

OPERATIONALISING PRO-POOR GROWTH: INDIA CASE STUDY*

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Executive Summary

Given its large population, the pattern of poverty reduction in India will have a significant bearing on whether the Millennium Development Goal of halving global poverty by 2015 is achieved. The aim of this analysis is to examine the interaction of initial conditions, institutions and policy in poverty reduction. We will look at the chains of influence via enhancing growth, reducing inequality and/or increasing the anti-poverty effectiveness of growth.

This paper examines trends in growth and poverty reduction in the post-Independence period. It records India's achievements in the poverty reduction domain and examines how poverty reduction has varied across different Indian states and across rural and urban sectors.

Since different states have experimented with a variety of policies as well as having different initial conditions, India represents an ideal testing ground for examining the link between growth and poverty and for identifying factors that contribute to poverty reduction.

The paper develops a framework to look at the relationship between growth and poverty reduction which allows us to examine whether economic growth has affected the pattern of poverty reduction across Indian states.

We show that poverty reduction performance in a state will depend in part on the extent to which a unit of growth affects poverty and in part on whether the state is

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growing more quickly relative to other states. This analysis allows us to think about whether and how growth has been poverty-reducing in India.

We examine what explains the heterogeneity in poverty reduction experiences across Indian states by focusing on (i) the policy regimes that states adopted and (ii) the initial conditions which may have influenced a states' ability to reduce poverty.

Under policy regimes we look at land reform and rural bank branch expansion which enable the poor to more actively participate in growth. We also look at labor deregulation and human capital which may remove impediments to participation of the poor in economic growth.

The paper also considers political economy factors affecting both adoption and effectiveness of these different policies. In particular we will look at which factors might improve the accountability of state governments in India to their citizens and discuss the evidence for this.

The initial conditions considered are land revenue institutions, female literacy, female labor force participation and electrical generating capacity. We ask how they influenced a state's ability to reduce poverty .

We also examine trade-offs between poverty and growth effects. For a given policy we want to ask what is the impact on poverty reduction. We then examine the impact on economic growth to examine whether there is a trade-off or whether poverty reduction and growth move in the same direction. In this way we are able to ask whether there was a growth cost of reducing poverty.

The final part of the paper looks at the poverty reduction agenda going forward, identifying six key elements which are supported by evidence from cross-state empirical studies:

- **Property Rights:** Strengthening property rights over land and improving access to land via land reform has been central to efforts to reduce poverty in India. The evidence underlines the effectiveness of land reforms that seek to abolish intermediaries and reform the conditions of tenancy in reducing poverty.
- **Access to Finance:** Access to financial services is critical to allow the poor to exploit investment opportunities. We present evidence that increasing access to financial services in rural areas reduces poverty by both increasing the sensitivity of poverty to economic growth and by directly encouraging economic growth.
- **Human Capital:** Literacy and other indicators of education remain woefully low in some parts of India. The evidence that we present points to investment in education as being central to reducing poverty both by increasing poverty-growth elasticities and by encouraging economic growth.
- **Gender:** Gender inequality on India remains one of the highest in the developing world. There is evidence that states with greater gender equality in India are also the fastest growing and have greater anti-poverty effectiveness of growth.

- **Regulation:** Economic analysis is increasingly playing a role in identifying specific directions for deregulation that help the poor. We show how labor regulation is an important part of the investment climate in India and how various types of regulatory change can both increase economic growth and the extent to which the poor benefit from economic growth.
- **Political Accountability:** Over the last decade or so political economy has moved to center stage in terms of identifying effective routes to poverty reduction. Our findings point to specific factors which make governments more responsive to the needs of citizens – the role of the media, political competition and political representation for minorities. These are important elements in making growth more poverty-reducing.

1 Introduction

India is a promising case study for investigating the determinants of poverty-reducing growth. This is because the federal structure provides a source of variation in policy and institutions which allows us to make real progress in exploring the impact of policy on growth, poverty and distribution. The length of time for which data is available is also important since many of the changes in distribution that take place in the development process may be slow moving. This typically makes it difficult to identify the influence of policy over short periods of time.

Given its size, the pattern of poverty reduction in India will have a central bearing on whether the Millennium Goal of halving global poverty by 2015 is achieved. The aim of this analysis is to examine the interaction of initial conditions, institutions and policy in poverty reduction. We will look at the chains of influence via enhancing growth, reducing inequality and/or increasing the anti-poverty effectiveness of growth.

In this case study we examine the links between poverty, growth and policy in India over the 1958-2000 period using state level panel data. Our focus is on sixteen main states of India which cover more than 95% of the population. We exploit the fact that India is a federal democracy which implies that states have made different policy choices: although as explained above, central government maintains significant economic power, the heterogeneity in state level policy makes it possible to distinguish the varied economic performance of states. The rich data set we have assembled on policy choices of Indian states combined with the fact that we have detailed information on poverty and growth allows us to explore in depth the links between policy, poverty and growth. In this way we are able to draw inferences regarding the set of policies which are capable of affecting poverty in this important country.

This case study will exploit these features of the Indian context to the full. We begin by describing some of the basic facts about growth and poverty. We do so both by using the methodology that unifies the case studies and by using other methods that make more explicit use of the richness of the Indian data. Measuring poverty through growth incidence curves gives little insight into policy questions – this requires drawing on country specific studies that use credible sources of exogenous variation in policy. Research of this kind is growing in India and we will draw on these extensively in what follows.

The plan for the case study is as follows. In the next section, we discuss relevant background and institutional facts. Section 3, discusses the growth-poverty linkage. Section 4 looks into building a policy agenda for poverty reduction. In section 5, we discuss what is known about trade-offs between poverty and growth in India, and section 6 concludes.

2 Background

2.1 Historical Context

The Constitution of India came into force in 1950 providing for a federal union of states and a parliamentary system. The first Prime Minister of post-Independence India was Jawaharlal Nehru, whose party, the Indian National Congress, of socialist ideology, was in power for most of the period up 1977 with political competition intensifying thereafter. The Constitution includes a list of fundamental rights guaranteeing freedom of the press and association and gives the states and union territories significant control over their own governments. The *Vidhan Sabhas* (state legislative assemblies) are directly elected bodies set up to carry out the administration of the government in the 28 states of India (see Figure 1 for a map of India's states). The Indian parliament has amended the constitution many times since 1950. Most of these amendments have been minor, but others have been significant: for example, the 7th amendment (1956) provides for a major reorganization of the boundaries of the states, and the 73rd and 74th amendments (1993) give constitutional permanence to units of local self-government: village councils, known as *panchayats*, and municipal councils. In practice, decentralization to both states and local government bodies was quite weak before the 1990s (Rao and Singh 2004). In the mid-1990s new constitutional provisions, including the requirement that a percentage of village council seats must go to women, were implemented to help improve these local governments.

The national government has exclusive powers over areas such as foreign affairs, international trade and relations and therefore trade policies, credit and monetary policies, and those areas having implications for more than one state. The states are responsible for public order, public health care, agricultural development, irrigation, land rights, fisheries and industries, and minor minerals. Some areas are the joint responsibility of both the national and state governments, mainly education, industrial relations, transportation, social security and social insurance. As explained by Rao and Singh (2004), although the states have their own revenues (the tax on the sale and purchase of goods being its most significant source), the states help finance their expenditures with transfers from the centre, which are known to be affected by political influence (e.g. whether the same party is in power in the center and states). Even though the Finance Commission, one of the bodies giving transfers, has used "objective" formulae to determine tax sharing, it also makes various grants—and states which are more represented in the membership of that commission seem to do relatively well in terms of those grants.

Population has increased more or less steadily over the 1958-2002 period, with substantial differences across states as shown in Figure 2. While northwestern states like Haryana, Jammu and Kashmir and Assam experienced moderate population growth in both the rural and the urban sector, Uttar Pradesh and Bihar show considerable increases in urban population. Although there have been large increases in urban

populations, a majority of India's population remains in the rural areas.

2.2 Patterns of Growth

Figure 3 displays the evolution of real income per capita in India between 1958 and 1997. While before the mid 1970s India's economic performance was somewhat unstable, real income per capita has increased at a fairly steady path since 1975, with average annual growth rates around 5 percent and larger from the mid 1990s onwards. Using data from the World Bank's World Development Indicators, in Figure 4 we plot the evolution of real GDP per capita for India and some other countries in South and East Asia since 1975. East Asian countries like Singapore and Malaysia have shown higher economic growth since the beginning of the period, with the exception of Indonesia, but India and its neighbors Bangladesh and Pakistan started with approximately the same 1975 levels of income. Interestingly, despite starting at the same point, India outperformed its two neighbors, and has been surpassed only by China from the early 1990s onwards.

The measures of income that are used in Figure 3 come from the national accounts statistics. The process of gathering national accounts statistics in India officially started in 1949, when the Government set up the National Income Committee, chaired by Mahalanobis, to provide estimates of national income for the entire Indian Union. Its first report was brought out in 1951. The coverage of the national accounts was gradually extended to incorporate the estimates of private consumption expenditure (namely, expenditure by households, including non-profit institutions, on non-durable consumer goods and services and all durable goods except land and buildings), saving, capital formation, factor incomes, consolidated accounts of the nation and detailed accounts of the public sector. The national accounts statistics present income disaggregated at the sector level.¹

Figure 3 also shows the changes in real income per capita of the agricultural and the non-agricultural sector separately at the all-India level, for 1958-1997. This shows the increasing importance of the non-agricultural component in explaining economic growth since 1970, thereby highlighting the importance of diversification out of agriculture.

It is important to look at the differences across India's states. States in India are still at a high level of aggregation—they are larger than many of the countries that appear in typical cross-country analyses. Moreover, they display a substantial degree of heterogeneity in their economic performance. Figure 5 displays the evolution of real income per capita for the agricultural and the non-agricultural sector separately by

¹The classification of sectors used by the national accounts is as follows: agriculture, forestry, fishing, mining and quarrying, registered manufacturing, unregistered manufacturing, electricity, gas and water supply, construction, trade, hotels and restaurants, railways, transport by other means, storage, communication, banking and insurance, real estate and ownership of dwellings, public administration and defence, and other services.

Indian state over 1958-1997. Experiences have been varied indeed: Andhra Pradesh, Maharashtra, Tamil Nadu and West Bengal exhibit rapid increases in non-agricultural output, while for instance in Punjab the agricultural sector is still very important. Moreover, some states display remarkable economic growth, such as Maharashtra and Tamil Nadu, as opposed to the more modest performances of Bihar and Jammu & Kashmir. This heterogeneity in economic performance constitutes an ideal set-up for identifying the poverty impacts of economic growth.

Despite this heterogeneity, a few patterns arise from Figure 5, in particular the relatively flat trends in agricultural income per capita and the divergence with non-agricultural income, with the latter rising more quickly after the 1970s. This can be linked to key political and policy changes at the time, for instance land reform efforts undertaken after Independence. What is interesting from a policy perspective is there is such heterogeneity in both growth rates and in the composition of growth across Indian states. We shall return to this issue in section 4.

2.3 Poverty and Inequality Trends

The need to develop a sound data base for the analysis of socioeconomic issues was felt by Nehru, the first Premier Minister of post-Independence India, as early as 1948. It was at his insistence that the large scale sample survey agency known as National Sample Survey (NSS) came into existence in 1950 on the recommendations of the National Income Committee, which was then chaired by Mahalanobis. The most important tool for monitoring poverty since 1958 has been the Household Consumer Expenditure Surveys conducted by the NSS Organization in the form of repeated rounds, generally of one year in duration, providing poverty measures for urban and rural areas of major states in India. The main difference between the estimates of consumption by the National Accounts (published by the Central Statistical Organization) and the NSS is that the former includes expenditures by non-profit organizations in its definition of private consumption, while the latter only includes expenditures by households (for details about the relevance of this for poverty estimates, see Appendix 2). Additionally, the National Accounts consumption also includes financial services and imputed rents for housing that are not included in the consumption estimates from the NSS.

The estimates of poverty that are derived from the NSS data use the urban and rural poverty lines developed by India's Planning Commission (Government of India, 1979). These poverty lines were chosen to assure that some predetermined nutritional requirements were met. These nutritional requirements are 2100 and 2400 calories per person per day, for urban and rural areas respectively. Correspondingly, the official rural poverty line was established then at 49 1973-74 Rs., while the urban poverty line was set about 15 percent higher, at 57 1973-74 Rs. Official poverty lines by state have been updated by the Planning Commission over time using the Consumer Price Index for Agricultural Labourers and the Consumer Price Index for Industrial Workers for

rural and urban poverty respectively. The most common measure of poverty is the headcount ratio, which estimates the proportion of the relevant population living in households with consumption or income below the poverty line. Another common measure is the poverty gap, given by the average distance below the line expressed as a proportion of the poverty line, where the average is formed over the whole population. Figures 6 and 7 display the changes in total, rural and urban poverty over 1958-2000, taking the log of the headcount ratio as poverty measure, for all-India and for India's states respectively. The all-India figures show the impressive fall in poverty from the early 1970s, with urban poverty showing the steepest reduction, especially during the 1990s. At the state level, although the general pattern is that of declining poverty over the period, there is again substantial heterogeneity in poverty reduction experiences across states.

In section 4, we discuss recent research that studies the impact of key political and policy changes that might be associated with greater poverty reduction in India. The evidence suggests that states that have had greater land reform (Besley and Burgess 2000), systems of revenue collection where collection was not made by landlords but rather by individuals or the village community (Banerjee and Iyer 2002), more rapid rural bank branch expansion (Burgess and Pande 2004), higher enrollment and literacy rates (Trivedi, 2002; Ravallion and Datt 2002) higher female literacy and female labor participation rates (Esteve-Volart, 2004) and an industrial relations climate which is pro-employer (Besley and Burgess, 2004) have enjoyed greater poverty reduction. We also show that newspaper circulation, political competition and representation of lower caste and tribal groups affect how accountable government is to the needs of citizens (Besley and Burgess, 2002; Pande, 2003).

