uses this unique data set to examine the interrelationships between average consumption and inequality within states, and test for causality. Distributional patterns of growth vary, but there is strong evidence in many instances of a strong negative effect of initial inequality on subsequent growth.

1. INTRODUCTION

It is widely argued that economic growth plays a key role in enabling effective poverty reduction. But how effective growth is in delivering poverty reduction depends critically on one of the age-old development issues: the relationship between growth and distribution. Obviously the distributional pattern of growth has implications for the evolution of inequality, which has direct consequences for the extent of poverty reduction. Equally though there are a number of arguments as to why the extent of inequality in a society will be an important determinant of growth, with many recent studies suggesting that high inequality may have a retarding effect on subsequent growth (Aghion et al, 1999).

Current empirical evidence on the (potentially two way) relationships between growth and inequality has been based almost entirely on cross-country regression analysis or, more recently, on cross-country panel data sets where the number of

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observations capturing the variation over time is very small. This is a very serious limitation in that the relationships being investigated are fundamentally dynamic in nature, and need to be considered over a much longer time dimension. In addition, cross-country regressions (even where using short panels) suffer from a number of other serious limitations, including the facts that the relationships may differ substantially across countries, and questions of data comparability may arise, especially inequality data, across countries (notwithstanding the valiant efforts of Deininger and Squire (1996) to try to create a comparable cross country data set).

In this paper we circumvent many of these issues by looking at the relationships between inequality and average consumption levels and their growth rates based on Indian state level data collected by the National Sample Survey. Although not available for every year over this period, the currently available series (1960-94) represents probably the longest time series of inequality information relating to developing countries. This long time dimension means that it is possible to consider the time series relationships between growth and inequality in each state separately, and to give serious consideration to dynamic issues, including causality. But also because the same data are collected in each state, it is possible to make meaningful comparisons of the relationships across states.[1] In addition a major advantage of this data set, in contrast to many cross country studies of growth inequality relationships, is that the measures of growth and inequality are both based on household level standard of living measures. Most cross-country studies (e.g. Deininger and Squire, 1998, one of the few studies to consider the potentially two-way relationship between inequality and growth) of this issue instead focus on the relationship between the inequality of household income or consumption levels and growth in GDP per capita, rather than the growth of household income or consumption which is of more direct relevance, especially given a focus on poverty reduction.

The case of India is of particular interest given that the country accounts for a substantial number of the world's poor, and given that disparities in living standards between and within states, including between urban and rural areas, have been a matter of serious concern for policymakers for decades. This paper uses this unique data set to examine the interrelationships between average consumption levels and

inequality within the different states, distinguishing urban and rural areas and testing for causality (allowing for possible two-way relationships). Both time series and panel data techniques are used to examine the potential two-way relationship between average consumption and inequality (or their changes). The paper is structured as follows. Section 2 briefly summarises the nature of the potential relationships between growth and inequality, including reviewing evidence in the Indian context. Section 3 then describes the data in more detail and provides a descriptive analysis of state-level trends in inequality and growth, while section 4 describes the methodology and the results obtained from the time series analysis. This discussion is then complemented by a panel data analysis of the same issues in section 5. Section 6 concludes.

2. RELATIONSHIPS BETWEEN GROWTH AND INEQUALITY

There is in fact a relatively limited literature on the relationships, which are the specific focus of this paper that between the average level of household consumption and the inequality of its distribution. Of course a vast literature has been devoted to the related question of the relationship between overall economic growth (GNP or GDP, often per capita) and inequality. In this literature there are arguments both for changes in average mean income or its growth affecting distribution and for inequality influencing future growth. Theoretical arguments can be advanced for either positive or negative relationships in each case.

Thus Kuznets (1955) hypothesised that in the early stages of economic development the distribution of income may tend to worsen, but it will improve at the later stages of development. In the Lewis model (1954, 1955) early growth may be concentrated in the modern industrial sector where employment is limited though wages and productivity are high. The income gap between the modern and traditional sectors may widen quickly before it eventually starts to converge. This has commonly been referred to by subsequent writers as the ‘inverted U’ Kuznets curve. However, the empirical evidence for this relationship is weak, and empirical studies (again based on cross-country regression evidence) find both positive and negative

impacts of inequality on growth. This makes sense given that the evolution of inequality is expected to depend on the form growth takes (e.g. which sectors growth is concentrated in; Fields, 1980).

In terms of the impact of inequality on subsequent growth, the view that initial wealth inequality is growth enhancing may, for example, be related to indivisibilities of investment. In the absence of well-functioning share markets, wealth needs to be sufficiently concentrated so that an individual is able to cover large sunk costs. However, more recent arguments suggest the opposite relationship. For example, when individuals are limited in their borrowing capacity, a more unequal distribution of wealth affects their production possibilities, which in turn will adversely affect the rate of growth of output (Galor and Zeira, 1993; Perotti, 1993; Saint-Paul and Verdier, 1993). Most recent empirical evidence – again primarily based on cross-country regressions – tends to find that higher initial inequality reduces subsequent growth (Alesina and Rodrik, 1994; Deininger and Squire, 1998)], although Forbes (2000) finds the opposite result.

In both cases though, as noted above, there is an important need to consider these dynamic relationships between growth and inequality based on clearly comparable data with a significantly longer time dimension. In addition it is of more interest that the growth and inequality variables both relate to the same measure of well-being at the household level, rather than looking at relationships between GDP growth and income or consumption inequality which is the more common focus of existing studies.[2] This data set allows these limitations to be overcome in considering growth inequality relationships for India.

In the case of India there are very few empirical studies analysing the nature and direction of causality between average income (or its changes) and inequality (or its changes) among the Indian states. This gap in the literature is despite the facts that the success of poverty alleviation depends to a large extent on how the fruits of growth have been distributed, and that poverty alleviation programmes have always been central to the government of India's economic planning since early 1950s. In a series of papers Ravallion and Datt (1996, 1998) investigate different aspects of poverty alleviation for the Indian states. For example, Datt and Ravallion (1996)

examined the effects of consumption growth on poverty reduction and find rural consumption growth reduced both rural and urban poverty while urban growth brought benefits only to the urban poor. Using the same data-set, Ravallion and Datt (1998) further investigate the inter-state differences in poverty reduction and suggest elasticities of measured poverty to farm yields and development spending did not differ significantly across states, while that to non-farm output varied appreciably. Relatedly, Datt and Ravallion (1993) use 1983 National Sample Survey (NSS) data to examine the effects of certain kinds of regional redistribution on national poverty among the Indian states. Their simulations suggest that the quantitative effect of this type of interventionist policy for alleviating poverty in India is rather modest.

While these studies provide valuable information about proximate causes of poverty change, changes in average household incomes and their distribution are not independent of each other. There is an important need to understand further the relationship between consumption and its distribution, both to understand the potential impact of inequality on subsequent growth and to enable a better assessment of the likelihood of a pro-poor pattern of household income growth. Ghosh and Pal (2003) adopt a more direct approach and use state-level panel data to examine the effect of initial inequality on growth of total and sectoral output per capita in 16 major states in India. Their empirical evidence suggests that rural inequality influences total output growth more than urban inequality and does so negatively. The present paper extends this earlier work in that it considers both the effects of inequality on consumption (or its change) and that of consumption on inequality (or its change)[3], and does so using both time series and panel data techniques.

3. TRENDS IN LIVING STANDARDS AND INEQUALITY

As explained above, the data used to examine the relationship between the average level and distribution of household living standards are based on those collected by the Indian National Sample Survey (NSS). The NSS has been conducted in the same way for each individual state on a regular basis since 1958, and provides comparable data across states and over time. The household level data are available for this study in the form of comparable summary information, as compiled by Ozler *et al.* (1996).

The standard of living is measured as average monthly per capita consumption expenditure in 1973-74 prices, and inequality as the Gini coefficient of the same variable.[4] These measures are available for urban and rural areas separately for sixteen main states. The preference for consumption rather than an income based standard of living measure reflects widespread practice in the poverty measurement literature (Lipton and Ravallion, 1995).