Figures 6 and 7 use data from the NSS rounds spanning the period 1957-58 to 1999-2000. While surveys up to 1993-94 (50th round) generate relatively uncontroversial estimates, the survey design and sampling changed from then on, so that questions have been raised regarding the comparability of the quinquennial 50th and 55th rounds of the Consumer Expenditure Survey. As a consequence, and even though official estimates show a steep reduction in poverty measures in the 1990s (except for Assam and Bihar), it is not clear whether these estimates are accurate. There has been considerable debate about this issue, leading to an array of adjusted numbers (Deaton and Dreze 2002, Sundaram 2001, Lal et al 2001, Sundaram and Tendulkar 2003a, 2003b, 2003c).²

Figures 8 and 9 show total (official) poverty and total adjusted (Deaton and Dreze 2002) poverty for 1993-94 and 1999-2000. The evidence from adjusted estimates at the state level is varied, but the bottom line is that official poverty levels over the period are overstated. Figures 8 and 9 incorporate adjustments for index prices as well as questionnaire survey, in fact, when both factors are taken into account, it seems that this poverty reduction may have been underestimated for most states and overestimated for a few states (namely Orissa and West Bengal).

²See Appendix 2 for details about different adjusted estimates.

The NSS data have also been used to explore inequality in India. The measurement of inequality in India has particularly benefited from the work of the World Bank team headed by Martin Ravallion, who put together series on poverty and inequality using tabulated NSS data (Ozler et al 1996). The inequality series that they estimate includes Lorenz curves and gini coefficients for rural and urban areas, as well as two measures of land ownership by households.

In Figures 10 and 11 we plot the evolution of the total, rural and urban Gini indexes at-the all India level and by state respectively across the 1958-1994 period. In broad terms, inequality at the all-India level decreased in the 1960s, increased in the 1970s, then decreased again until the mid 1980s approximately, and has more or less decreased until 1994. At the state level, again, the evidence is mixed, with some states with large increases in inequality during the 1980s and early 1990s (especially urban, in Jammu and Kashmir, Orissa, and Tamil Nadu) and another bigger set of states for which the recent pattern has been one of declining inequality (e.g., Punjab, Rajasthan). The basic data underpinning these figures is also summarized in Tables 1 and 2.

The inequality picture is somewhat different for the period 1993-94 to 1999-2000. Deaton and Dreze (2002) explore the evolution of inequality in the 1990s adjusting expenditure data from the NSS. According to their estimates, consumption patterns have diverged across states along the period, and rural-urban inequalities have increased at the all-India level. However, they do not find evidence of clear rural-urban increases in inequality within states.³ For most states, their measure of inequality either is the same in both periods or it has slightly increased,⁴ while it has slightly declined for some states too. Within-state inequality seems to have decreased more in rural areas than in urban areas. Deaton and Dreze's calculations also suggest that inequality may have moderated the effects of growth on poverty reduction. In similar vein, Banerjee and Piketty (2003) use tax data to argue that the post-liberalization period (1992 onwards) has been associated with an increase in the incomes of the very rich but had a more uniform impact on the rest of the taxpayers.

The all-India picture shows increased real output per capita throughout the period. This is especially true of non-agricultural income since 1970. This has been accompanied by sustained poverty reduction, in both rural and urban areas. The time path of inequality cannot be simply summarized for the whole period. However, the rise in inequality in the 1970s coincides with the take-off of non-agricultural output and hence seems not to have been translated into higher poverty. Economic growth was sufficiently strong to generate poverty reduction until the close of the 1980s and during the 1990s in spite of increases in inequality. Thus it is important to look at distributional and income changes together to gain the complete picture.

The data set that we use in this case study spans the 1958-2000 period and in-

³The measure of inequality in Deaton and Dreze (2002) is the difference between the logarithm of the arithmetic mean of consumption and the geometric mean of consumption.

⁴Rural Haryana is an exception. It displays a stark increase in inequality, from 0.16 to 0.23.

cludes data from India’s major sixteen states. The growth variables that we use are real per capita agricultural, non-agricultural, and combined state domestic product. Agricultural state domestic product was deflated using the Consumer Price Index for Agricultural Labourers while the Consumer Price Index for Industrial Workers was used to deflate the non-agricultural state domestic product. We use the poverty measures put together by Ozler et al (1996), who estimated headcount index and poverty gap measures from the grouped distributions of per capita expenditure published by the NSS, updated to 2000.⁵ As argued before, for the sake of robustness we also use the adjusted headcount ratio estimates for 1993-94 and 1999-2000 by Sundaram and Tendulkar (2003b).

This case study uses a variety of policy measures. Our measure of land reform comes from Besley and Burgess (2000), while measures of access to credit come from Burgess and Pande (2004). In particular we use per capita agricultural credit, which comes from the Reserve Bank of India. Another policy related variable in this study is a measure of labor regulation. This variable is taken from Besley and Burgess (2004), and measures whether labor regulation in Indian states has been moving in a pro-worker or pro-employer direction across the 1958-92 period. Additionally, we use a measure of the degree of unionization in manufacturing. Measures of human capital, such as female and male literacy, come from the Census of India, issues 1961, 1971, 1981 and 1991. Female labor force participation is also included as control for initial conditions, and is taken from the Census of India 1961. Detailed variable definitions are provided in the Data Appendix.

3 Analysis of the Poverty Impact of Growth

3.1 The Growth-Poverty Link

This section investigates the role of economic growth in explaining poverty reduction in India. A simple way to summarize this is to run regressions of the form:

$$p_{st} = \alpha_s + \gamma_t + \beta_s y_{st} + \varepsilon_{st}.$$

where s denotes an Indian state and t denotes a year, α_s is a state fixed effect, γ_t is a year fixed effect, p_{st} is the log of the poverty headcount ratio, and finally y_{st} is the log of income per capita.⁶ These regressions are run separately for the sixteen main

⁵We thank Guarav Datt and Martin Ravallion for providing us with updates of the poverty series to 2000.

⁶It is important to note that y_{st} is income per capita not consumption per capita. In many ways it would be natural to use the latter, but for the fact that most studies of growth look at determinants of income and not of consumption. Hence, it would not be straightforward to translate conventional statements about growth into statements about poverty. If we look at poverty/consumption elasticities, we find a larger number. However, this is explained by the fact that a regression of log consumption per capita on log income per capita at the state level yields a coefficient which is

Indian states for the period 1958-2000 exploiting the fact that, as seen in Figures 5 and 7, there is significant heterogeneity in both growth and poverty reduction across Indian states.

The coefficient β_s represents the poverty reduction efficiency of growth within states. As both poverty and income per capita are measured in logs, this coefficient is the elasticity of poverty with respect to growth. It tells us, what percentage fall in poverty was achieved for each percentage increase in income per capita. States with a higher value of β_s (in absolute terms) have experienced growth spells that have yielded greater poverty reduction. Thus having a high β_s provides a plausible notion of more effective poverty-reducing growth. Understanding what policy factors – economic, social and political factors – are associated with high β_s , provides a way of thinking about how to operationalize poverty-reducing growth.

One way of thinking about the interpretation of β_s is as follows. Suppose that consumption is proportional to income and the cumulative distribution function for consumption is $F(y; \sigma)$ where σ is some measure of inequality. Consider a proportional scaling up of mean consumption of Δ and let the share in the gain be $\alpha(y)$ as a function of one's place in the consumption distribution where:

$$\int y \alpha(y) dF(y; \sigma) = 1.$$

Then, the headcount after growth of Δ will be:

$$F(\hat{y}(z, \Delta, \sigma); \sigma)$$

where $\hat{y}(z, \Delta, \sigma)$ solves:

$$z = \hat{y}(z, \Delta, \sigma) (1 + \alpha(\hat{y}(z, \Delta, \sigma)) \Delta).$$

Then the change in the (log) headcount is:

$$\log(F(\hat{y}(z, \Delta, \sigma)) / F(z)) \simeq -\frac{f(z; \sigma)}{F(z, \sigma)} \times \left[\frac{z \alpha(z)}{1 + \alpha'(z) z} \right] \Delta = \beta \Delta$$

Thus,

$$\beta_s = -\frac{f(z; \sigma_s)}{F(z, \sigma_s)} \times \left[\frac{z \alpha_s(z)}{1 + \alpha'_s(z) z} \right]$$

which is determined by features of the income distribution as measured by $\frac{f(z; \sigma_s)}{F(z; \sigma_s)}$ and by the way in which income accrues to the poor as measured by $\left[\frac{z \alpha_s(z)}{1 + \alpha'_s(z) z} \right]$.

The “explained” component of poverty reduction between any two time periods in a given Indian state will be a function both of the state poverty-growth elasticity β_s and the state growth rate g_s :

$$\Delta \hat{p}_{st} = \beta_s g_s$$

significantly below one.

where the coefficient β_g represents the poverty efficiency reduction of growth within states. This coefficient summarizes many things, but it loosely summarizes how much growth within a state is poverty-reducing.

Table 3 shows the poverty elasticities with respect to growth for India's states. The estimated elasticities are negative in every case, confirming that increases in income per capita are associated with poverty reduction. This is consistent with the findings of a variety of studies (Dollar and Kraay 2002, Ravallion 2004, Besley and Burgess 2003, Bourguignon 2002). The average elasticity estimated for India is -0.65, with an average (robust) standard error of 0.08. The size of the coefficient means that an increase in growth of one percent is associated with a reduction in poverty of 0.65 percent. That is, growth reduces poverty less than proportionally. However, this is only an average, and we are more interested in seeing whether some states are more efficient than others in reducing poverty through growth. Table 3 shows that elasticities range from -0.30 for Bihar to -1.23 for Kerala.

It is interesting to see how these numbers compare with estimates found for other countries and regions. In particular, we can compare the estimates in Table 3 with the cross-country estimates in Besley and Burgess (2003), which are given in Table 4. These estimate the poverty elasticity with respect to income per capita to be -0.73 (with a robust standard error of 0.25) for a sample of 88 low- and middle-income countries. This is about the same size of the estimated elasticity for Andhra Pradesh, for which the elasticity equals -0.76 (with standard error of 0.05), and similar to that of Orissa and Gujarat. Indeed, the average estimated elasticity for Indian states is -0.65, just slightly below the estimated global average elasticity.

By region, the highest elasticities in absolute value (and hence where growth is associated with the greatest poverty reduction) are for East Asia and the Pacific, and Eastern Europe and Central Asia. These have an elasticity that is greater than one in absolute terms. The lowest (absolute) elasticities are found for South Asia, with -0.59 (s.e.=0.36), which is similar to our estimated average elasticity for India, and Sub-Saharan Africa, where the elasticity is -0.49 (s.e.=0.23).

Although India's average elasticity is somewhat modest in international terms, the estimates by state show the variety across India's states: in particular, Kerala and West Bengal exhibit remarkable larger-than-one elasticities, as large as the elasticity for East Asia and the Pacific. On the more negative side, a bunch of Indian states (namely, Bihar, Assam, Madhya Pradesh, Maharashtra, and Rajasthan) show elasticities as low as those of Sub-Saharan Africa.

Hence Table 3 exhibits variation in poverty-growth elasticities among India's states that is approximately as big as the variation at the global level. This degree of heterogeneity of India's states elasticities is very interesting from a policy perspective: what has made Kerala's growth more poverty-reducing than Maharashtra's growth? Why in some states has growth been associated with impressive poverty reduction, like in West Bengal, while in others, like Bihar, economic growth has only lead to modest poverty reduction? It is possible that some of this heterogeneity can

be explained by different initial conditions? In particular, we expect states that have better education and infrastructure to be more able to transform growth into poverty alleviation effectively. The empirical evidence on the importance of institutions, for instance, take us one step forward in explaining why these initial conditions matter. Nevertheless, there is also the possibility that differences in the poverty reduction experiences of states can also be explained by differences in the policy climate, as suggested by a growing body of evidence that links state level policies with economic performance.

The measure of poverty that we have used for estimating the elasticity coefficients in Table 3 is the headcount ratio. We have also estimated the state poverty elasticities with respect to growth with alternative measures of poverty, in particular the poverty gap and the squared poverty gap (Tables A2 and A3 respectively). The estimated elasticities with these two measures exhibit lower values, that is, growth would be more poverty-reducing (average elasticities are -1.09 (s.e.=0.14) and -1.42 (s.e.=0.19) with the poverty gap and the square poverty gap respectively). However, the variety of performances across states remains the same, with the same distribution of losers and winners in terms of the elasticity of poverty reduction with respect to growth: with Kerala, West Bengal and Punjab experiencing the greater poverty reductions for a level of growth, and Assam and Bihar among the worst experiences in the poverty reduction efficacy of growth. Throughout this paper we use the headcount ratio estimates.

In Table 5 we introduce a measure of inequality into the picture, so that we are effectively estimating:

$$p_{st} = \alpha_s + \gamma_t + \beta_s y_{st} + \gamma_s \sigma_{st} + \varepsilon_{st}. \quad (1)$$

where σ_{st} denotes the standard deviation of the logarithm of income.⁷

We are interested in measuring the elasticity of poverty with respect to inequality as well as in finding out whether controlling for inequality changes the estimates of the poverty-growth elasticity. The poverty-growth elasticities in Table 5 are similar to those in Table 3, except that now Bihar does not have the lowest coefficient in absolute terms which is now found in Assam. West Bengal now has the same elasticity as Kerala.

More interesting is the observation that the poverty-inequality elasticity varies a lot in size and sign. For example, for Haryana and Maharashtra, more income inequality is associated with *greater* poverty, while Andhra Pradesh, Bihar and Karnataka show significantly negative elasticities – an increase in income inequality is associated with poverty reduction. For the remaining states, as well as for the average of all states, the inequality-elasticity is not significantly different than zero. The

⁷This is calculated from the gini index as follows:

$$\sigma = \sqrt{2}\Pi^{-1}\left(\frac{1+G}{2}\right)$$

where Π denotes the cumulative standard normal distribution and G is the gini index divided by 100 (Aitchison and Brown 1966).

pattern of variation between inequality and poverty is therefore much less clear cut than that between economic growth and poverty.⁸ This is not to say that inequality is not important. However, it is clear that the data does not associate inequality reduction with poverty reduction in the same way as it presents a robust picture linking economic growth and poverty reduction.

3.2 Decompositions

We now suggest two ways of decomposing the explained component of each state's poverty reduction experience. In the first of these we separate out that part of a state's performance that is due to its growth record against that part which is due to the anti-poverty effectiveness of a given amount of growth. In the second, we separate the poverty reduction experience into a growth and inequality component using the results from running equation (1).

3.2.1 Growth and Anti-poverty effectiveness of growth

In comparing poverty reduction experiences across Indian states, it is useful to consider the following decomposition:

$$\Delta \hat{p}_{st} = \bar{\beta} \bar{g} + (\hat{\beta}_s - \bar{\beta}) \bar{g} + \beta_s (g_s - \bar{g}).$$

where $\bar{\beta}$ is the average poverty-growth elasticity and \bar{g} is the average growth rate. The first term is thus the average reduction in poverty, the second term is a measure of the efficacy of growth in reducing poverty, and the third term is a measure of how the growth level differs across states.