Although the survey was not conducted each year, this data set still represents the longest time series on inequality available for developing countries. These data show significant urban-rural differentials in average consumption levels, with urban areas being somewhat above rural areas, in many instances by 40% or more (Table 1). In all cases except one, inequality as measured by the Gini coefficient is higher in urban areas as well, often by 15% or more. Thus urban areas are richer on average, but also more unequal. However, there is no obvious relationship between the extent of the urban-rural differential and the relative importance of manufacturing and agriculture in the state.

Further summary properties of these consumption and inequality measures, and their changes over the period, are reported in Table 2. Average levels and changes over time are computed over a five year period to minimise the effects of exceptional years. This is justified given the high coefficients of variation displayed by the annual average consumption levels shown in Table 2. In some instances annual estimates of inequality also show quite high coefficients of variation, but somewhat less than the consumption data.

Average consumption levels generally increased over this period, but the annualised growth rates were modest in most cases (being highest in both urban and rural areas of Kerala). Increases are particularly evident in urban areas where average consumption levels increased in every state. The rural areas show lower growth rates on average, but still the majority of states show increases in average consumption levels over this period. There were though quite large falls in Assam and Bihar.
However, what is equally striking from this table is the extent to which inequality fell over this period, even from initial levels that were not particularly high. Levels of Gini coefficients fell in the vast majority of cases, sometimes modestly, but in others

quite substantially (for instance, rural Karnataka or urban Punjab). Only Jammu and Kashmir shows a tendency to increased inequality over this period.

While the most common pattern evident in theses summary statistics is one of states displaying modest consumption growth and falling levels of inequality, there are nonetheless significant variations across the different cases. There is no obvious general relationship between growth and inequality in consumption evident in these figures. Thus in urban areas cases of relatively fast consumption growth have been accompanied by falling inequality in some instances (e.g. Punjab) and rising inequality in others (e.g. Kerala); slow growth has generally been accompanied by falling or unchanged levels of inequality. In rural areas both positive and negative growth has generally been accompanied by falling inequality and occasionally by increasing inequality. Even within a given state the associations are often different between urban and rural areas (e.g. Kerala again).

However, summary statistics averaged over a long period of time are not an appropriate basis for drawing conclusions about the relationships between consumption levels and inequality over time, not least because the averages hide the degree of volatility in the data as was discussed above. This needs to be considered based on the profile over time of these variables. To consider this issue further, Figures 1 and 2 show the trends over time in consumption and inequality for two instances: rural Bihar and rural Kerala respectively. In neither case do the graphs suggest any obvious association between these series, and the same is true for other states not presented here. The relationships of course may operate with a lag; may be more evident looking at rates of change rather than levels; and so on. A more in-depth analysis necessitates use of time series econometrics, which also offers a powerful technique for looking at the causal direction of any relationships operating.

The graphs also show one major limitation of the time series data available – the fact that there are several years for which information is not available, corresponding to the years when the NSS was not carried out. But to investigate time series relationships will require continuous time series, given that the relationships may involve lags. Therefore it was necessary to estimate values by interpolation for the years for which the NSS was not conducted. This requires interpolation, generally

covering short time periods. And the graphs suggest that it should be possible to make plausible interpolations for the missing years (see for example figures 1 and 2). For the consumption series this was done by the interpolation using a related series technique (Friedman, 1962), using per capita manufacturing output in urban areas and per capita agricultural output in rural areas. As these activities are key income sources in urban and rural areas, they should capture a significant part of the volatility in consumption to be present in the interpolated series. For the Gini coefficients, in the absence of a suitable related series, Newton's divided difference formula was used for interpolation. While this procedure is far from ideal, the Gini coefficient time series are at least significantly less volatile than the consumption series.

Inevitably though the fact that it is necessary to estimate a significant number of observations in the time series must raise questions about the extent to which any econometric results obtained based on these series are affected by the interpolation. So, as a second best alternative, a panel data set was also constructed by computing average and initial values of variables over short time periods (3-6 years) at the beginning and end of each of which NSS data were available. With this data set it is not possible to look at dynamics based on annual data, but it is possible to consider relationships between average values of consumption, inequality or their growth rates and average or initial values of other variables for the same period. More precisely, exploiting the panel aspect it is possible to consider the impact of initial inequality on subsequent consumption growth, or contemporaneous relationships between consumption and inequality. The relationships though are required to be the same across all states.

Moreover, the resultant panel data set is of an unbalanced nature, given that for Haryana observations were available only from 1965, and for Jammu and Kashmir observations were not available for the first two years and for 1993. For analysing the effect of initial inequality on subsequent growth we consider the variation in the annual rate of growth of consumption (rural or urban) while for examining the impact of growth on inequality we consider the contemporaneous relationship between sectoral consumption and inequality Gini index.

4. TIME SERIES EVIDENCE

4.1. Method

We first consider evidence on the relationships between consumption and inequality based on the time series data discussed above, testing for causality between these time series based on conventional Granger causality tests. However, as such tests are only valid when the variables in question are stationary, it is first necessary to determine the order of integration of the relevant series. The tests are then based on vector autoregression (VAR) relationships between the stationary series. However, where the original series are both I(1) and cointegrated with each other it is necessary additionally to include an error correction term in the VAR model. On the other hand, if the variables are both I(1) but non-cointegrated with each other, a VAR can be estimated in the first differences of the variables.

It is possible that the relationship between average consumption and subsequent inequality may be non-linear, as for instance the Kuznets' "inverted U relationship" would imply. One way of allowing for this is by including quadratic terms in the relevant variables in the VAR model (having first tested these quadratic terms for their order of integration and transformed them as necessary).

In addition, one potential source of problem in an unrestricted VAR is the inclusion of irrelevant lagged polynomials. It has been argued (e.g. Luintel, 1998) that causality tests need to be conducted in a restricted VAR framework since there are significant differences in causality test results for restricted (imposing restrictions on the coefficients of lagged polynomials) and unrestricted VAR models. Accordingly, restricted VAR models will be considered, with the specification varying from case to case depending on initial levels of significance of coefficients in the unrestricted VAR.

4.2. Results

Augmented Dickey-Fuller (ADF) tests were used to determine the order of integration

of the underlying consumption and inequality series for the case in question; Table 3 classifies the different cases according to the orders of integration of the underlying series. Where both variables were I(1), a test for cointegration were also conducted, but in none of these cases was there any evidence of cointegration.

Table 3 reports the coefficients of the explanatory variables included in the preferred models for consumption (columns 2-5) and for inequality (columns 7-10), plus the results of Wald tests for causality (columns 6 and 11). Specifications were also tried including quadratic terms in the equations determining inequality (see above), but these were never significant. Thus we do not have any evidence of Kuznets' type inverted U relationships between consumption (its level or first difference) and inequality (its level or first difference).[5]

In about half the cases there is no evidence of any causal relationships between average consumption or its change, and inequality or its change. However, the remaining instances do find evidence for statistical causality, with causality being found to be two way in six instances. Of particular interest though is the sign of the relationships where a causal relationship is found to be present. In twelve instances inequality (or the change in inequality) is found to have a significant causal relationship with subsequent average consumption or its change, and in all instances except one (which is marginally significant) this relationship is found to be negative. In other words, there is strong evidence that high or increasing levels of inequality have an adverse impact on a state's consumption level or rate of growth. This relationship is evident in both urban and rural areas of Bihar, Karnataka and Kerala, as well as in the urban or rural areas of five other states. And the magnitudes of the effects are generally quite large, where for instance in urban Bihar or Rajasthan a 1 percentage point increase in the Gini coefficient is associated with a 1% or more reduction in subsequent consumption growth.

As discussed above, this negative impact of inequality on subsequent growth or consumption levels is consistent with a number of theoretical arguments, and with an increasing body of empirical evidence from cross-country growth regressions evidence about the negative influence of initial inequality levels. However, these results are based on time series data which enables a much more careful consideration

of the dynamics of the relationships. It is also consistent with the results obtained for India by Ghosh and Pal (2003) who, based on a panel data approach, find a similar negative impact of particularly rural inequality on the growth of total output per capita in the subsequent period.