Intuitively, there are two routes through which poverty reduction performance can be enhanced:

1. By having higher than average poverty-growth elasticities – i.e. the $(\hat{\beta}_s - \bar{\beta}) \bar{g}$ element.
2. By having higher than average growth rates – the $\beta_s (g_s - \bar{g})$ element.

We then let the data tell us which states have done better than average in any of the relevant dimensions. The values given by the decomposition of these elements are in Table 6. The poverty-growth elasticity component is in column (3), while the growth rate component is in column (4).

Examining the sign of these two effects allows us to group states into four groups:

- — states – these are low performing states which are doing worse than average in terms of both poverty elasticities and growth rates

⁸Tables A2 and A3 in Appendix 1 provide estimates of β using the poverty gap and the squared poverty gap respectively as poverty measures .

- ++ states – these are high performing states that are doing better than average in terms of both poverty elasticities and growth rates
- +- states – these are states which have higher than average poverty elasticities but lower than average growth rates
- -+ states – these are states which have lower than average poverty elasticities but higher than average growth rates

This classification (shown in Box 1) will allow us to think about the heterogeneity in poverty reduction experience in India. From a policy perspective, we want to know what it is in terms of policy that high performing states are doing differently to low performing states. Admittedly, there are still stark differences between states in each category: this classification should not be viewed as a judgement but rather a useful way of classifying states in the poverty-growth coordinates. Similarly, although it would be interesting to look at more disaggregated time periods, regressions with fewer data points would not be reliable.

Below, we will discuss some specific case studies for states that receive different classifications according to this methodology.

3.2.2 Growth and Inequality

An alternative decomposition is to look at changes in both growth and inequality using the fact that the explained change in poverty can be written as:

$$\Delta \hat{p}_{st} = \beta_s g_s + \gamma_s \phi_s$$

where

$$\Delta \hat{p}_{st} = (1/N \sum \beta_s g_s + 1/N \sum \gamma_s \phi_s) + (\beta_s g_s - 1/N \sum \beta_s g_s) + (\gamma_s \phi_s - 1/N \sum \gamma_s \phi_s).$$

where ϕ_s denotes the change in the measure of inequality for state s , γ_s is the poverty-inequality elasticity, and N is the number of states. The first term is thus the average reduction in poverty, the second term is the growth component, and the third term is the inequality component of poverty reduction. Table 7 shows this alternative decomposition.

Column (1) shows the growth component: Kerala, Punjab and West Bengal show a relatively large growth component, while this is relatively smaller for Bihar, Rajasthan and Assam. In column (2) we see that inequality has played a relatively larger role in poverty reduction for Haryana and Punjab, while this has been smaller for Bihar, Maharashtra and Assam. It is particularly notable that Bihar, whose record is poor in both dimensions, has experienced a significant increase in poverty due to the change in inequality over this period.

Comparing columns (1) and (2), it is clear that growth rather than changes in inequality is far more important in explaining the variety of poverty experiences across Indian states.⁹ Only in Haryana is the inequality change more important than the growth component in the effect that it has had in reducing poverty. Among the states that have had very significant reductions in poverty – Andhra Pradesh, Kerala, Punjab, and West Bengal, the explained component due to changes in inequality are small.

3.3 Case Studies

We now return to the decomposition in Box 1 above and take a closer look at the underlying heterogeneity by taking an example of each type of state according to our main decomposition (in which we look at the poverty-elasticity and the growth components). This will help to breathe some life into the quantitative comparisons. Again, this classification is only a descriptive tool for a rather long time period, but it is still useful in order to think about different experiences in the poverty-growth spectrum.

Kerala As a case study of a ++ state, we examine Kerala which has been successful both in creating economic growth and in making this growth effective at reducing poverty. Kerala is the paradigm of social well-being and public action in India. It has the best public-food distribution system, the lowest birth and death rates, and the highest immunization rate in India (Ramachandran 1997). Women in Kerala have made important gains in health and education, and participate more in the organized labor market. In fact, literacy rates are (and have been since 1961) the highest in India, for both men and women, at 93 and 84 percent respectively in 1991 according to the Census of India. The circulation of newspapers is more widespread in Kerala than in any other state (Besley and Burgess 2002). There have been important achievements with respect to the abolition of untouchability. The most radical implementation of land reforms in India has happened in Kerala: land reform transferred land to 1,630,000 households (Radhakrishnan 1989), reducing both land and income inequality and undermining the material basis for caste and class inequality (Franke 1993). In summary, Kerala's achievements are linked to mass literacy and to the fact that traditional patterns of gender, caste, and class dominance were transformed radically after Independence (Ramachandran 1997).

West Bengal We take the state of West Bengal as an example of +- state. This is a state that has experienced relatively little growth over 1958-2000, but this growth has effectively reduced poverty. From Table 11 we see that this is especially true for rural areas. The pace of urbanization has been relatively slow in West Bengal,

⁹ This is on top of the fact that our regressions in (1) did not yield a consistent story about the effect of inequality change on poverty.

with low economic growth due to stagnating industrial performance and substantial pro-worker labor regulation (see Besley and Burgess 2004) and limited agricultural growth between the early 1950s and the early 1980s.¹⁰ West Bengal exemplifies the feasibility of political transformation: it has been unique in being ruled since 1977 by a coalition of left-wing parties that are publicly committed to improving the welfare of the rural poor as a matter of priority. Its victory was possible thanks to the region's political history of involvement in anti-colonial struggle and peasant movements. The reform programme set by this government has been based on two fronts: democratic decentralization (in the form of the local government Panchayati Raj Institutions (PRIs)) and agrarian reforms (in the form of Operation Barga).

Although some attempts at agrarian reforms had been made before 1977, it was not until the establishment of Operation Barga, that effectively encouraged and protected the registration of tenants, that tenure started being perceived as secure (Bardhan and Rudra 1984). Registration of tenants increased from 15 percent in 1978 when the operation was launched to 65 percent in 1993 (Banerjee et al 2002). On the one hand, Operation Barga has been able to extend security of tenure to tenants who previously faced a constant threat of eviction by landlords, and this has translated into higher crop shares for tenants. On the other hand, an unwanted side-effect of tenancy regulation from the distributional point of view may have been the restriction in the supply of potentially profitable new leases (Sengupta and Gazdar 1997). That is, the agrarian reforms in West Bengal have been a useful tool in poverty reduction but their total productivity effect is not theoretically clear. The evidence is that after very low agricultural growth relative to India as a whole during the 1970s, agricultural growth took off in 1983. This may be related to the length of the registration process, as by 1979 only 15 percent of tenants were registered. Banerjee et al (2002) estimate an overall positive effect of Operation Barga on agricultural productivity. In sum, agrarian reforms in West Bengal constitute an example of the role of institutions which have strengthened the enforcement of property rights, shaping economic incentives and improving the welfare of the landless.

The decentralization effort into PRIs is perceived to have been successful in implementing poverty alleviation programmes: while in other states in India beneficiaries of such programmes were often the well-off relatives of Panchayat officials, most beneficiaries in West Bengal were found to be from the target group – this was partly achieved thanks to greater popular participation in programme implementation: the poor's participation in local democracy has promoted political accountability (Sengupta and Gazdar 1997).

Maharashtra Maharashtra is an example of state $-+$: although it has had above-average economic growth over 1958-2000, it has failed to transform this economic growth into substantial poverty reduction. Maharashtra is the most industrialized

¹⁰In 1960, 23% of India's industrial output was from West Bengal, but this figure fell to 10% in 1980 and was under 7% by the end of the 1980s (Sengupta and Gazdar 1997).

state in India: while agricultural income was important until around 1970, non-agricultural income has taken off since then (Figure 4), partly due to several consecutive droughts in the early 1970s. Maharashtra has relatively good social conditions: the social climate is not as good as that of Kerala but, as opposed to Uttar Pradesh, literacy and life expectancy rates are relatively high, and birth, death and infant mortality rates are relatively low (Dreze and Sen 1995). What is the factor that may be hindering the poverty reduction efficacy of growth? Unlike other Indian states, Maharashtra's growth has been driven by industrial and service sectors, while growth in agriculture, the largest provider of livelihood to the state's citizens, has remained relatively low and its productivity below national average. Indeed, Maharashtra has a high level of inequality as compared to most other Indian states: it consists of two quite separate regions: prosperous urban centers comprising of Mumbai and Pune, and a relatively dry rural interior. Another factor underlying the poor poverty-reducing efficacy of growth in Maharashtra may be due to the former control by the Nizam of Hyderabad, who made areas under his rule socially regressive and failed to provide good rail connectivity relative to British-ruled areas. Mumbai is home to the largest number of rich Indians and to the largest number of slum dwellers in the country at the same time. Some interventions are reported to benefit the well-off: power and electricity subsidies tend to benefit the better-off farmers (sugarcane growers) and households (World Bank 2002b).

Uttar Pradesh As an example of — state we focus on Uttar Pradesh (UP), a primarily agricultural state: it has experienced relatively low growth during the period, and this growth has failed to successfully translate into greater poverty reduction. Economic growth in UP has been low because agriculture continues to stagnate. UP is still constrained by state and central government regulations that limit price movement and intrastate commerce, public procurement, and canalization of trade. Heavy reliance on subsidies to electricity and a large wage bill, moreover, have crowded out public investment in roads, irrigation, and agriculture technology (World Bank 2002a). The quality and availability of infrastructure is poor: the power infrastructure is so weak that more than 90 percent of firms have their own generator (the comparable figure for Maharashtra is 50 percent) (Stern 2003). In comparison with West Bengal, where land reform efforts appeared late and have affected poverty reduction greatly over the period, in Uttar Pradesh land reform efforts were early (mainly in the 1950s) and since then, in the absence of major redistributive programmes, the gradual expansion of private incomes only lead to a slow decline in conventional indicators of poverty. Although decentralization to local governments was undertaken in both West Bengal and Uttar Pradesh, in the latter this has failed to provide local democracy and accountability.

If we compare UP with Kerala, we also find some sharp contrasts. As opposed to Kerala, Uttar Pradesh belongs to the group of states with the lowest life expectancy, immunization, and literacy rates in India, and the highest fertility rates and levels of

undernutrition. Female-to-male ratios (on the decline since 1901) are the lowest in India (879 women per 1000 men in 1991), reflecting female disadvantage in survival from birth until the mid-thirties. This social climate constitutes a candidate for explaining the stark contrast between Kerala's and Uttar Pradesh's poverty-growth elasticity. While Kerala has enjoyed an advanced social climate, conducive to transforming growth into poverty reduction, the social backwardness in Uttar Pradesh has not allowed economic growth to reduce poverty effectively. Another (related) candidate in explaining UP's low poverty-growth elasticity is the poor functioning of public services, such as the public food distribution system. Both aspects, backward social conditions and poor public services, are rooted in the state's low commitment to development and social equity, and the failure of its civil society to promote social needs (Dreze and Gazdar 1997). It is also possible that UP's low poverty-growth elasticity has to some extent not allowed the state to become more socially developed. Whatever the causality is, there seems to exist a strong association between Uttar Pradesh's social backwardness and the efficacy with which economic growth reduces poverty.

Comparison with China To extend this analysis further afield, it is interesting to take an international comparator – the case of China. A regression of cross-country data on poverty and growth indicates that China is a ++ country: that is, that not only has China achieved high growth in per capita GDP but also this growth is efficient in reducing poverty. Data on GDP per capita in PPP terms from the World Bank Development Indicators (2001) shows that although India used to be richer than China between 1975 and approximately the late 1980s, China's economic growth then took off, outperforming India from 1990. By 1999 China enjoyed a GDP per capita about 1.6 times higher than India's (see Figure 4). Diversification and growth penetrated rural China in a way which it did not in India. Moreover, poverty rates have declined much more in China than in India since 1980. In particular, World Bank estimates from household survey data indicate that the percentage of individuals living under \$1 a day in 1981 was higher in China (64%) than in India (54%), but in 1990 China already had lower poverty rates (33% versus India's 42%). In 1999, China has managed to reduce poverty to 16%, while the figure is 35% for India. But how was China's poverty performance achieved?

Argang et al (2004) suggest six main reasons for China's large poverty reduction. First, China's high economic growth (higher than India's, Figure 4). Second, the importance of the non-agricultural sector in rural areas (township and village enterprises have more than doubled since 1978). Third, the increased urbanization rate. Fourth, the implementation of export-oriented policies (exports of labor intensive commodities has especially increased). Fifth, the improvement of human capital: the illiteracy rate has dropped from 23% in 1982 to 7% in 2000 according to the authors' calculations. These figures are much lower than India's 50% illiteracy rate according to the Census of India 1991. Finally, the authors also mention the

anti-poverty actions adopted by the government (mainly to increase and loosen the price of agricultural products). According to this information, some tentative lessons for India might be drawn regarding the importance of the non-agricultural sector in rural areas, literacy, and openness to trade.

3.4 Sources of Growth

In this section, we break up state income into its different components to see whether different types of growth have different effects on poverty. This will be a useful first step in getting behind the patterns in the data. In Tables 8, 9 and 10 we examine the contribution of each productive sector to poverty reduction in India across the period 1965-1994.¹¹ As shown in Figure 3, the path of non-agricultural output per capita is similar to that of agricultural output per capita up to the mid-1970s, but the former takes off after that. This diversification process happened at different rates in different states which makes it interesting to see how this evolution affected poverty reduction.

We can also look at whether variations in the components of growth have differential effects on poverty reduction. Table 8 shows the average shares of each productive sector across 1965-94 by Indian state. In Table 9 we present the results of regressing total poverty on three different types of real income by sector, weighted by their respective shares in total output. The three broad sectors we look at are primary (agriculture, mining, forestry and fishery), secondary (manufacturing, construction, electricity, water and gas), and tertiary (transport, storage, communication, trade, real estate, banking, and public administration).

We use panel regressions across Indian states including year and state fixed effects to relate patterns of growth to changes in poverty. The bottom row of Table 9 gives the estimates from a pooled regression of all states. The coefficients for the three sectors are negative and significant, meaning that each of the three sectors contributes to poverty reduction in a significant way. Moreover, the estimated elasticities for the secondary and tertiary sectors are larger than the estimated elasticity for the primary sector. That is, a one percent increase in either the secondary or the tertiary sector output reduces total poverty by more than a one percent increase in the primary sector output. These estimated elasticities by state display substantial heterogeneity. While poverty-growth elasticities in the tertiary sector are negative and statistically significant for all states but two (Punjab and Rajasthan), the primary and secondary sectors show significant poverty-growth elasticities for about a half of India's states only.