By contrast, when there is found to be a significant causal impact of consumption or its growth on subsequent inequality, this relationship is positive in some instances (e.g. rural Assam, urban and rural West Bengal and urban Rajasthan) and negative in others (e.g. rural and urban Orissa, and rural Karnataka). In this case there is much less of a general relationship across all states, in other words the distributional pattern of consumption growth varies from case to case. Thus in urban and rural Orissa growth has tended to be associated with falling inequality, other things being equal, that is growth when it has occurred has tended to be pro-poor. In urban and rural West Bengal for instance the opposite has tended to be the case. By assumption in this model the same relationships apply in reverse, so suggesting that falling average consumption levels in Orissa tend to be associated with increasing inequality.

Two way causality is found in a number of instances. In some instances a negative impact of inequality on subsequent consumption occurs alongside a positive impact of consumption on subsequent inequality; where that combination occurs then the increasing inequality that results from consumption growth is likely to have a dampening effect on subsequent growth.

These results obviously invite the question as to why some states have experienced pro-poor patterns of consumption growth while others have experienced the opposite. This almost certainly reflects the different policies underlying the growth (or lack of it) in the different states. Conditional upon the available state-level information, here we focus on four possible explanations. (a) Changing share of agricultural output (vis-à-vis manufacturing output) in the state domestic product, given that the majority of the poor are engaged in agriculture. (b) Effects of state-level land reform measures on the distribution of landholding and its possible effects on the distribution of consumption, especially in the rural sector. (c) Government efforts to spread the formal credit network in both rural and urban sectors. This is reflected in

the real per capita agricultural/industrial bank finance for each state.[6] (d) Role of redistributive state-level development expenditure in the provision of public utility services including health, education, family welfare, community services.

Explanations for the distributional pattern of growth almost certainly differ from case to case, and, despite the limited available state-level data to consider this, it may be instructive to consider some individual cases. In both rural and urban Orissa, increases in the level of consumption were found to have a negative causal relationship with subsequent inequality or its change, in other words a broadly pro-poor pattern of development. In both urban and rural areas growth was more pronounced after around 1968 compared to before (see Figures 3a and 3b); this change might be explained by a fall in land inequality around that time, by sustained increases in development expenditure and tax revenue as a proportion of SDP over this period, or by the large increases in agricultural credit over this period (see Figure 4a). Of course the second and third explanations would only apply if poor groups also derived significant benefits from development spending and agricultural credit, something which cannot be assessed from aggregate data.

In urban and rural West Bengal by contrast, the relationship between the growth of consumption and the subsequent level of inequality is positive, that is the opposite of a pro-poor pattern of consumption growth. Here average consumption fell substantially from 1961 to 1968 (Figures 3c and 3d), before growing (at a generally slower rate than they fell) subsequently. Unlike Orissa, the average share of manufacturing was higher and the land inequality (Figure 4b) too increased marginally in the 1980s. Though development expenditure increased substantially after 1967 (Figure 4b), the levels of SDP devoted to development expenditure were lower than for Orissa and they also began to show a trend decline after 1983.

The evidence from this section though does strongly suggest that in many instances inequality has a negative influence on consumption growth, while higher consumption growth are sometimes associated with higher inequality and sometimes with lower inequality, presumably reflecting the policies that give rise to that growth.

5. PANEL DATA EVIDENCE

5.1. Method

Questions may however arise about the robustness of these time-series relationships given the need to estimate some values by interpolation. Consequently as an alternative approach in this section we construct a panel data set based on the NSS data to re-examine these relationships, again separating rural and urban areas. As in section 4, we examine the consumption inequality relationship separately for the rural and urban sectors of the sample states. A distinguishing characteristic of this section is that we also introduce appropriate policy variables for explaining the observed consumption-inequality relationships. [7]

The panel data set is constructed as follows. We have selected eight periods covering intervals of three to six years between the initial and end date such that the NSS was always conducted at least at the beginning and the end of each period[8], as well as in several years in between in most instances. For each of these periods we have taken the initial values of consumption and inequality, as well as the period averages of these and their growth rates. This data, in addition to information on a number of other potentially relevant explanatory variables affecting the relationship, including the period averages of redistributive development expenditure by the government[9] or the real per capita sectoral credit available from the banks (as opposed to other informal agencies)[10], forms the basis of the data set. In the cases of Haryana and Jammu and Kashmir it was only possible to compute this data for seven periods, due to the NSS not being conducted in the early period in both states (see above). These computations provide a sample of 126 observations with 16 cross-sectional state units.

Based on this data set a fixed effects model is estimated whose general form for state s (s = 1,2,...,16) and time period t (t = 1,2,….,8) is as follows:

$$y_{st} = b' x_{st} + f_s + u_{st}$$

where y_{st} is the dependent variable, x_{st} is the k x 1 vector of exogenous regressors, f_s is the state-specific fixed effect, and u_{st} is the random disturbance term. The fixed-effects f_s will account for the unobserved differences in growth due to inter-state

differences in history and economic structure, so capturing the heterogeneity that would otherwise cause inconsistency in the standard OLS regression. This general model will be modified slightly when we examine the effects of lagged explanatory or dependent variables on y_{st}.

The panel data technique is used to model both the impacts of initial inequality on the level or growth rate of subsequent consumption, and the contemporaneous relationship between the levels or growth rate of consumption and inequality. In the former case the dependent variable is the level or growth rate of average household consumption, and the initial period level of inequality in the same locality is included in the vector of explanatory variables. Other explanatory variables in the different specifications of this model include the beginning period values of urban and rural consumption[11], inequality indices, share of sectoral output[12] in total output, share of development expenditure in state domestic product and share of bank credit available to the agricultural or industrial sector as appropriate.

In the latter case we consider the other direction of causation, to see if there is a relationship between rural or urban inequality (or its rate of change) and contemporaneous (Kuznets' type relationship) or initial level of consumption. In this case we too include other explanatory variables as mentioned above, where these are contemporaneous or initial period values corresponding to the way inequality is included. Following Anand and Kanbur (1995), we also include inverses of rural and urban consumption in each case to test if the relationship is non-linear (although in practice these terms were never significant and so are not included in the reported specifications)

5.2. Results

The least squares dummy variable (LSDV) or fixed effects estimates are summarised in the upper and lower panels of Table 4. We first consider the relationship between consumption and initial period inequality (columns 2 and 3 of the upper panel of Table 4). This suggests that higher rural (urban) inequality is associated with higher average rural (urban) consumption. Also, the initial rural (urban) consumption level is significantly positively associated with the urban (rural) consumption level.

More interesting are the impacts of beginning of period inequality on subsequent average growth rates of consumption (columns 4 and 5 of the upper panel of Table 4). Rural inequality matters more in explaining annual change in rural consumption and similarly urban inequality matters more in explaining annual change in urban consumption. In each case the coefficient is negative so that higher initial rural (urban) inequality lowers the subsequent average rate of growth rural (urban) consumption per capita. This is consistent with what the time series data suggested for a large number of states. In addition, the initial levels or urban (rural) consumption are negatively associated with subsequent growth, consistent with the results of most growth equations. A larger initial share of agricultural output is negatively correlated with the rate of growth of rural consumption, which may be due to slower rates of growth of output in this sector compared to the rural non-agricultural activities. Among the two policy variables, the initial share of development expenditure remains insignificant while the real per capita sector specific bank credit is significantly positive in both rural and urban areas. In other words, increasing availability of bank credit boosts growth of sectoral consumption while redistributive development expenditure does not have any perceptible impact in this respect.

Next, we consider the effects of contemporaneous and lagged consumption on inequality or its change as shown in the lower panel of Table 4. In each case, the non-linear inverse terms of sectoral consumption are insignificant and so are dropped. The results indicate that higher rural (urban) consumption is associated with higher rural (urban) inequality, while higher urban (or rural) consumption is associated with lower rural (urban) inequality (see columns (2) and (3) of the lower panel of Table 4). More interestingly, redistributive development expenditure seems to be effective in rural areas in that it lowers inequality there, though the effect is insignificant for the urban sector. Higher real per capita agricultural bank credit however enhances rural inequality. This result may reflect the fact that largely the asset-less rural poor households are unable to access the formal loans offered by banks because they cannot satisfy the collateral requirement.

Finally, the regression of the average annual rate of change of sectoral inequality on initial consumption levels (columns 4 and 5 of lower panel of Table 4)

suggests that higher initial rural consumption levels are significantly associated with falling inequality, although there is no significant corresponding relationship in urban areas. Initial values of development expenditure do not have any significant impact on growth of inequality either in the rural or in the urban sector and increased availability of bank credit in urban areas is actually associated with increasing inequality there.

Taken together, the panel data analysis provides some confirmation of the relative importance of the time series results. In particular there is strong evidence from both methods that higher initial inequality has an adverse effect on subsequent growth, this applying in both rural and urban areas. There is no evidence of a non-linear Kuznets type relationship in our sample nor is there a systematic pattern in the direction of association between contemporaneous inequality and growth (growth being associated with falling inequality in some instances, and increasing inequality in others). The panel data analysis has also allowed some exploration of the effects of other important explanatory factors in the growth-inequality relationships, including policy variables. The effect of redistributive development expenditure on sectoral consumption (or its subsequent growth) is insignificant, but a higher share of redistributive development expenditure significantly lowers rural inequality though this effect is not significant in urban areas. Also, increased availability of sector specific bank credit is significantly beneficial for the annual rate of growth of consumption, but if anything is associated with higher or increasing inequality.

6. CONCLUSIONS

A major problem with most of the existing evidence of the relationships between growth and inequality has been its need to rely on cross country regression methods, whether or not these incorporate a panel component with a short time dimension. Cross country regression methods though suffer from serious conceptual and econometric problems, which are being increasingly widely recognised. It has generally been necessary to reply on this technique because of the absence of comparable time series data on inequality. The availability of the NSS data set provides long time series information on inequality at state level in India, so enabling the application of time series techniques to look at the dynamic relationships between

consumption and inequality at the state level. Over the period 1960-94, inequality levels were low and in fact fell in most cases; however at the same time most experienced low or sometimes negative growth.

Time series techniques have been used in this paper to examine the nature and direction of causality between consumption (or its change) and inequality (or its change) depending on the stationarity property of these variables. There is strong evidence across many states that lower initial inequality has had a favourable influence on subsequent consumption (which is compatible with much international evidence on the relationships between inequality and GNP growth). This pattern is strongly confirmed by the panel data analysis, conducted to check the robustness of the time series results given the need to interpolate some missing values.

The effects of higher consumption on subsequent inequality vary from case to case. In some instances this relationship has been negative (e.g. rural and urban Orissa), with increases in consumption being associated with falling inequality (a pro-poor pattern of growth) and conversely when consumption falls. In many instances though (e.g., observed in rural and urban West Bengal) the relationship has been positive so that increases in consumption (where they have occurred) have been associated with increasing subsequent inequality and vice versa. This absence of a general pattern is supported by the panel data analysis, and neither the time series nor the panel data analysis provides any support for a non-linear Kuznets curve within or across Indian states.

This finding of the lack of a general distributional pattern of growth is not surprising in that it is neither realistic nor sensible to expect a general relationship. The nature of these relationships will reflect the sectoral pattern of growth, which among other things will reflect policies pursued and other state-specific factors (geographic, demographic, political or economic), including one-off shocks. The panel data analysis suggests that the availability of bank credit has a positive impact on growth in both urban and rural areas, but is generally associated with higher or increasing inequality. Similarly, state development expenditure is not significantly associated with growth, but does fulfil something of a redistributional role in rural

areas. Such a relationship though cannot be inevitable, because it depends on the forms this expenditure takes and who has access to its benefits.

Even if both inequality levels and growth levels in Indian states have been low over this period, there is however strong evidence from this data set of the adverse effect of higher initial inequality on subsequent growth.

Table 1. Rural-Urban Disparities among the Indian States : Average for 1960-94

State	Ratio of manufacturing to agricultural output	Ratio of urban to rural consumption	Ratio of urban to rural inequality
AP	0.22	1.31	1.1
Assam	0.20	1.76	1.46
Bihar	0.22	1.48	1.22
Gujarat	0.61	1.29	1.08
Haryana	0.25	1.21	1.1
J&K	0.15	1.4	1.12
Karanataka	0.36	1.38	1.16
Kerala	0.32	1.3	1.18
MP	0.22	1.31	1.12
Maharashtra	0.95	1.55	1.2
Orissa	0.15	1.28	1.23
Punjab	0.21	1.19	1.07
Rajasthan	0.18	1.32	0.94
Tamilnadu	0.72	1.44	1.16
UP	0.19	1.15	1.14
WB	0.56	1.63	1.24

Table 2: Variations in consumption and inequality between 1960 and 1994

State	Mean monthly consumption at 1973-74 prices (Rs.)			Gini coefficient of the distribution of consumption		
	Average, 1960-64	Change, 1960-64 to 1990-94 (ann'l growth)	Coeff. of variation (%)	Average, 1960-64	Change, 1990-94 minus 1960-64	Coeff. of variation (%)
			RURAL			
AP	51.6	1.0	15.7	31.5	-3.3	5.5
Assam	63.6	-0.5	10.7	25.3	-5.4	14.5
Bihar	56.6	-0.5	14.4	30.8	-8.2	14.5
Gujarat	53.4	0.4	11.2	28.6	-4.6	11.5
Haryana*	67.1	-0.2	10.0	29.2	-3.5	12.9
J&K**	62.7	0.3	11.0	24.0	3.2	12.9
Karnataka	59.4	-0.2	12.8	31.8	-5.3	8.9
Kerala	48.4	1.3	23.8	32.3	-2.4	9.4
MP	61.3	0.0	11.5	32.7	-2.9	6.9
Maharastra	50.6	0.5	13.6	28.7	0.9	12.0
Orissa	55.0	0.6	13.6	28.6	-2.6	7.1
Punjab	77.4	0.4	10.6	31.7	-4.2	8.6
Rajasthan	61.0	0.0	12.9	34.4	-5.3	13.2
Tamil N	50.0	0.8	14.1	30.4	-1.6	6.6
UP	65.5	0.0	11.3	29.9	-2.2	6.1
W Bengal	58.9	0.5	17.0	26.7	-1.1	8.1
			URBAN			
AP	69.1	1.0	12.9	32.8	0.4	5.2
Assam	98.8	0.4	12.5	31.1	-2.8	14.6
Bihar	72.8	0.3	13.9	34.9	-1.9	10.9
Gujarat	70.7	0.5	14.4	33.1	-1.5	10.8
Haryana*	76.0	0.3	14.8	31.1	-2.9	8.9
J&K**	78.5	1.0	16.3	26.7	1.7	17.8
Karnataka	72.7	0.8	15.3	37.5	-2.8	7.7
Kerala	63.9	1.6	25.7	35.3	1.9	7.8
MP	72.0	0.5	10.7	35.5	-1.6	10.2
Maharastra	82.4	0.2	6.4	37.5	-1.2	5.9
Orissa	63.0	1.0	16.0	35.8	0.7	12.3
Punjab	89.2	0.8	13.9	35.2	-8.0	12.2
Rajasthan	74.7	0.6	11.6	31.1	-0.6	8.5
Tamil N	73.9	0.8	13.3	32.7	3.2	8.6
UP	70.9	0.5	11.1	37.3	-4.3	8.2
W Bengal	97.5	0.3	11.4	32.7	1.2	5.2

Notes: AP: Andhra Pradesh; J&K: Jammu and Kashmir; MP: Madhya Pradesh; Tamil N: Tamil Nadu: UP: Uttar Pradesh.