Table 10 performs a decomposition analysis to explore how much of the poverty reduction can be explained through a change in output, and how much can be explained through a change in the share of each sector, by productive sector. Having a greater share of income generated in a sector is better if that sector grows more.

¹¹We use the period 1965-1994 in order to include as many states as possible in our calculations.

However, it may also be that sectoral change is important to poverty reduction in and of itself.

We disaggregate the explained poverty change over 1965-1994 across the three productive sectors taking into account two elements: first, how much is given by the (output) growth in that sector over the period, given its average share, and second, how much is given by the increased share of that sector in the economy, given the output growth in that sector. The decomposition of the explained poverty change into the percentage explained by each productive sector corresponds to:

$$\Delta \hat{p}_s \approx \sum \beta_{ks} (\bar{s}_{ks} \Delta y_{ks} + \bar{g}_{ks} \Delta s_{ks})$$

where s_k denotes the share of sector k in total output, \bar{s}_{ks} denotes the average share of sector k in state s , and $\bar{g}_{ks} = \frac{1}{2} \Delta y_{ks}$.

Contrary to previous evidence from Ravallion and Datt (1996),¹² the results in Table 10 suggest that the biggest contribution to poverty reduction has come from the secondary and tertiary sectors, while the primary sector has only had significant contributions in a few states (namely Assam, Bihar, Gujarat, Punjab, and West Bengal). Even in states where the primary sector has contributed to poverty reduction, both the secondary and the tertiary sectors have contributed more to poverty reduction (e.g., while the primary sector has contributed to 24% of the explained poverty reduction in Bihar, the numbers are 32% and 42% for the secondary and tertiary sector contributions respectively). Overall, the primary sector is more important than the secondary sector in explaining poverty reduction only in Assam and West Bengal, and the tertiary sector is more important than the primary sector in all states bar Tamil Nadu.¹³

It is also interesting to look at the rural-urban dimension of the growth-poverty linkage. Do particular types of growth have different effects on rural and urban poverty? What types of growth have played a central role in driving down poverty in rural and urban settings? For this purpose we have also estimated β_s distinguishing between rural and urban poverty. Estimated elasticities are in Table 11. Results from regressing the log rural headcount on the log real income per capita are in column (1), while those from regressing the log urban headcount on the log of real income per capita are in column (2).

¹²They actually find that the secondary sector contributes negatively to poverty reduction. However, they also find that the services sector contributes more to poverty reduction than the primary sector.

¹³In appraising these results, it is important to note that the methodology in Ravallion and Datt (1996) differs from ours in a number of ways. First, they use aggregate data. Second, they do not include year effects. Third, they use a deflator derived from the national accounts statistics, while we use a combination of the consumer price indices for agricultural laborers (CPIAL) and for industrial workers (CPIIW) as in other work (Besley and Burgess 2000, 2004). Finally, they add the change in the rural price index (CPIAL) relative to the national accounts statistics deflator as an additional regressor.

A couple of interesting observations emerge from this exercise. On average, the efficacy of aggregate growth in reducing poverty is higher in terms of urban poverty than in terms of rural poverty. The average β_s equals -0.85 for urban poverty, but is a more modest -0.60 for rural poverty. This is consistent with previous studies (Datt and Ravallion 1998, 2002, Ravallion and Datt 2002).

3.5 Measuring the Distributional Impact of Growth on Poverty

The estimates of the impact of growth on poverty we have examined so far come from a regression based methodology based over a long time horizon. In this section, we look at a more recent time period using the methodology put forward by Ravallion and Chen (2003) applied to Indian data. Appendix 1 explores the application of this methodology to tabulated distributions of household monthly per capita expenditure for the periods 1993/94 and 1999/2000. The reader is referred to Appendix 1 and the Methodological Appendix for detail. The key idea is to look at the distribution of benefits from economic growth at different points in the income distribution. Appendix 1 gives all-India results for rural and urban samples, using two different poverty lines (a national poverty line, which represents "extreme" poverty, and a "regular" poverty line of twice as much). Results are summarized in Tables 12 and 13.

In Table 12, we look at rural growth. Columns (1) and (2) are in per annum terms and look at the growth rate at the mean and the pro-poor growth rate using a national poverty line that approximates an "extreme" level of poverty. The pro-poor growth rate in India with this national poverty line, 0.94%, lies below the overall growth rate, 1.24% (the all-India distributional effect equals 0.76). The pro-poor growth rate is naturally higher for a higher poverty line, corresponding to "regular" poverty.

The results for urban poverty are in Table 13. The rate of pro-poor growth is 0.57% per year, lower than that for the rural sample, and the growth rate, 1.94%, is higher, resulting in a substantially lower distributional effect (equal to 0.30 for the national poverty line).

These results are consistent with those in Ravallion (2004), who calculates an aggregate national growth rate of 1.3% per year and pro-poor growth rate of 0.8% for the same time period.

The underlying poverty reduction performances and decompositions into growth and distribution effects are displayed (in percentage terms) in columns (3)-(5).¹⁴ The growth component tends to be the dominant force, which is consistent with the general story coming from the regression based method using the longer time horizon which we reported in Tables 5 and 10. In fact, for the urban sample, the redistribution component has tended to increase poverty.

¹⁴These decompositions are based on Ravallion and Datt (1992) methodology as detailed in the Methodological Appendix.

4 Building an Agenda for Poverty Reduction in India

In this section we focus on the question of which policy interventions work in India. We look at six important policy areas where there is robust empirical evidence of an effect of policy on poverty and/or economic growth. We review evidence from cross-state regression analysis. We also explore whether the cross-sectional patterns of growth and poverty reduction (via the coefficient β_s estimated in the previous section) mirror this evidence from such studies. Finding that it does reinforces the usefulness of looking at poverty-reducing growth through the kind of decomposition presented in Table 6.

We begin with the link between land reform and poverty reduction. We then examine how access to credit can enable poor households to transform their production and employment activities and exit poverty. Links between education, growth and poverty reduction are examined next. We then turn to looking at how female education and labor force participation can increase economic growth and reduce poverty. Our focus next falls on the role of the state and specifically the links between labor regulation, growth and poverty. Finally we examine measures which make governments more accountable to citizens. These include the role of mass media and political competition in making governments more responsive to the policy preferences of citizens and the role of political reservation in ensuring that disadvantaged groups are politically represented.

The policy analysis that we report on uses state level panel data for the entire post-Independence period. It exploits the fact that, since India is a federal democracy, states have different initial conditions and received different policy treatments during the post-Independence period. This provides an ideal testing ground for looking at how policy regimes and initial conditions affect poverty-reducing growth.

To assess the effect of policies on poverty requires that there be a credible source of reasonably exogenous policy variation. The studies that we discuss here proceed as follows. The main dependent variables that can be studied are income per capita, poverty and inequality. For some vector of policy variables, this permits the analyst to estimate panel data regressions of the form:

$$y_{st} = \alpha_s + \beta_t + \gamma x_{st} + \phi z_{st} + \varepsilon_{st}$$

where y_{st} is the outcome variable of interest (e.g. poverty) in state s at time t , x_{st} are policy variables of interest (i.e. land reform, access to finance, human capital, gender, regulation and political economy variables), α_s is a state fixed effect which captures initial conditions and sources of permanent heterogeneity such as geography and history, β_t is a year dummy variable which controls for macro-economic influences which are common across states, and z_{st} are variables which control for other factors that could affect poverty or growth.

The coefficient of interest is therefore γ which tells us whether variation in a given policy affects is systematically related to an outcome variable like poverty. Unbiased estimation of policy effects requires that the policy variables (x_{st}) be uncorrelated with the error. The inclusion of state fixed effects α_s is important here as sources of fixed social, political, economic and cultural variation which are likely drivers of policy choices are controlled for. The variables z_{st} can also help to control for time-varying influences on policy choice, for example by including measures of political control. Thus, while the policy variation is not experimental, the Indian context does provide a promising context for identifying policy effects.

In practice, most of the work so far has focused on policies that drive growth and poverty as left hand side variables. Much less is known about drivers of inequality. In a cross-country context, the main outcome variable of interest is almost always economic growth – even less is known about drivers of poverty and inequality.

For the remainder of this section, we report on work that exploits some kind of panel regression method to look at the effects of policy on outcomes. We emphasize the importance of drawing on such quantitative studies in informing the policy debate. Even though the range of policies that can be studied is somewhat limited, we believe that this evidence based approach does play an important role in shaping the agenda. As well as presenting the evidence directly, we also try to tie these studies back to the previous section by relating policy outcomes (and in some cases initial conditions) to the parameters (β_s, g_s) above. We will also discuss some aspects of policy where more evidence is needed.

4.1 Property Rights

Given that the majority of India’s poor reside in rural areas, rural development is key to India’s success in reducing poverty. Land reforms aimed at increasing security of tenure or at redistributing land have been a central plank in efforts to reduce poverty in India. Under the Constitution of India, which has been in place since 1950, states were granted the powers to enact and implement land reforms. This implies that there is a great deal of variation across time and states in terms of the types of land reforms implemented. Land reform legislation in India falls into the following four categories: tenancy reform (to give tenants greater security of tenure), abolition of intermediaries,¹⁵ imposition of ceilings on land holdings (to redistribute land to the landless), and finally consolidation of disparate land-holdings.

Besley and Burgess (2000) code each land reform act passed in an Indian state into one of these categories. They then analyze using state panel data for the period 1958 to 1992 how land reform affected poverty and growth. The main results are in Table 14. In column (1) we see that land reform taken as a whole is associated with reductions in rural poverty. In column (2) we see that urban poverty is unaffected

¹⁵Intermediaries who worked under feudal lords and were reputed to allow a larger share of the land surplus to be extracted from the tenant.

which makes sense in that this was a rural program. In column (3) we break up land reform by type. What we see is that it is tenancy reforms and the abolition of intermediaries that account for the reduction in rural poverty. Land ceiling and land consolidation legislation do not affect rural poverty. These results suggest that more moderate reforms which improve the property rights and bargaining power of tenants (and marginal farmers) may have had significant effects of rural poverty whereas attempts to directly redistribute land had no effect as they tended to be blocked or evaded by powerful landed elites. Column (4) looks at whether there was trade-off with growth in agriculture output. There we see that tenancy reforms, though poverty reducing, are negatively associated with the growth of real agricultural output per capita.

It is interesting to observe that the patterns found in Besley and Burgess (2000) hold up when looking at the poverty-growth elasticity and economic growth in a purely cross-sectional setting. This comes out by looking at Figure 12. The upper panel depicts the relationship between the poverty-growth elasticity of states (in absolute value) and their average land reform legislation efforts using data for the period 1958-92.¹⁶ There we see that there is a positive relationship between the two variables: whatever level of economic growth they have enjoyed, states that have had more land reform attempts have been more effective at reducing poverty. Land reform is an example of a institutional reform that has the potential to enhance the poverty impact of a given increment in growth. The bottom panel of Figure 12, however, shows states that have enacted more land reforms have experienced lower economic growth rates. Land reforms have had a significant and large impact on rural poverty in India, however, implementation of these reforms may have come at some cost to growth. Overall, the evidence from the regression analysis lines up with the more impressionistic graphical evidence based on the descriptive analysis from the last section.

That securing property rights is an important area for poverty reduction policy is borne out in a variety of other studies. Links between property rights and economic performance have been proffered in the cross-country literature (see Hall and Jones, 1999; Acemoglu, Johnson and Robinson, 2001). This evidence is now being complemented with micro-economic studies.¹⁷ Some of these extend beyond agricultural property rights. For example, studies from Latin America indicate that obtaining property rights over land in urban areas can also help poor squatter households to gain access to credit, increase labor supply and improve productivity (see Field, 2002). This is a ripe area for future research on India.

The work by Besley and Burgess (2000) focuses on land reform after independence. But by 1950, there were interesting and important differences already in historical

¹⁶Land reform legislation is here measured as the cumulative sum of the number of land reform acts passed in the period 1958-1992 (Besley and Burgess 2000).

¹⁷See, for example, Banerjee, Gertler and Ghatak (2002) for a study of operation Barga in West Bengal.

landholding institutions. These are subsumed in the state fixed effects in cross-state regressions. However, it could be that these initial conditions are also important to subsequent performance. We speculate on this with the aid of Figure 13 which examines the relationship between an index of land-holding institutions and our poverty elasticities and growth rates. This index which is based on Banerjee and Iyer (2002) measures the area in a state under non-landlord tenure system. Whether a state was dominated by landholding institutions which favored landlords was a function of choices made by British administrators during the colonial period. In landlord-based areas landlords were responsible for collecting revenue in a specific area, whereas in non-landlord areas either British officials collected revenue directly without the intermediation of a landlord, or the collection was undertaken by a village community body (Banerjee and Iyer 2002).

In the upper panel of Figure 13 we see that states with greater area under non-landlord systems of tenure had higher poverty elasticities. In these states income growth is more effective at reducing poverty. We also see in the bottom panel that having a larger fraction of land under the non-landlord tenure system is also associated with having higher rates of economic growth (see Banerjee and Iyer 2002). While somewhat speculative, this points to the possibility that the type of landholding institutions inherited from the British may have affected future poverty reduction via both the poverty elasticity and growth channels outlined in section 3. The fact that these effects are determined by history however implies that the direct policy implications we can draw from this type of analysis is limited.

4.2 Access to Finance

By transforming their production and employment activities, access to finance can enable people to exit poverty. Understanding which factors drive structural change by facilitating the emergence of small businesses and other non-agricultural activities is a major challenge in efforts to reduce poverty. Burgess and Pande (2004) try to make some inroads into this issue by evaluating whether a massive rural branch expansion program in India affected rural poverty and economic growth. Over the 1961-2000 period over 30000 new branches were opened in rural areas. The rationale for the program was simple. The government identified lack of access to finance as a significant reason why growth was stagnant and poverty persistent in rural areas. The failure of banks to enter rural areas was seen as a brake on entrepreneurship and the emergence of new activities. To address this, the Indian central bank first nationalized commercial banks in 1969 and then imposed a license rule in 1977 which stated that for each branch opened in a banked location (typically urban) banks had to open four branched in unbanked location (typically rural). This rule was removed in 1990 and branch building in rural areas came to a halt. As a result of the imposition of the 1:4 rule, states which had fewer banks per capita before the program in 1961 received more bank branches between 1977 and 1990 leading to both a reduction

and an equalization in population per bank branch. ‘Priority sectors’ consisting of entrepreneurs, small businessmen and agriculturalists as well as ‘weaker sections’ such as lower caste and tribal households were explicitly targeted in the mandated lending practices of rural banks.