- *data for Haryana are available separately only after 1965, and so averages for the first period are for 1965-69. ** data for Jammu and Kashmir are available only after 1962, so averages for the first period are for 1962-66.*

Table 3: Estimates of Restricted VAR

	Inequality → Consumption					Consumption→ Inequality				
(1) States	(2) MEAN1	(3) MEAN2	(4) GINI1	(5) GINI2	(6) Wald Statistic	(7) MEAN1	(8) MEAN2	(9) GINI1	(10) GINI2	(11) Wald Statistic
Case 1: inequality I(0), consumption I(0)										
Rural AP	0.98**	-	-0.53	-	1.8748	0.13	-0.14*	0.55**	-	10.6262**
Rural Assam	0.88**	-	-	-0.44*	3.4382*	0.16*	0.11	-	-0.13	21.1032**
Rural Gujarat	0.94**	-	-0.09	-	0.3513	-0.12	-	0.46**	-	2.5921
Rural J&K	0.57*	-	0.10	-	0.0161	-0.14	-	0.61*	-	0.1131
Rural Karnataka	1.13**	-0.34*	-0.7*	-	5.0451*	-0.26**	-0.31**	0.51**	-	11.1871**
Rural Orissa	0.65**	0.22	-0.72*	-	4.9696*	-0.09*	-	0.33*	-	3.6488*
Rural Rajasthan	1.11*	-0.2*	-0.03	-	0.0560	0.005	-	0.86**	-	0.0029
Urban AP	1.03**	-	-0.13	-	0.1866	-	0.04	0.52**	-	2.5216
Urban MP	0.88**	-	-	-0.2	1.1147	-0.35*	0.278	1.12**	-0.47*	7.3614*
Case 2: inequality I(0), consumption I(1)										
Rural Tamil	0.09	-	-	-0.09	0.1953	-	0.09	0.75**	-	0.7905
Rural UP	-0.26	-	-0.68	-	1.7533	-0.09	-	0.92**	-0.43*	2.0805
Rural WB	-0.11	-	-	0.07	0.0826	0.15*	-	0.85**	-	6.2301*
Urban Bihar	0.14	-	-1.00**	-	13.0526**	-	-0.04	0.54**	-	0.7022
Urban Karnataka	-0.04	-	-	-0.84**	6.8059**	0.09*	-	0.53**	-	3.3282*
Urban Punjab	-	-0.11	-	0.5*	3.7791*	-0.005	-	0.78**	-	0.0048
Urban Rajasthan	-	-	-1.18**	0.03	13.6262**	0.20**	-	-	0.42**	11.0674**
Urban UP	-	-0.25	-	-0.22	1.1326	-	-0.06	1.26**	-0.37*	0.9326
Urban WB	0.14	-	-	-0.28	0.3710	0.11*	-	0.66**		6.4242**
Case 3: inequality I(1), consumption I(0)										
Rural Kerala	1.71**	-0.77**	-0.97**	-	19.2220**	0.45*	-0.50*	-0.75**	-	5.4701*
Rural Punjab	0.7**	0.15	-	-0.50	1.7369	-0.03	-	-	-0.39*	0.4006
UrbanMaharasht	0.75**	-	-0.11	-	0.1158	-0.001	-	-0.25	-0.24*	0.0004
Urban	0.83**	-	-	-0.2	0.4928	-0.16*	0.06	-	0.28	3.0957
Orissa Urban Tamilna	0.96**	-	-	-0.73*	5.4095*	-	0.03	-	-0.42**	0.2734

Table 3: Estimates of Restricted VAR (Continued)

(1) States	(2) MEAN1	(3) MEAN2	(4) GINI1	(5) GINI2	(6) Wald Statistic	(7) MEAN1	(8) MEAN2	(9) GINI1	(10) GINI2	(11) Wald Statistic
Case 4: inequality I(1), consumption I(1)										
Rural Bihar	0.08	0.14	-0.51*	-	3.7426*	-	0.09	-0.17	-0.27*	1.2276
Rural Haryana	-	-0.35	-	0.48	0.1671	-	0.28	-	0.45	1.1416
Rural MP	0.22	-	-	0.23	0.8153	-0.16	-	-0.09	-	1.7399
Rural Maharash	-	-0.22	-	0.34	1.6429	0.19	-	-	-0.06	2.3814
Urban Gujarat	-	0.28	-	-0.47	0.5107	-	0.09	-0.11	-0.49*	0.6182
Urban J&K	0.48**	-	-1.05**	-	10.7303**	-	0.11	-	-0.2	2.3513
Urban Haryana	-0.28	-	-	-0.10	0.2571	-0.02	-	-0.04	-	0.0527
Urban Kerala	-	-0.22	-1.13**	-	10.4382**	-0.07	-	-0.46*	-	0.6204

Note: AP: Andhra Pradesh, J&K: Jammu and Kashmir; MP: Madhya Pradesh, UP: Uttar Pradesh; WB West Bengal. Consumption is determined by lagged values of consumption (MEAN1, MEAN2) and inequality (GINI1, GINI2); similarly, inequality is determined by lagged values of inequality (GINI1, GINI2) and consumption (MEAN1, MEAN2); levels or first difference of consumption or inequality are used depending on the order of integration. MEAN1 : first lag of consumption; MEAN2 : second lag of consumption; GINI1: first lag of Gini coefficient; GINI2: second lag of Gini coefficient. '*' denotes that the variable is significant at 10% or lower while '**' denotes the same at 1% or lower level of significance.

Table 4. Fixed Effects Panel Data Estimates

(1) Explanatory variables	(2) Rural Consumption	(3) Urban Consumption	(4) Annual rate of change of rural consumption	(5) Annual rate of change of urban consumption
Share of agri output	-32.9 (3.785)*	-	-7.13 (2.86)**	-
Share of mfg output	-	36.03 (1.228)	-	4.02 (0.428)
Rural consumption	-	0.87 (8.936)*	-0.16 (6.09)**	-
Urban consumption	0.35 (4.964)*	-	-	-0.05 (2.343)*
Rural inequality	0.72 (4.460)*	-0.88 (4.029)*	-0.07 (1.773)*	-0.11 (1.582)
Urban inequality	-0.36 (2.066)*	0.94 (4.089)*	0.06 (0.118)	-0.26 (3.27)**
Share of dev expen.	0.003 (0.720)	0.04 (0.629)	0.001 (1.009)	0.005 (0.261)
Agril bank credit	0.0004(0.455)	-	0.001(4.12)**	-
Industrial bank credit	-	-0.0002 (1.02)	-	0.002 (3.91)**
R^2	0.82	0.77	0.40	0.28
F-Statistics	22.06	17.34	3.31**	1.92 *
Obs.	126	126	126	126
(6) Explanatory variables	(7) Rural inequality	(8) Urban inequality	(9) Annual rate of change of rural inequality	(10) Annual rate of change of urban inequality
Rural consumption	0.16 (3.24)**	-0.11 (2.218)*	-0.04 (2.646)*	0.01 (0.070)
Urban consumption	-0.13 (3.69)**	0.12 (3.481)**	0.002 (0.248)	-0.01 (1.180)
Rural inequality	-	-	-0.15 (6.22)**	-
Urban inequality	-	-	-	-0.22 (9.84)**
Share of dev expen.	-0.004 (1.71)*	-0.003 (1.114)	0.001 (1.253)	-0.003 (0.507)
Agril bank credit	0.001 (2.044)*	-	0.0003 (0.195)	-
Industrial bank credit	-	0.004 (0.805)	-	0.003 (2.421)*
R^2	0.59	0.57	0.41	0.55
F-Statistics	8.19**	7.25**	3.69**	6.33**
Obs.	126	126	126	126

Figure 1. Rural Bihar : Consumption and Gini index (original RMEAN, RGINI and interpolated series RRMEAN, RRGINI)

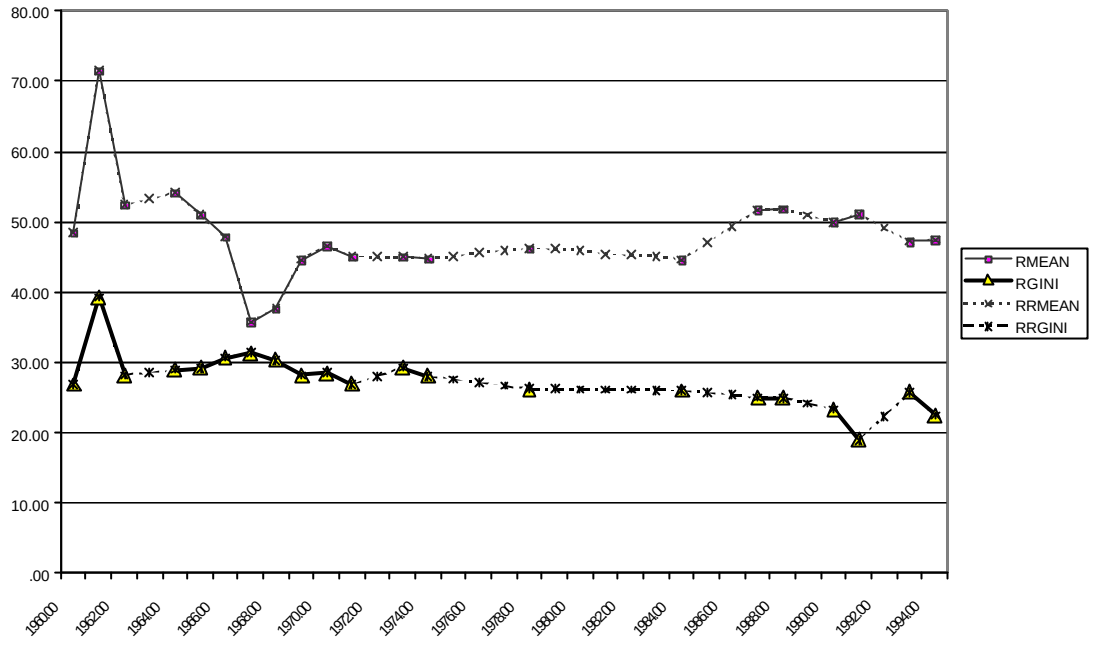


Figure 2. Rural Kerala: Consumption and Gini index (original RMEAN, RGINI and interpolated series RRMEAN, RRGINI)

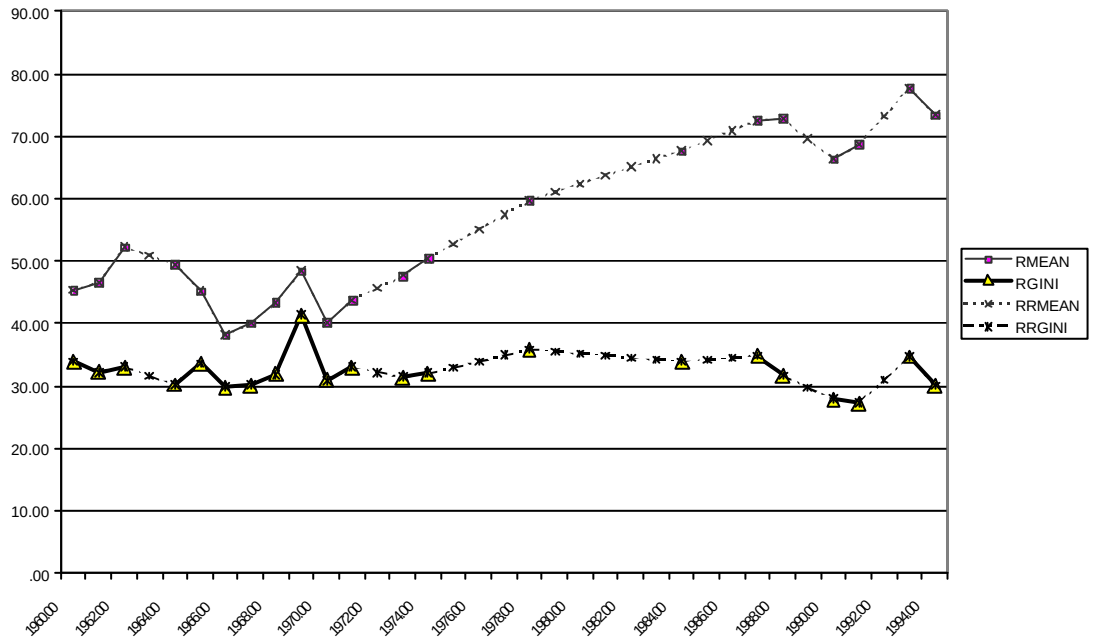


Figure 3a. Rural Orissa: Consumption and Gini index (original RMEAN, RGINI and interpolated series RRMEAN, RRGINI)

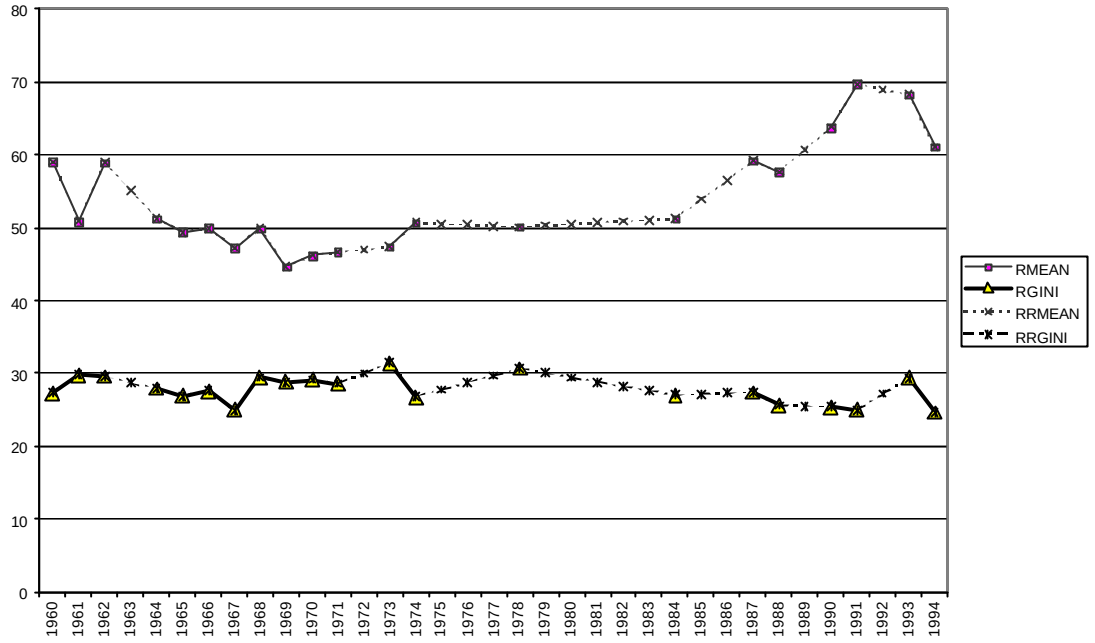


Figure 3b. Urban Orissa: Consumption and Gini index (original UMEAN, UGINI and interpolated series RUMEAN, RUGINI)