To evaluate the program Burgess and Pande (2004) use these 1977 and 1990 trend breaks in the relationship between initial financial development and rural branch expansion attributable to license regime shifts as instruments for the number of branches opened in the rural unbanked locations. Some key results are contained in Table 15. In column (1) we see that rural branch expansion reduced rural poverty. Urban poverty, in contrast, is unaffected (column (2)). In column (3) we see that wages of agricultural laborers are positively affected by rural branch expansion. This may have been because a rise in non-agricultural activities reduced supply of labor to this sector thus driving up wages of agricultural laborers that remained. This group is amongst the poorest in India often having limited access both to land and to non-agricultural employment activities. The wage effects thus point to an indirect mechanism via which the poorest of the poor in India might benefit from rural branch expansion even if they do not transact directly with banks. In column (4) we see that rural branch expansion positively affected economic output across Indian states. Burgess and Pande (2004) show that was due to rural branch expansion driving up non-agricultural output. Agricultural output, in contrast, was unaffected. The (albeit forced) entry of banks into the rural areas of India is seen to have been a spur for entrepreneurship, structural change and poverty reduction. This example brings home how access to finance may be critical in enabling poor, rural residents to begin new economic activities and thereby exit poverty.

These thrust of these findings is confirmed in the pattern of growth and poverty-growth elasticities across states as illustrated in Figure 14. The upper panel shows the relationship between the poverty-growth elasticity of states and their average real agricultural credit per capita using data for the period 1958-93. These two variables exhibit a positive relationship – states that have had access to more agricultural credit have been more effective at poverty reduction. In the bottom panel of Figure 14 we see that states which extended more agricultural credit also grew more quickly. This suggests that the poverty elasticity and growth effects of credit expansion reinforced one another. The poverty impact of state-led credit expansion may have been effective because it both heightened the poverty impact of economic growth and increased economic growth itself.

The fact that Burgess and Pande (2004) find that rural branch expansion increased the size of the secondary and tertiary sectors which have a high elasticity with respect to poverty (see section 3) and have been the main sources of economic growth over the period (see section 2) also helps us to understand the pattern of results we observe in Table 15. Thus, the panel data evidence lines up with what comes out by looking at patterns of growth and growth-poverty elasticities.

4.3 Human Capital

Human capital is often seen as a constraint on economic growth and poverty reduction in India. Average literacy rates in India are low. According to the Census of India in 1991, the literacy rate is 63% for males and 36% for females. These rates are lower than those in many east and south-east Asian countries even 40 years ago, and are no higher than modern day rates in sub-Saharan Africa (Dreze and Sen 1995). Moreover, there are large inequalities in educational achievements across states – male literacy rate ranges from 50% in Andhra Pradesh and Bihar to 93% in Kerala, and female literacy rates vary from 17% in Rajasthan and 20% in Uttar Pradesh to 84% in Kerala (Census of India 1991). There are large inequalities in educational outcomes between females and males, and between rural and urban areas, and between individuals of different castes.

In the Indian constitution education is mainly the responsibility of states. Therefore the large differences in outcomes are due in part to the fact that efforts to expand education have varied enormously across states. Initial conditions are also important here. For example, in Kerala, the region with highest educational attainments in India, widespread literacy existed well before British rule, and mass literacy since then has been achieved via a mass social movement to promote schooling (Dreze and Sen 1997). In contrast, in Uttar Pradesh, endemic teacher absenteeism and shirking is linked to poor schooling outcomes (Dreze and Gazdar 1997).

Trivedi (2002) exploits this heterogeneity in educational outcomes across Indian states by building up a panel data set on male and female secondary school enrollment rates for the period 1965-1992. He examines whether secondary school enrollment rates are related to economic growth across this period. His main findings are in Table 16. Column (1) shows that there is a positive and significant relationship between both male and female enrollment rates and the annual rate of growth in per capita state income. Column (2) shows that this result is robust to the inclusion of control variables proxying for non-educational human capital and physical capital. Column (3) shows that narrowing gap between male and female enrollment would result in an increase in economic growth. Moreover, consistent with other evidence for India (see Esteve-Volart, 2004), but in stark contrast with results from cross-country studies,¹⁸ Trivedi (2004) finds that female human capital has a larger impact on economic growth than male human capital.

We now explore how these findings relate to growth-poverty elasticities. Figure 15 plots state specific poverty elasticities and growth rates against average per capita expenditure on education. We see that states that spent more on education had higher poverty elasticities. There is also some evidence that states with higher per capita education expenditures grew more quickly.¹⁹ These patterns of association, while somewhat weak, are consistent with the evidence in Table 16.

¹⁸For a review and results, see Krueger and Lindahl (2001).

¹⁹Jammu and Kashmir is an outlier in both the graphs in Figure 15.

These results suggest that investments in human capital may represent a key means of increasing economic growth in Indian states. How such increases in human capital will be achieved remains an open question which can be only addressed via microeconomic evaluation of specific innovations in the delivery of education in India.

4.4 Gender

Gender inequality in literacy in India is amongst the highest in developing countries. While 63% of men were literate in 1991, this figure was only 36% for women – lower than the average female literacy rate in Sub-Saharan African countries in the same year (51%).²⁰ There is significant heterogeneity in female literacy rates across India's states. Although northern states (most notably Rajasthan, with 17%, and Bihar, with 18%) are characterized by relatively low figures (even in Haryana, actually the richest of Indian states that year, 1991, there was a meagre 34% of literate women), southern states have traditionally had larger rates (most remarkably Kerala, with 84%, but also Tamil Nadu and Karnataka, with figures around 40-50%). Even though female literacy in less developed countries usually lags behind male literacy, the wide disparity between Indian states does not only correspond to different levels of development. Indeed, northern regions tend to be more patriarchal and feudal (and have lower female-to-male sex ratios and therefore more "missing women" as calculated by Sen (1992)) than southern regions, where generally women have more freedom and a more prominent presence in society (Dreze and Sen 1995).²¹

India is not only well known for its low female-to-male literacy rates and sex ratios, but also for the relatively low participation of women in productive sectors. Female labor participation in India was lower in 1991 (20%) than in 1901-1951. As is the case with literacy and sex ratios, southeastern states tend to have larger rates of female labor force participation than northwestern states. In general though, while women in the middle classes do not tend to participate in the labor force, women from poorer households cannot afford not to engage in productive activity outside the home. That is, female labor participation in India is the result of the interaction between social norms (enforced by social stigma that obliges men to provide for their families) and economic conditions, as the probability that the stigma binds is greater the larger the family income.

²⁰Data from the World Development Indicators, WDI 2001, World Bank.

²¹Interestingly Sen (2003) revisits the topic of female-to-male ratios with Census of India 2001 information and remarks on the regional divide: "Most interestingly, a remarkable division seems to run right across India, splitting the country into two nearly contiguous halves. Using the European female-to-male ratios of children (the German figure of 94.8 girls per 100 boys was used as the dividing line), all the states in the north and the west have ratios that are very substantially below the benchmark figure, led by Punjab, Haryana, Delhi, and Gujarat (between 79.3 and 87.8 girls per 100 boys). On the other side of the divide, the states in the east and the south of India tend to have female-to-male ratios that equal or exceed the benchmark line of 94.8, with Kerala, Andhra Pradesh, West Bengal, and Assam leading the pack with 96.3 to 96.6 girls per 100 boys."

Esteve-Volart (2004) uses state panel data for the period 1961-1991 to examine the aggregate costs in terms of development of gender discrimination in the labor market. She finds that these costs are substantial. Her main results are in Table 17. Columns (1) and (2) respectively show that there are positive relationships between the ratios of female-to-male managers and female-to-male total workers and per capita total real output. Columns (1) and (2) also show that female literacy is positively associated with development, while the relationship with male literacy is not statistically significant. Columns (3) and (4) deal with endogeneity concerns by instrumenting both the female-to-male managers and total workers with the ratio of prosecutions launched relative to complaints received by inspectors under the Maternity Benefits Act of 1961. Interpreting the instrumented results, we see that a 10% increase in the female-to-male ratio of managers would increase real output per capita by 2% percent, while a 10% increase in the female-to-male ratio of total workers would increase real output per capita by 8%. That is, gender inequality in the access to labor markets acts as a brake on development. Moreover, the efficiency costs of such inequality are large.

Do these patterns show up in poverty elasticities and growth rates? The upper panel of Figure 16 shows that states that had higher female literacy rates in 1961 also have been the states where growth has reduced poverty most effectively, regardless of their growth rate. From the bottom panel we also see that states with higher female literacy in 1961 also record higher growth rates over the period. This is a key point as it suggests that attempts to increase literacy will be effective in reducing poverty both by leading to higher rates of growth and by ensuring that each increment in output has a larger impact on poverty. Figure 17 shows, in the same vein as Esteve-Volart (2004), that states that had higher female labor participation rates in 1961 have had higher poverty-growth elasticities. Growth rates in states with higher rates of female labor force participation are also higher over the period. These results therefore line up with those for female literacy. Together these results suggest that enhancing female educational attainment and labor force participation represent important means of increasing growth and reducing poverty in India.

4.5 Regulation

Labour regulations have been identified as an important element of the investment climate in India (Stern, 2001; Sachs et al, 1999). Besley and Burgess (2004) examine whether labour can help explain differences in urban poverty and manufacturing performance across Indian states. Manufacturing has historically played a large role in the structural change accompanying economic development and has been a key driver in reducing poverty. For example, the share of manufacturing in GDP increased three-fold in a number of East Asian countries between 1960 and 1995 (e.g. from 8% to 26% in Malaysia) . These countries also experienced sharp reductions in poverty. However, manufacturing in India only increased from 13% to 18% in the same period.

The manufacturing sector in India consists of two sub-sectors: registered (formal, about 9% of GDP) and unregistered (informal, about 5% of GDP) manufacturing. Firms are required to register if they employ more than ten employees and utilize electric power, or if they employ more than twenty employees and do not use electric power.

The analysis of Besley and Burgess (2004) which is based on state panel data for the 1958-1992 period exploits two important facts: (i) labour regulations only apply to firms in the registered manufacturing sector (ii) the Indian constitution empowers state governments to amend central legislation. The main piece of central legislation is the Industrial Disputes Act of 1947. This Act has been extensively amended by state governments during the post-Independence period. Besley and Burgess (2004) read the text of each amendment and coded each as pro-worker (+1), neutral (0) or pro-employer (-1).

Besley and Burgess (2004) then check whether the pattern of regulatory changes affects urban and rural poverty and manufacturing development in the registered and unregistered sectors. Key results from their analysis are shown in Table 18. In columns (1) and (2) we see that regulating in a pro-worker direction is also associated with increases in urban poverty but does not affect rural poverty. This reflects the fact that the adverse effects of pro-worker labour regulation are mainly being felt in the registered sector which is found primarily in urban areas. Moreover the effects they find are large – for example, had West Bengal, a state with substantial pro-worker legislation, not passed any pro-worker amendments, it would have had urban poverty that was 11 percent lower in 1990. These results suggest that attempts to redress the balance of power between capital and labour can end up hurting the poor. Column (3) of Table 18 shows that moving in a pro-worker direction is associated with lower per capita manufacturing output levels. This effect is accounted for by the fact that pro-worker labour regulation led to less output in registered manufacturing (column (4)). Investment in this sector is lower in states with more pro-worker labour regulation. Column (5) shows that the effect goes the other way for unregistered manufacturing. That is, states with more pro-worker labour regulations tend to have larger informal manufacturing sectors. This makes sense as where workers are able to extract more of the rents from production in registered sector, capitalists will prefer to remain in the unregistered sector where labour has no power.

As Besley and Burgess (2004) show, the policy choices of state governments in India as regards labour regulation have strongly affected manufacturing performance. Policies like labor regulation which are, in part, under the control of sub-national governments have a strong bearing on whether or not manufacturing develops in areas under their jurisdiction. And this in turn will have welfare consequences for citizens in those regions. It is important to note that the large differences in manufacturing performance were present well before liberalization in 1991.²² This suggests that

²²Besley and Burgess (2004) restrict their econometric analysis to the 1958-1992 period in order to better identify the impact of domestic state level policies prior to liberalization.

countries or regions wishing to develop manufacturing and reduce poverty must pay attention to the policies which affect the business climate which firms face. The institutional environment affects the investment and location decisions that entrepreneurs make and have an important bearing on the pattern of poverty reduction in a state.

These results on labour regulations are mirrored in the relationship between urban poverty elasticities and labor regulation. In the upper panel of Figure 18 we see that this relationship is negative. States that have had more pro-worker legislation have been less effective at reducing poverty for a given level of growth. The relationship with economic growth seen in the bottom panel of Figure 18 is more pronounced. States which enacted pro-employer amendments (and hence are to the left of zero) record significantly higher growth rates than states that enacted pro-worker amendments (and hence are to the right of zero). This is interesting as it suggests that shifting the investment climate in a pro-worker direction can damage investment incentives and economic growth with negative poverty consequences for workers in urban areas where more registered manufacturing firms are located. Our findings take on added resonance during the post-1991 liberalization period when the negative consequences of having a poor investment climate may be magnified (see Aghion, Burgess, Redding and Zilibotti, 2004).

4.6 Political Accountability

How can government be encouraged to respond to the needs of the poorest citizens? Besley and Burgess (2002) analyze this issue in the context of the public food distribution and calamity relief in India and find that the role of the media is important in ensuring that the government responds effectively to the needs of vulnerable citizens when they face natural calamities.

They use panel data from India's states across 1958-1992 to explore the role of the media and political competition in mitigating political agency problems by providing information to voters. For this, they focus on the public food distribution and calamity relief systems in India, which were set in part to deal with the threat posed by famine and natural calamities (such as droughts, floods, earthquakes, cyclones). The public food distribution system, which involves large-scale procurement, storage, transportation and distribution of food grains, is a key means of responding to drops in food production caused by droughts. Calamity relief expenditure covers a variety of direct relief measures, such as drinking water supply, medicine and health, clothing and food, veterinary care and assistance for repair of damaged property and is a means for the state to respond to crop damage caused by floods.