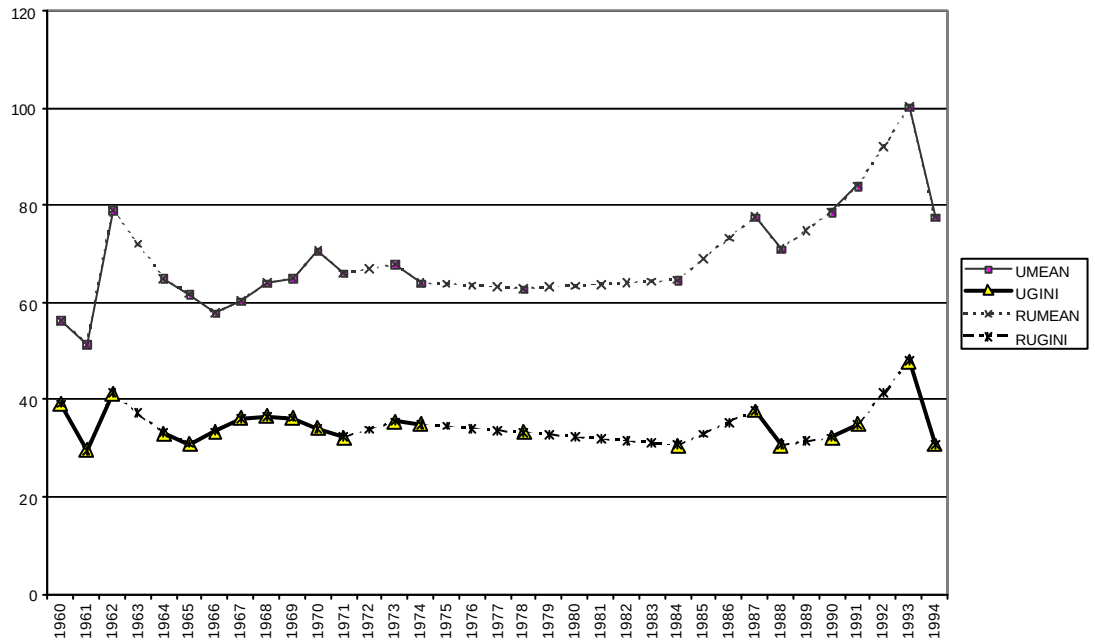


Figure 3c. Rural West Bengal: Consumption and Gini index (original RMEAN, RGINI and interpolated series RRMEAN, RRGINI)

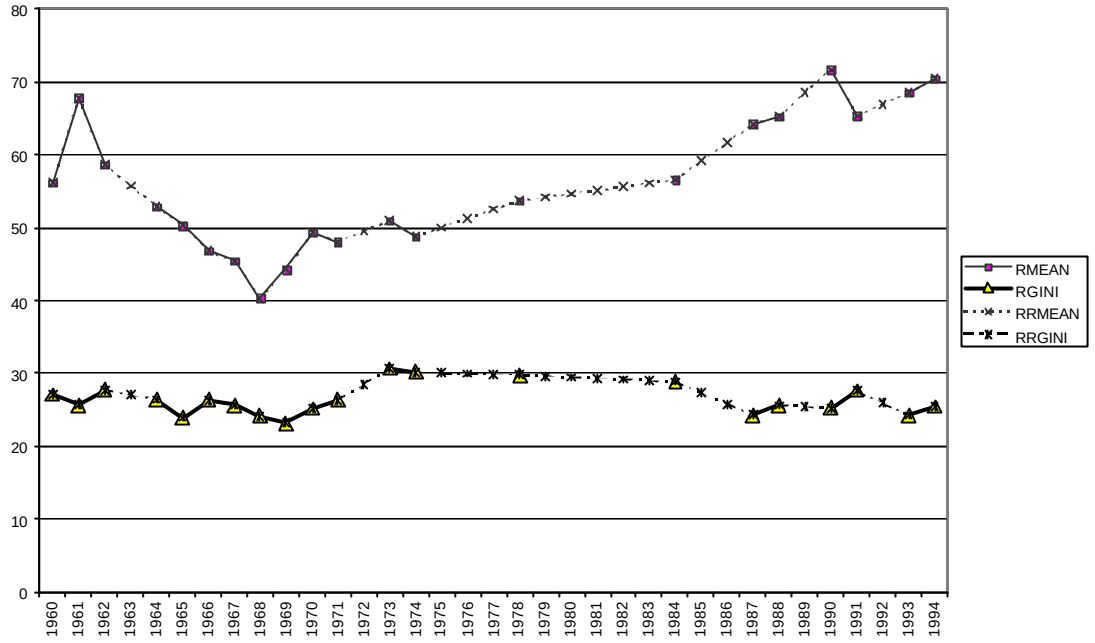
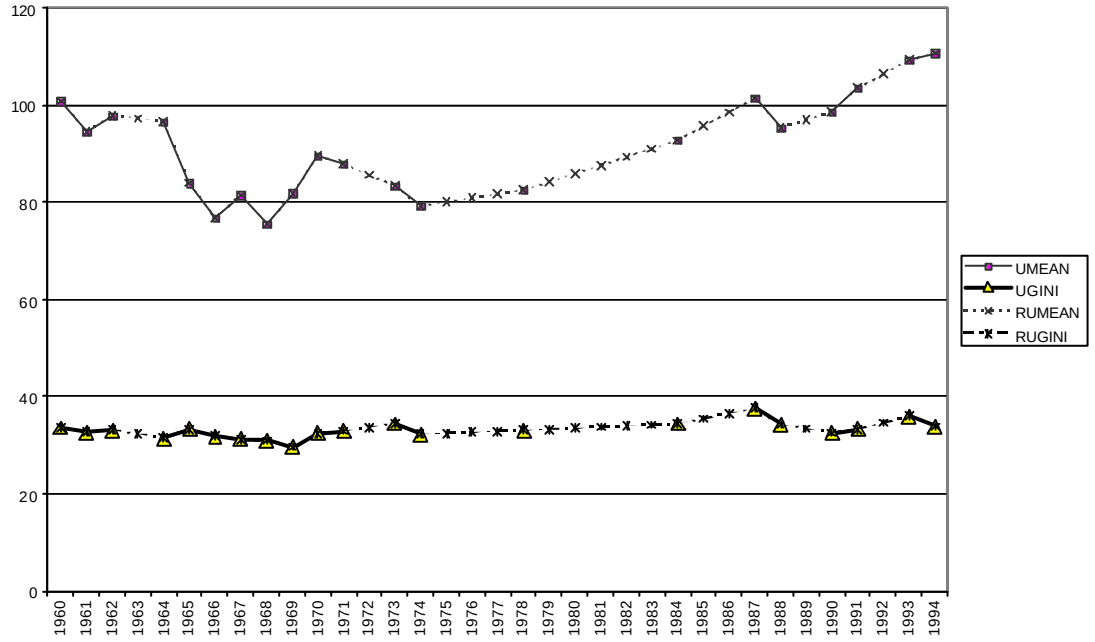


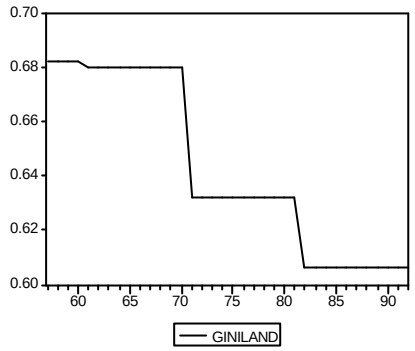
Figure 3d. Urban West Bengal: Consumption and Gini index (original UMEAN, UGINI and interpolated series RUMEAN, RUGINI)



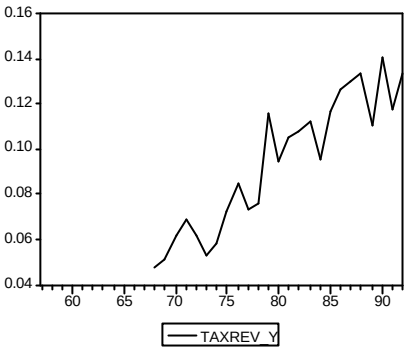
Note: RMEAN, UMEAN: Avereage per capita rural and urban consumption; RGINI, UGINI: rural and urban Gini coefficients in the distribution of per capita consumption; RRMEAN, RUMEAN: interpolated series for RMEAN and RGINI; RUMEAN, RUGINI: interpolated series for UMEAN, UGINI.