Besley and Burgess (2002) pose two main questions. First, in the event of a fall in food production due to drought, does having greater newspaper or stronger political competition imply that state governments will be more responsive in terms of distributing greater amounts of food via the public food distribution system. Second, in the event of a flood damaging crops, does having greater newspaper or stronger

political competition imply that state governments will be more responsive in terms of spending more on calamity relief. Key results from their analysis are displayed in Table 19. Column (1) shows that when food production falls, having higher newspaper circulation in a state makes states more responsive in terms of public food distribution. Column (3) shows that in states where political competition is more intense (i.e. the gap in seats held in the state legislature between the dominant party and its main competitor is smaller), state governments provide more food via the public food distribution system in response to a fall in food production. Columns (2) and (4) show similar results for calamity relief expenditures. In column (2) we see that for a given level of crop damage due to floods states with higher newspaper circulation per capita spend more on calamity relief. Column (4) shows that having more intense political competition in a state implies that state governments spend more on calamity relief in response to crop damage caused by floods.

Besley and Burgess (2002) also look at the role of the media in greater detail and find that it is regional newspapers that seem to be associated with having more responsive governments. This is consistent with both the fact that regional newspapers (i.e. those printed in the regional languages) report more localized events, and with the fact that readership of regional newspapers tends to comprise local vulnerable populations who are more reliant on action by state governments for protection.

A second area of political economy which has relevance to efforts to reduce poverty concerns political representation of disadvantaged groups. A basic premise of representative democracy is that all those subject to policy should have a voice in its making. However, policies enacted by electorally accountable governments often fail to reflect the interests of disadvantaged minorities. Pande (2003) exploits the institutional features of political reservation, as practiced in Indian states in 1960-1992, to examine the role of mandated political representation in providing disadvantaged groups (scheduled castes and scheduled tribes) influence over policy-making. Her study is of practical importance as a quarter of all legislators in India, at both the national and state level, come from reserved jurisdictions. She uses changes in the extent of political reservation, which are specific to a given state, to identify how changes in the group shares of minority legislators affect policy outcomes. The main finding of the paper is that political reservation in Indian states has increased redistribution of resources towards the groups which benefit from political reservation.

Specifically Pande (2003) finds that scheduled caste (SC) reservation increases job quotas (in particular, a 1 percent rise in SC reservation increases job quotas by 0.6 percent), while scheduled tribe (ST) reservation increases spending on ST programs (a 1 percent increase in ST reservation increases the share devoted to ST welfare programs by 0.8 percentage points). This is consistent with the nature of the SC and ST groups: since SC individuals are more educated and geographically more dispersed than ST individuals, they have higher returns from individual-specific policies as job quotas; while ST individuals, who are less dispersed, benefit more from geographically localized welfare programs. In sum, changes in legislator identity in

India have exerted a significant influence on state level policies.

Scheduled castes and scheduled tribes represent roughly 16 and 8 percent of the Indian population, respectively. The incidence of poverty in these two groups is one and a half times that in the rest of the population. Hence, poverty reduction could be affected more than proportionally if targeting these two groups, for instance by giving them political influence, can be achieved.

4.7 Other Policy Issues and Areas for Future Research

In this section, we have emphasized an agenda for poverty reduction using studies which find robust, quantitative evidence of a link between policy and either poverty and/or economic growth. We have also shown that the patterns found there are frequently mirrored in more speculative examination of the pattern of cross state growth and poverty reduction elasticities. This provides some encouragement for looking for associational patterns in other areas of policy as a means of identifying important areas for future study.

We are not aware of convincing panel studies of infrastructure provision. But poor quality roads, electricity and water provision remain a central issue in large parts of India. Figure 19 provides a hint that this indeed important for poverty reduction. The upper panel of Figure 19 plots the relationship between the poverty elasticity and the total installed electrical generating capacity per capita in 1961 (as measured in kw thousands). We find that states that had greater capacity to generate electricity have been more efficient at reducing poverty for a given level of growth. The bottom panel shows how there also exists a positive relationship between generating capacity in 1961 and the growth rate over the subsequent period. Clearly more work is needed to identify specific infrastructure interventions which are capable of reducing poverty and increasing economic growth in India.

Another important area concerns the links between economic liberalization, poverty and growth. In India industrial delicensing which began in 1985 marked a discrete break from a past of centrally planned industrial development. Using a panel of 3-digit state industries for the period 1980-1997 Aghion, Burgess, Redding and Zilibotti (2004) find that industrial delicensing had unequal effects on manufacturing performance of 3-digit industries located in different states of India leading to an increase in within industry inequality. They also find that institutional conditions, as proxied by the labor regulation measures described above, affect whether or not industry in a specific 3-digit sector and state benefited from industrial delicensing. This suggests that liberalization is not uniformly beneficial and that institutional and other conditions matter for whether a firm or industry will benefit from liberalization. More work is also needed here to link specific liberalization reforms in India to poverty.

Finally, we mention the importance of the macro-economic climate to the poor. The state level approach subsumes macro-economic factors into “year indicator” variables. Hence, it is not able to cast light on how macro-economic management has

helped or hindered growth and poverty reduction in India. Recent studies of the East Asian crisis in the late 1990s have emphasized the importance of macro-economic stability to the poor. This is likely true in India and this central plank of the Washington consensus remains an important consideration even though it is not apparent in a disaggregated analysis such as this.

Another important area for future investigation is the link between policies and the sectoral changes in income. There are plenty of good reasons to regard regulation, credit and human capital as important drivers of structural change. Our finding in Table 10 that tertiary income plays a major role and suggests that future policy analyses pay attention to structural change as well as income levels in explaining how growth and poverty interact.

5 Trade-offs Between Poverty and Growth

The preceding analysis has offered insights into the policies and initial conditions which are conducive to poverty reduction. An important remaining question is whether these policies and initial conditions had a negative or positive impact on growth and whether growth and poverty effects move in the same direction. Figures 12 - 19 offer some suggestive insights into these issues.

In the case of land reform we find evidence of a trade-off. Figure 12 shows that states which enacted more land reforms had higher poverty-growth elasticities. Whatever level of economic growth they have enjoyed, states that have had more land reform attempts have been more effective at reducing poverty. Land reform is an example of a institutional reform that has the potential to enhance the poverty impact of a given increment in growth. This finding is in line with the state level analysis presented in Besley and Burgess (2000) which shows that enactment of land reforms is associated with significant reductions in rural poverty. The bottom panel of Figure 12, however, shows that states which enacted more land reforms also grew less quickly over the period. That is, in the case of land reform, there is trade-off between poverty and growth objectives. Evidence of this trade-off was also found in the state panel analysis presented in Besley and Burgess (2000).

Reviewing the evidence over Figures 12-19, land reform is the only example of a policy or initial condition where we find a clear trade-off in the pattern of correlation with poverty-growth elasticities and the pattern of correlation with economic growth. In the case of credit, labor regulation and human capital the effects move in the same direction. In other words states which extend more credit, which enact pro-employer labor regulations and which spend more on education per capita both record higher poverty-growth elasticities and record higher rates of economic growth over the sample period. There is no evidence of a trade-off in these areas of policy. Instead the effects on the poverty-growth elasticities and the effects on economic growth reinforce one another. By moving policies in these direction states are not only recording higher rates of growth but are also reducing poverty more for each increment in economic

growth.

The results where we examine the correlation of initial conditions in 1961 with poverty-growth elasticities and economic growth across our sample period also do not exhibit any evidence of a trade-off. States which in 1961 had higher female literacy and labor force participation rates and higher infrastructure exhibit both higher poverty-growth elasticities and higher economic growth across our sample period.

Though we should not read too much into this simple correlation analysis with only sixteen observations, these results are nonetheless important in suggesting that the effects of a range of policies and initial conditions on poverty and growth go in the same direction. States with these initial conditions or which moved policy in these directions will have been more successful at reducing overall poverty in the post-Independence period not only because they have higher poverty-growth elasticities (which makes each increment in growth more poverty-reducing) but also because they record higher rates of economic growth.

6 Recommendations for Policy Making

In this final part of the paper we draw on the empirical evidence that is described in section 4, to draw out some policy recommendations. For more details on these studies and the basis for our policy recommendations, we refer the reader to section 4.

- **Property Rights:** (section 4.1) Institutions which perform these functions will be critical in encouraging investment, trade and exchange to take place and will have a central bearing on whether the poor are able to participate in growth. We discussed in section 4.1 that strengthening property rights over land and improving access to land via land reform has been central to efforts to reduce poverty in India. In particular, the evidence underlines the effectiveness of land reforms that seek to abolish intermediaries and reform the conditions of tenancy. Renewed emphasis on this area of policy is required in particular in areas where land tenure systems are biased in favor of landlords. However, the policy-making community should keep in mind the poverty-growth trade-off that is found in the empirical evidence and find means of tackling both poverty reduction and output growth.
- **Access to Finance:** (section 4.2) Access to financial services is critical to allow the poor to exploit investment opportunities. We present evidence in section 4.2 that increasing access to financial services in rural areas both increases the poverty-growth elasticity and encourages economic growth. This is consistent with available studies that look into the effects of the rural bank branch expansion in its license rule which operated between 1977 and 1991. These results are of great relevance in light of the finding in section 3.4 that the tertiary sector

has been the main contributor to poverty reduction in India for most states. Much of the push to extend financial services to the poor in India has been via state-led rural branch expansion. However, in the post-liberalization period it will be necessary to examine how NGO and private providers can be involved possibly in association with the bank branch and cooperative networks.

- **Human Capital:** (section 4.3) Literacy and other indicators of education remain woefully low in large part of India. The evidence we have presented in section 4.3 points to investment in education as being central to reducing poverty both by increasing poverty-growth elasticities and by encouraging economic growth. Moreover, the available evidence also quantifies human capital externalities in India as sizable. Policies which increase female literacy and labor force participation seem particularly valuable as means of attacking poverty in India. The challenge going ahead is to find specific means of increasing levels of education in India in particular for females.
- **Gender:** (section 4.4) Gender inequality in India is among the highest in the developing world. We presented evidence in section 4.4 that states in India with greater gender equality are also the fastest growing and have greater anti-poverty effectiveness of growth. This analysis suggest that policies enable females to enter schools and the labor force will have positive consequences for poverty reduction and growth.
- **Regulation:** (section 4.5) Economic analysis is increasingly playing a role in identifying specific directions for deregulation that help the poor. For much of its post-Independence history India has been a centrally planned, highly protectionist economy. We have shown in section 4.5 how labor regulation is a key part of the investment climate in India and how various types of regulatory change can both increase economic growth and the extent to which the poor benefit from economic growth. Indeed, the studies that we tackle in this paper show that states that have had more pro-worker industrial regulation in the post-Independence period have had more modest economic outcomes. Our findings take on added resonance during the post-1991 liberalization period when the negative consequences of having a poor investment climate may be magnified.
- **Political Accountability:** (section 4.6) Over the last decade or so political economy has moved to center stage in terms of identifying effective routes to poverty reduction. Findings in section 4.6 point to specific factors which make governments more responsive to the needs of citizens. In particular, we have focused on three factors for which evidence is available for India. First, we have highlighted the importance of the role of the media, particularly regional media, for government responsiveness in public food distribution and calamity relief programs. Second, we have also argued that the evidence points towards

the importance of political competition as a driver of such public action. Finally, we have stressed empirical results regarding the importance of political representation for minorities, which in the case of India has been shown in the case of scheduled castes and scheduled tribes. Political reservation both for scheduled caste and tribe individuals and for women may have a role to play in assisting these disadvantaged groups who are heavily represented amongst the poor. These are important elements in making growth more poverty-reducing.

Much remains to be done to understanding what policies have worked in reducing poverty and how these affect the relationship between poverty and growth. The results that we present are mostly recent and represent the fact the evidence base is now expanding rapidly. Overall, the potential for an evidence-based agenda for poverty in India is promising indeed.²³

²³While we have focused here on analysis from cross-state data, but there are many policy studies now taking place at a more micro-level exploiting variations across towns, districts and villages to investigate effective policies for poverty reduction.

7 Methodological Appendix – Measuring the Impact of Growth on Poverty

Part 1 in Appendix 1 explores the elasticity of poverty to growth according to all Foster-Greer-Thorbecke measures of poverty across Indian states. The three poverty indexes we use here were put together by Ozler et al (1996), who estimated the head-count index, poverty gap, and squared poverty gap from the grouped distributions of per capita expenditure published by the NSS, updated to 1997.

Both Part 2 and Part 3 draw on tabulated distributions of monthly per capita expenditure at the all-India level. For 1999/2000, official distributions are used (NSSO 2000). For 1993/94, we use adjusted tabulated distributions of monthly per capita expenditure based on a mixed reference period as published in Sundaram and Tendulkar (2003c) (see details and other related issues in the Data Appendix 2). We use the poverty lines at the all-India level that were used by Sundaram and Tendulkar. From this we are able to deflate expenditure in the 55th round and calculate poverty measures using poverty lines in 1993/94 Rupees. The poverty lines that we have used are 211.3 and 274.88 1993/94 Rupees for the rural and urban samples respectively.²⁴ Calculations with these poverty lines suggest that they are roughly similar to the "\$1 a day" poverty line used by the World Bank (Global Poverty Monitoring project, World Bank).²⁵ Therefore these roughly correspond to *extreme* poverty lines in World Bank terms. We have also made the calculations with *regular* poverty lines in World Bank terms ("2 a day") for all-India. For this, we use 422.6 1993/94 Rs. for rural households and 549.76 1993/94 Rs. for urban households.

Part 2 in Appendix 1 follows the methodology in Ravallion and Chen (2003) to calculate rates of pro-poor growth and growth incidence curves. Growth incidence curves have been calculated with the 'gicurve' program prepared by Michael Lokshin and Martin Ravallion from the World Bank, with an eight-band option.

Part 3 in Appendix 1 decomposes the rate of poverty reduction into growth and distributional components following Ravallion and Datt (1992). The change in poverty is decomposed into three components: the growth component (the difference between the two poverty indices keeping the distribution constant), the redistribution component (the change in poverty if the mean of the two distributions is kept constant), and the residual component (the change in poverty due to the interaction of growth and inequality). These decompositions have been calculated using the 'gidecomposition' program prepared by Michael Lokshin and Martin Ravallion.

Results from Part 2 and Part 3 are summarized in Tables 12 and 13 and discussed

²⁴We would like to thank Suresh Tendulkar for kindly providing us with the poverty lines and details to carry out our calculations. We are also grateful to Martin Ravallion and Shaohua Chen for their programs and all-India data.

²⁵The Global Poverty Monitoring project of the World Bank calculates that 44% of the population were living with less than \$1 a day in India in 1993. This is close to the 35% of the population that we calculate to be living with less than 211.3 Rupees in 1993/94 Rs. terms.

in section 3.5.

8 Data Appendix 1

The data used in this case study come from a variety of sources.²⁶ They come from the sixteen main states listed in Table 1. For the pro-poor growth measurements in Appendix 1 we have excluded Jammu and Kashmir. Other details that are specific of calculations in Appendix 1 are described in the Methodological Appendix.

Growth variables: The primary source for data on state income is an annual government publication Estimates of State Domestic Product (Department of Statistics, Ministry of Planning). The primary source for the Consumer Price Index for Agricultural Laborers (CPIAL) and Consumer Price Index for Industrial Workers (CPIIW) which are used to deflate agricultural and non-agricultural state domestic product respectively is a number of Government of India publications which include Indian Labour Handbook, the Indian Labour Journal, the Indian Labour Gazette and the Reserve Bank of India Report on Currency and Finance. Ozler et al (1996) have further corrected these price indices to take account of inter-state cost of living differentials and have also adjusted CPIAL to capture rising firewood prices. We have updated CPIAL and CPIIW to 1997 following their methodology.

Poverty and inequality variables: We use the poverty measures for the rural and urban areas of India's sixteen major states, spanning 1957-58 to 1991-92 put together by Ozler et al (1996). These measures are based on 22 rounds of the NSS which span this period. The poverty lines that were used for calculating these are those recommended by the Planning Commission [1993] and are as follows. The rural poverty line is given by a per capita monthly expenditure of Rs. 49 at October 1973-June 1974 all-India rural prices. The urban poverty line is given by a per capita monthly expenditure of Rs. 57 at October 1973-June 1974 all-India urban prices. See Datt (1995) for more details. The headcount index, poverty gap and squared poverty gap measures are estimated from the grouped distributions of per capita expenditure published by the NSS, using parametrized Lorenz curves (Datt and Ravallion 1992). The poverty measures have been consistently updated up to 2000 while inequality data have been updated up to 1994.

Given comparability issues with official poverty data in the 1990s we have done the calculations in Appendix 1 with adjusted NSS distributions for 1993/94 from Sundaram and Tendulkar (2003c) and official tabulations from the NSSO (2000) for 1999/2000.

Policy variables: the land reform variable that we use is the cumulative sum of the number of land reform acts as constructed by Besley and Burgess (2000) from land reform legislation amendments by states between 1960 and 1992. Agricultural

²⁶The state-level data base used in this case study builds on Ozler, Datt and Ravallion (1996) which collects data on poverty, output, wages, price indices and population to construct a consistent panel data set on Indian states for 1958-92. We are grateful to Martin Ravallion for providing us with these data. To these data we have added information on labor regulation, land reform, landholding institutions, human capital, caste fractionalization, credit, unionization, and labor force participation.

credit comes from the Reserve Bank of India publication *Statistical Tables Relating to Banks in India*. The labor regulation measure is calculated by Besley and Burgess (2004) from state-specific text amendments to the Industrial Disputes Act 1947. Each change was coded as follows: a 1 denotes a change that is pro-worker, a 0 denotes a change that may not have affected the bargaining power of either employers or workers, and a -1 denotes a pro-employer change. These are accumulated to map the history of each state beginning from 1947. Education expenditure data come from the Public Finance Statistics (Ministry of Finance, Government of India).

Initial conditions variables: landholding institutions stands for the weighted historical area under non-landlord control by state. This comes from district-level information compiled by Banerjee and Iyer (2002) and was weighted by the land area of a district. Female literacy rates come from Education in India (Ministry of Education, Government of India). Data on population and female labor participation force come from the Census of India (Office of the Registrar General and Census Commissioner). Total installed electrical capacity of electrical generation plants is measured in thousand kilowatts and come from various issues of the Statistical Abstracts of India (Central Statistical Office, Department of Statistics, Ministry of Planning, Government of India).

9 Data Appendix 2: Data Issues with the NSS

There are several issues regarding the poverty estimates derived from NSS data in the 1990s.

The National Sample Surveys Organizations (NSSO) collects data from household surveys that are carried out on an approximate yearly basis. The most complete rounds are undertaken approximately every five years, and are called quinquennial ('thick') rounds. Quinquennial rounds include the following surveys: consumer expenditure survey (CES), employment and unemployment survey (EUS), and unorganized non-agricultural enterprises survey. Additionally, since 1989 (round 45th) information on consumer expenditure is gathered between quinquennial rounds using smaller samples (about one sixth of the size of quinquennial surveys size).

There are two main comparability issues that arise due to changes in the design of the CES household questionnaire between rounds 50th (1993-94) and 55th (1999-2000). The first change is as follows. Up to the 50th quinquennial round in 1993-94, information on the monthly per capita expenditure of households was collected using a '30-day recall' questionnaire. Although other questionnaires, with other recall periods, were typically used, those were administered to different (and *independent*) samples of households. But after that 50th round, the NSS put together on the same page both the question based on expenditures during the previous 30 days, plus the question based on expenditures during the previous seven days. That is, both a 30-day recall and a 7-day recall period were used for the same sample of households, on the same page of the questionnaire. This new questionnaire design, as Deaton and

Dreze (2002) and others argue, may have led to a sudden 'reconciliation' of the results obtained from the two different recall periods: if consumers were first asked about the 7-day recall period question, and then extrapolated this to the 30-day recall period question next to it, this is likely to have overstated expenditure estimates based on 30-day data, pulling down the official poverty estimates.

The second comparability issue arises from the fact that in the 55th round, information on less frequently purchased goods (clothing, footwear, durables, education and health care (institutional) – was collected only on a 365-day recall period (as opposed to the previous quinquennial rounds, for which these were collected on a 30-day recall period too). For this reason, the published size-distributions of per capita total expenditure from the CES in round 55th are based on a mixed reference period, while the corresponding size-distributions for round 50th are based on a uniform reference period of 30-days for all expenditure items.

Two sets of authors provide adjusted estimates in order to address these two comparability issues. On the one hand, Deaton and Dreze (2002) 'adjust' the 55th-round estimates to achieve comparability with the earlier rounds by making use of the fact that in the 55th round, for some items (namely fuel and light, non-institutional medical care, and large categories of miscellaneous goods and services) only a 30-day recall period was used (and therefore reports on these items were not affected by a 7-day entry). The authors argue that expenditure on this set of goods is highly correlated with total expenditure, which makes it possible to derive total expenditure trends.²⁷ In order to calculate poverty rates, they perform two further adjustments: first, they use improved price indexes from Deaton (2001) to update the 'poverty line' over time and construct state-specific poverty lines;²⁸ second, they derive an explicit estimate of the gap between rural and urban poverty lines (in contrast to official rural-urban gaps). That is, the adjusted poverty rates from Deaton and Dreze (2002) make use of some specific expenditure estimates, new price indexes, and adjusted poverty lines: this can be summarize in two stages, in the first stage they adjust for changes in the questionnaire design, and in the second stage they adjust for revised poverty lines. The adjusted poverty measures that they then estimate show that all states have enjoyed reductions in poverty during the 1990s, in terms of either rural or urban poverty, with the exceptions of Assam, for which rural poverty would have remained practically the same between 1993-94 and 1999-2000, and Orissa, for which the same is true regarding urban poverty. Their adjusted numbers suggest that the questionnaire

²⁷As argued by Deaton and Dreze (2002), their approach is valid if two assumptions hold: first, that reported expenditures on the intermediate goods –for which the recall period is unchanged– are unaffected by the changes elsewhere in the questionnaire. Second, if the relation between expenditure on intermediate goods and total expenditure is similar in 1993-94 and 1999-2000.

²⁸Deaton (2001) argues that poverty lines from the 1987-88 round onwards are miscalculated due to the fact that price levels that have traditionally been used to update poverty lines are based on fixed and frequently outdated commodity 'weights'. Deaton (2001) calculates updated poverty lines from 1987-88 onwards that Deaton and Dreze (2002) use in order to calculate adjusted estimates of state-specific head count ratios for 1987-88, 1993-94, and 1999-2000.

design issue would slightly overstate poverty reduction, especially rural poverty, while controlling for adjusted poverty lines actually estimates poverty reduction between 1994 and 2000 to be higher overall than under the official methodology (especially rural poverty).

The second set of authors, K. Sundaram and Suresh D. Tendulkar, present their adjusted poverty estimates in various papers (Sundaram and Tendulkar 2003a, 2003b, 2003c). Their strategy is to recalculate poverty rates for round 55th by checking the effects of differences in questionnaire design drawing from expenditure data from the EUS (rather than the CES, which is the source of official estimates). The EUS was canvassed on an independent sample of households distinct from those in CES but from the same universe of population – importantly, the EUS used only the 30-day recall period for items in the food group, therefore the 30-day entries are not contaminated by a 7-day entry. Based on this, the authors argue that the 30-day questions in the 55th round CES survey are not much distorted by the 7-day questions alongside. Then, the major source of comparability would not be the first issue but the second one, that is, the revised treatment of the less frequently consumed items. They take advantage of the fact that in round 50th, consumption of low frequency items was reported on a 30-day and a 365-day reference period, recalculate poverty rates using the later,²⁹ and compare them with the 55th round estimates: they are able to confirm about 75% of the official decline (10 percentage points, from 36 to 26 percent) in the headcount ratios at the all-India level between the two rounds. At the all-India level, Sundaram and Tendulkar (2003c) recalculate poverty measures for CES data and find that the headcount ratio declined by over 8 percentage points over the six years between the 50th and 55th rounds—their estimates also show that the overall performance in all dimensions of poverty has been far better between 1994 and 2000 than between 1983 and 1994.

There is also a comparability issue between consumption data from the NSS and from the National Accounts (published by the Central Statistical Organization). Over time, CSO estimates of consumption expenditure have grown more than NSS estimates, casting some doubt on the NSS data. However, Sen (2000) argues that there is no evidence of a large widening of the gap between NSS and National Accounts estimates in the 1990s. As argued in Section 2.3, the measures of consumer expenditure published by the NSS and the National Accounts are different: the main difference is that the National Accounts numbers include expenditures by non-profit organizations, which are not included in the NSS definition. Additionally, the National Accounts also include financial services and imputed rents for housing—none of them included in the NSS definition. According to Sundaram and Tendulkar (2001), who quote a cross-validation study by the National Accounts Department, these two items account for 22 percent of the difference between NSS and National Accounts

²⁹Specifically, in Sundaram and Tendulkar (2003a) they use the following expenditure categories: clothing, footwear, education, medical (institutional), and durables. Sundaram and Tendulkar (2003c) adds medical non-institutional.

estimates of consumer expenditure. These authors give an accurate report of the differences found by the cross-validation report, and finally state that NSS estimates are more appropriate for studying the evolution of poverty over time.

In our calculations we follow Sundaram and Tendulkar (2003c) in using a mixed uniform reference period. For this we use for 1993/94 their tabulated adjusted distributions of monthly per capita expenditure for rural and urban samples at the all-India level, and for 1999/2000, we use the official distributions for rural and urban samples as published by the NSSO (2000).

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Table 1. Rural Poverty and Inequality, by Indian state,
1970-2000¹

| <i>State</i> | <i>Change in Headcount ratio</i> | | | | <i>Change in Gini index</i> | | |
|-----------------|----------------------------------|---------|---------|-----------|-----------------------------|---------|---------|
| | 1970-83 | 1983-87 | 1987-94 | 1994-2000 | 1970-83 | 1983-87 | 1987-94 |
| Andhra Pradesh | -19.5 | -4.03 | -5.03 | -5.17 | 0.47 | 1.20 | -2.00 |
| Assam | -3.00 | -1.94 | 4.73 | 3.19 | 0.91 | 1.81 | -3.77 |
| Bihar | 3.92 | -13.5 | 7.06 | 3.69 | -2.5 | -1.02 | -2.54 |
| Gujarat | -26.6 | 3.40 | -7.24 | -7.00 | -1.73 | 4.73 | -6.59 |
| Haryana | -13.62 | 0.21 | 8.11 | -6.09 | -6.92 | 1.50 | 2.23 |
| Jammu & Kashmir | 1.30 | 2.52 | | | -0.06 | 5.45 | |
| Karnataka | -19.6 | 1.47 | -5.18 | -8.04 | 3.61 | -1.42 | -2.01 |
| Kerala | -34.5 | -4.04 | -8.59 | -15.7 | 2.96 | 0.94 | -4.75 |
| Madhya Pradesh | -10.8 | 1.31 | -8.99 | -2.11 | -3.07 | 2.04 | -3.68 |
| Maharashtra | -14.1 | -0.64 | -6.10 | -3.10 | 1.63 | 1.16 | 0.67 |
| Orissa | -9.44 | -11.8 | -4.67 | -6.07 | -2.11 | 0.34 | -2.78 |
| Punjab | -14.3 | 2.17 | -2.93 | -3.72 | -1.58 | 1.82 | -2.30 |
| Rajasthan | -19.9 | -3.34 | 1.87 | -9.28 | -0.92 | -4.29 | -3.82 |
| Tamil Nadu | -14.8 | -10.2 | -8.04 | -6.48 | 2.21 | -2.44 | 0.78 |
| Uttar Pradesh | -8.99 | -8.50 | 5.38 | -4.54 | 0.13 | 1.24 | -2.53 |
| West Bengal | -10.9 | -15.1 | -6.83 | -10.9 | 3.72 | -4.56 | 1.14 |

1/Source: Datt et al (1996) as derived from official NSS data. Poverty reduction between 1994 and 2000 is generally perceived to be overestimated by NSS data, see the Data Appendix 2 for more on this and adjustments to data.