FIGURE 4a: **Time series plot of other relevant variables, Orissa**

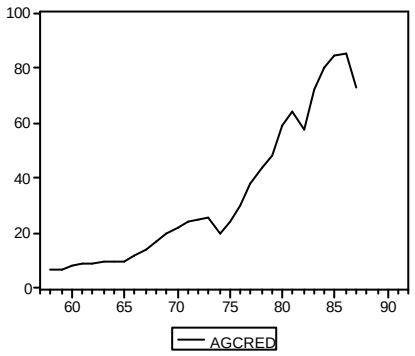
Land distribution



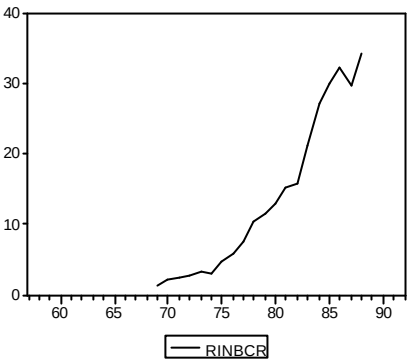
Proportion of tax revenue in sdp



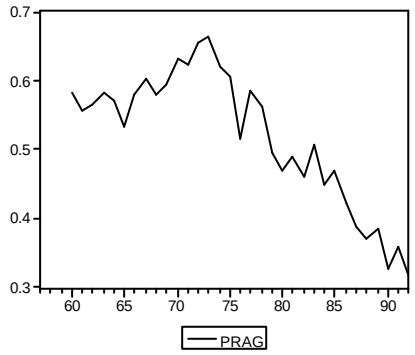
Real per capital agricultural credit



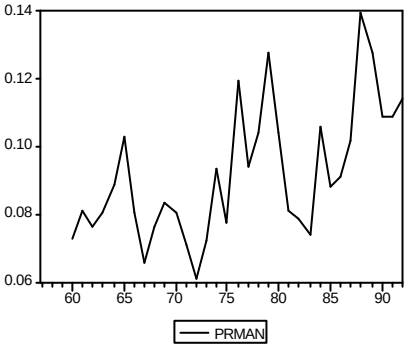
Real per capita industrial bank finance



Share of agriculture



Share of manufacturing



Proportion of development expenditure

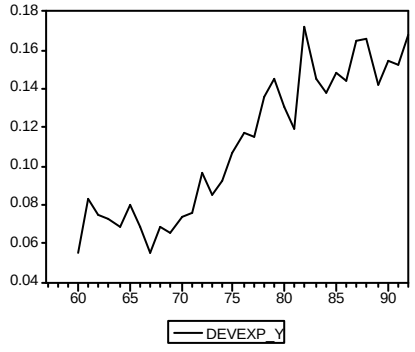
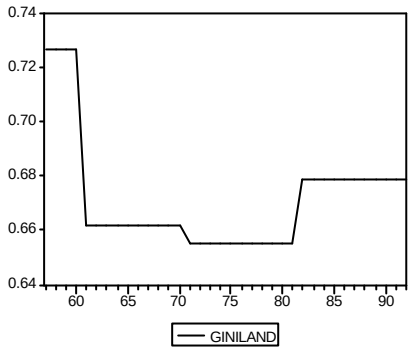
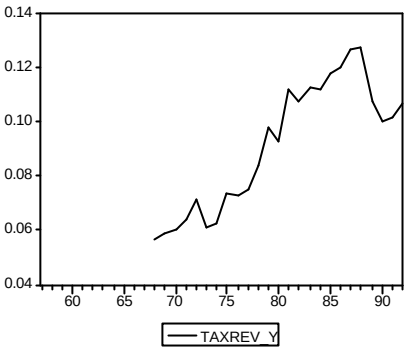


FIGURE 4b: Time series plot of other relevant variables, West Bengal

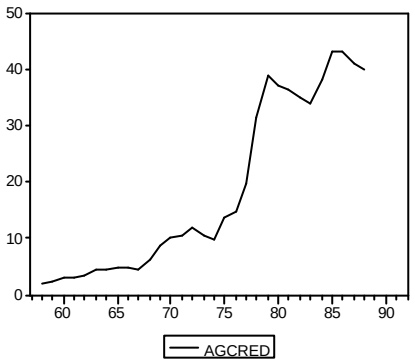
Land distribution



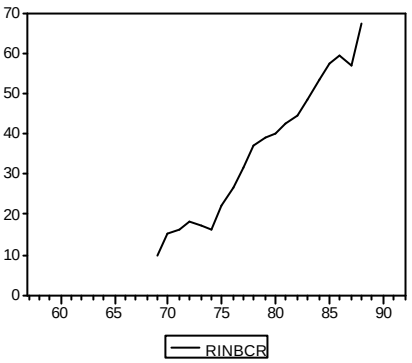
Share of tax revenue in sdp



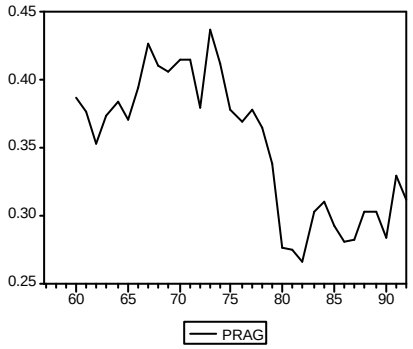
Real per capita agricultural credit



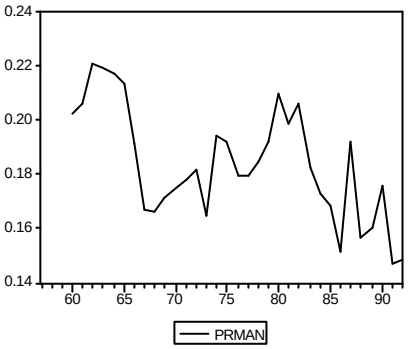
Real per capita industrial bank finance



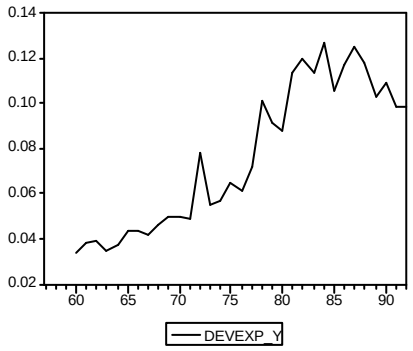
Share of agriculture



Share of manufacturing



Share of development expenditure in sdp



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NOTES

[1] This would also mean that cross sectional relationships based on this data set would not suffer from the serious problem of the potential non-comparability of data which affects cross country estimates. However, they would still suffer from several of the other problems of cross sectional studies of this issue (see above) and so this paper focuses predominantly on the time series relationships.

[2] It may be that because household consumption expenditure accounts for a high proportion of GDP, similar relationships may apply between the level or change of household income or consumption and its distribution, as between GDP growth and the distribution of household income or consumption. But this is an empirical issue.

[3] In a slightly different vein, Das and Barua (1996) examine the effect of changing trade regime on inter-regional inequality in India, with special reference to Kuznets type relationship. As indicated, our study is more general in that it also considers the effect of initial inequality on subsequent growth.

[4]Note that the Gini coefficients were estimated using parameterized Lorenz curves, using two alternative specifications: the general quadratic and the beta specificiation. The preferred specification varied by state and by urban/rural areas within the state (Datt and Ravallion, 1992). No other inequality estimates were available for this paper.

[5] Given that we use annual data to study the relationship between consumption (or its changes) and inequality (or its changes), this is perhaps not a surprising result.

[6] This corresponds to government efforts to reduce credit market segmentation where a significant proportion of total credit is still supplied by the informal agencies including the moneylender, who charge an exorbitantly high rate of interest. Although interest rates are generally lower for the credit offered by the formal sector (e.g., commercial banks), formal loans generally require some acceptable form of collateral, which in turn restrict the access of assetless poor households to formal credit.

[7] We would like to thank Professor Tim Besley for allowing us to use this additional information.

[8] While it is unfortunate that the periods are of differing length, the variations are quite small and this is not a particularly serious issue because the data set focuses on initial values and averages over the period only.

[9] Given the India government's emphasis on poverty alleviation programmes, government regularly undertakes redistributive expenditure to provide social, economic and community services aimed in favour of the poor.

[10]This captures an important aspect of segmented credit markets especially prevalent in rural India.

[11] When the dependent variable is the growth of average consumption, this captures the Barro convergence hypothesis: after controlling for all other factors, states with lower initial consumption will experience a higher rate of growth and vice versa.

[12] Here rural output is measured by the share of agricultural output while urban output by that of manufacturing output.