Table 2. Urban Poverty and Inequality, by Indian state,
1970-2000¹

| <i>State</i> | <i>Change in Headcount ratio</i> | | | | <i>Change in Gini index</i> | | |
|-----------------|----------------------------------|---------|---------|-----------|-----------------------------|---------|---------|
| | 1970-83 | 1983-87 | 1987-94 | 1994-2000 | 1970-83 | 1983-87 | 1987-94 |
| Andhra Pradesh | -12.3 | 3 | -7.81 | -5.77 | -1.46 | 3.17 | -2.83 |
| Assam | 0.35 | 6.13 | -17.9 | 0.02 | -2.03 | 7.87 | -5.43 |
| Bihar | -3.10 | -7.54 | -3.06 | -13.1 | -2.10 | 3.33 | -3.24 |
| Gujarat | -16.5 | 4.45 | -15.4 | -6.67 | -0.90 | 3.10 | -1.70 |
| Haryana | -19.9 | -0.85 | -9.27 | -1.54 | 1.55 | -5.37 | 0.07 |
| Jammu & Kashmir | -9.71 | 1.42 | | | -0.43 | 3.92 | |
| Karnataka | -10.9 | 4.75 | -12.5 | -6.27 | 0.64 | 0.61 | -3.20 |
| Kerala | -21.9 | 4.09 | -25.7 | -11.4 | -1.90 | 3.97 | -9.01 |
| Madhya Pradesh | -5.92 | -3.01 | -5.36 | -3.80 | -3.23 | 2.65 | 0.02 |
| Maharashtra | 3.17 | -0.58 | -4.98 | -1.89 | 0.41 | 0.80 | 0.62 |
| Orissa | 5.75 | -5.13 | -9.05 | -5.80 | -3.55 | 7.11 | -7.01 |
| Punjab | -2.11 | -13.6 | -2.84 | -1.06 | 2.93 | -5.13 | -0.62 |
| Rajasthan | -15.6 | -3.63 | -3.93 | -8.50 | -2.02 | 3.26 | -4.86 |
| Tamil Nadu | -6.56 | -4.99 | -8.22 | -5.86 | 2.53 | -1.10 | -0.48 |
| Uttar Pradesh | -9.09 | -3.18 | -12.6 | -4.98 | -2.56 | 2.44 | -2.43 |
| West Bengal | -0.38 | -2.10 | -7.75 | -7.23 | 1.92 | 3.22 | -3.80 |

1/Source: Datt et al (1996) as derived from official NSS data. Poverty reduction between 1994 and 2000 is generally perceived to be overestimated by NSS data, see the Data Appendix 2 for more on this and adjustments to data.

Table 3. The elasticity of total poverty with respect to growth,
by Indian state, 1958-1997

| <i>State</i> | β_s | <i>Standard error</i> |
|-----------------|-----------|---------------------------|
| | (1) | (2) |
| Andhra Pradesh | -0.76 | 0.05 |
| Assam | -0.38 | 0.09 |
| Bihar | -0.30 | 0.07 |
| Gujarat | -0.66 | 0.05 |
| Haryana | -0.57 | 0.08 |
| Jammu & Kashmir | -0.57 | 0.17 |
| Karnataka | -0.53 | 0.06 |
| Kerala | -1.23 | 0.06 |
| Madhya Pradesh | -0.39 | 0.06 |
| Maharashtra | -0.40 | 0.04 |
| Orissa | -0.69 | 0.08 |
| Punjab | -1.03 | 0.07 |
| Rajasthan | -0.43 | 0.09 |
| Tamil Nadu | -0.59 | 0.04 |
| Uttar Pradesh | -0.64 | 0.08 |
| West Bengal | -1.17 | 0.09 |
| Average | -0.65 | 0.08 |

Notes: log head count regressed on log real income per capita. Standard errors are robust

Table 4. The elasticity of poverty with respect to growth, low- and middle-income countries

| | <i>Whole sample</i> | <i>East Asia and Pacific</i> | <i>Eastern Europe and Central Asia</i> | <i>Latin America and Caribbean</i> | <i>Middle East and North Africa</i> | <i>South Asia</i> | <i>Sub-Saharan Africa</i> |
|---|---------------------|------------------------------|--|------------------------------------|-------------------------------------|-------------------|---------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Elasticity of poverty with respect to income per capita | -0.73 (0.25) | -1.00 (0.14) | -1.14 (1.04) | -0.73 (0.29) | -0.72 (0.64) | -0.59 (0.36) | -0.49 (0.23) |

Notes: log head count regressed on log real income per capita. Robust standard errors in parentheses. Sample of 88 low- and middle-income countries. Source: Besley and Burgess (2003).

Table 5. The elasticity of total poverty with respect to growth and inequality, by Indian state, 1958-1997

| <i>State</i> | β_s | γ_s |
|-----------------|-----------------|-----------------|
| | (1) | (2) |
| Andhra Pradesh | -0.87 (0.06) | -2.13 (0.66) |
| Assam | -0.37 (0.12) | -0.86 (0.65) |
| Bihar | -0.48 (0.09) | -0.94 (0.29) |
| Gujarat | -0.63 (0.06) | 0.34 (0.43) |
| Haryana | -0.66 (0.09) | 1.43 (0.55) |
| Jammu & Kashmir | -0.55 (0.21) | -0.25 (1.32) |
| Karnataka | -0.60 (0.09) | -1.06 (0.52) |
| Kerala | -1.23 (0.08) | 0.34 (0.38) |
| Madhya Pradesh | -0.37 (0.09) | 0.49 (0.56) |
| Maharashtra | -0.48 (0.04) | 1.25 (0.19) |
| Orissa | -0.64 (0.11) | 0.96 (0.74) |
| Punjab | -1.06 (0.10) | 1.30 (0.66) |
| Rajasthan | -0.45 (0.12) | 0.20 (0.32) |
| Tamil Nadu | -0.54 (0.06) | 0.11 (0.47) |
| Uttar Pradesh | -0.68 (0.11) | -0.56 (0.64) |
| West Bengal | -1.23 (0.13) | 1.32 (0.71) |
| Average | -0.68 (0.10) | 0.12 (0.57) |

Notes: log head count regressed on the log real income per capita and the standard deviation of the distribution. Standard errors (in parentheses) are robust.

Table 6. Decomposition into total poverty elasticity and growth components

| <i>State</i> | β_s | g_s | $\bar{g}(\beta_s - \bar{\beta})$ | $\beta_s(g_s - \bar{g})$ |
|-----------------|-----------|-------|----------------------------------|--------------------------|
| | (1) | (2) | (3) | (4) |
| Andhra Pradesh | -0.76 | 0.028 | 0.17 | 0.24 |
| Assam | -0.38 | 0.021 | -0.41 | -0.07 |
| Bihar | -0.30 | 0.012 | -0.53 | -0.23 |
| Gujarat | -0.66 | 0.027 | 0.02 | 0.18 |
| Haryana | -0.57 | 0.031 | -0.12 | 0.32 |
| Jammu & Kashmir | -0.57 | 0.018 | -0.12 | -0.19 |
| Karnataka | -0.53 | 0.024 | -0.19 | 0.02 |
| Kerala | -1.23 | 0.026 | 0.90 | 0.21 |
| Madhya Pradesh | -0.39 | 0.022 | -0.39 | -0.03 |
| Maharashtra | -0.40 | 0.029 | -0.38 | 0.15 |
| Orissa | -0.69 | 0.021 | 0.06 | -0.12 |
| Punjab | -1.03 | 0.030 | 0.61 | 0.46 |
| Rajasthan | -0.43 | 0.018 | -0.33 | -0.15 |
| Tamil Nadu | -0.59 | 0.029 | -0.09 | 0.24 |
| Uttar Pradesh | -0.64 | 0.015 | -0.01 | -0.34 |
| West Bengal | -1.17 | 0.021 | 0.82 | -0.21 |
| Average | -0.65 | 0.023 | 0.001 | 0.03 |

Notes: log head count regressed on log real income per capita. The decomposed elements in (3) and (4) have been normalized dividing by $\bar{\beta} \bar{g}$.

Table 7. Decomposition into growth and inequality components

| <i>State</i> | $\beta_s g_s - \frac{1}{N} \sum_s \beta_s g_s$ | $\gamma_s \phi_s - \frac{1}{N} \sum_s \gamma_s \phi_s$ |
|-----------------|--|--|
| | (1) | (2) |
| Andhra Pradesh | 0.37 | -0.04 |
| Assam | -0.49 | -0.10 |
| Bihar | -0.76 | -0.25 |
| Gujarat | 0.16 | 0.03 |
| Haryana | 0.16 | 0.25 |
| Jammu & Kashmir | -0.33 | 0.03 |
| Karnataka | -0.19 | -0.10 |
| Kerala | 1.04 | -0.01 |
| Madhya Pradesh | -0.44 | 0.07 |
| Maharashtra | -0.25 | -0.11 |
| Orissa | -0.08 | 0.08 |
| Punjab | 1.01 | 0.22 |
| Rajasthan | -0.50 | 0.02 |
| Tamil Nadu | 0.12 | -0.01 |
| Uttar Pradesh | -0.38 | -0.03 |
| West Bengal | 0.56 | -0.06 |

Notes: log head count regressed on log real income per capita and the standard deviation of the logarithm of income. The decomposed elements have been normalized dividing by

$$\frac{1}{N} \sum_s \beta_s g_s + \frac{1}{N} \sum_s \gamma_s \phi_s .$$

Box 1. Classification of states according to total poverty elasticity and growth components

| | (+) High growth | (-) Low growth |
|-----------------------------|---|--|
| (+) High poverty elasticity | Andhra Pradesh Gujarat Kerala Punjab | Orissa West Bengal |
| (-) Low poverty elasticity | Haryana Maharashtra Tamil Nadu | Assam Bihar Jammu & Kashmir Karnataka Madhya Pradesh Rajasthan Uttar Pradesh |

Table 8. Average shares of productive sectors by state,
1965-1994

| <i>State</i> | <i>Primary Income</i> | <i>Secondary Income</i> | <i>Tertiary Income</i> |
|-----------------|---------------------------|-----------------------------|----------------------------|
| Andhra Pradesh | 0.48 | 0.17 | 0.35 |
| Assam | 0.56 | 0.15 | 0.30 |
| Bihar | 0.54 | 0.19 | 0.27 |
| Gujarat | 0.39 | 0.27 | 0.34 |
| Haryana | 0.54 | 0.19 | 0.27 |
| Jammu & Kashmir | 0.51 | 0.14 | 0.35 |
| Karnataka | 0.47 | 0.22 | 0.31 |
| Kerala | 0.43 | 0.21 | 0.37 |
| Madhya Pradesh | 0.54 | 0.19 | 0.27 |
| Maharashtra | 0.28 | 0.33 | 0.39 |
| Orissa | 0.57 | 0.15 | 0.28 |
| Punjab | 0.51 | 0.18 | 0.30 |
| Rajasthan | 0.53 | 0.17 | 0.30 |
| Tamil Nadu | 0.31 | 0.29 | 0.40 |
| Uttar Pradesh | 0.51 | 0.17 | 0.32 |
| West Bengal | 0.39 | 0.25 | 0.36 |
| Average | 0.47 | 0.21 | 0.33 |

Notes: Primary sector: mining and quarrying, forestry and logging, fishery, and agriculture; secondary sector: manufacturing, construction, electricity and gas; tertiary sector: transport, storage, communication, trade, banking, and public administration. Due to data availability, we take data for 1970 for Assam (instead of 1965) and 1991 for Jammu & Kashmir (instead of 1994).

Table 9. Total poverty-growth elasticity by productive sector

| <i>State</i> | $\beta_{s1} s_1$ <i>Primary</i> <i>Income</i> | $\beta_{s2} s_2$ <i>Secondary</i> <i>Income</i> | $\beta_{s3} s_3$ <i>Tertiary</i> <i>Income</i> | R^2 |
|-------------------|--|--|---|-------|
| Andhra Pradesh | -0.04 (0.09) | -0.16 (0.16) | -0.44 (0.10) | 0.95 |
| Assam | -0.90 (0.22) | -0.72 (0.12) | -0.78 (0.16) | 0.68 |
| Bihar | -0.41 (0.10) | -0.31 (0.09) | -0.57 (0.11) | 0.56 |
| Gujarat | -0.40 (0.08) | -0.55 (0.09) | -0.50 (0.14) | 0.82 |
| Haryana | -0.18 (0.20) | 0.02 (0.37) | -0.65 (0.14) | 0.65 |
| Jammu & Kashmir | -0.75 (0.44) | -0.52 (0.56) | -0.72 (0.30) | 0.34 |
| Karnataka | 0.07 (0.14) | 0.04 (0.14) | -0.18 (0.10) | 0.68 |
| Kerala | -0.78 (0.13) | -1.07 (0.14) | -0.93 (0.13) | 0.93 |
| Madhya Pradesh | -0.25 (0.15) | 0.02 (0.17) | -0.58 (0.12) | 0.57 |
| Maharashtra | -0.15 (0.11) | 0.02 (0.17) | -0.39 (0.04) | 0.75 |
| Orissa | 0.10 (0.12) | -0.25 (0.20) | -0.29 (0.09) | 0.78 |
| Punjab | -0.45 (0.19) | -1.27 (0.33) | -0.48 (0.36) | 0.89 |
| Rajasthan | -0.16 (0.10) | -0.96 (0.23) | -0.07 (0.14) | 0.58 |
| Tamil Nadu | -0.20 (0.14) | -0.14 (0.17) | -0.60 (0.09) | 0.85 |
| Uttar Pradesh | -0.37 (0.16) | -0.33 (0.20) | -0.60 (0.19) | 0.61 |
| West Bengal | -0.82 (0.30) | -0.86 (0.35) | -1.01 (0.13) | 0.78 |
| Pooled regression | -0.25 (0.11) | -0.36 (0.14) | -0.32 (0.14) | 0.88 |

Notes: robust standard errors in parentheses. Primary sector: mining and quarrying, forestry and logging, fishery, and agriculture; secondary sector: manufacturing, construction, electricity and gas; tertiary sector: transport, storage, communication, trade, banking, and public administration. We estimate $\log p_{st} = \alpha + \beta_{s1} s_{s1} y_{s1} + \beta_{s2} s_{s2} y_{s2} + \beta_{s3} s_{s3} y_{s3}$ including fixed and year effects, where y_1 denotes logged primary income, y_2 denotes logged secondary income, y_3 denotes logged tertiary income, and s represents the respective income shares. The bottom row presents results from the pooled regression, where standard errors have been clustered by state. See Table 8 for average share of sectors.

Table 10. Decomposition of % contribution to poverty reduction by productive sector, 1965-1994

| <i>State</i> | <i>Primary Income</i> | | <i>Secondary Income</i> | | <i>Tertiary Income</i> | | <i>Poverty change</i> |
|-----------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------|
| | $\bar{s}(Y_{94} - Y_{65})$ | $\bar{g}(s_{94} - s_{65})$ | $\bar{s}(Y_{94} - Y_{65})$ | $\bar{g}(s_{94} - s_{65})$ | $\bar{s}(Y_{94} - Y_{65})$ | $\bar{g}(s_{94} - s_{65})$ | $P_{94} - P_{65}$ |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Andhra Pradesh | 2.67 | -0.63 | 11.7 | 2.45 | 69.0*** | 14.8*** | -0.62 |
| Assam | 31.0*** | -3.73*** | 12.7*** | 0.29*** | 49.3*** | 10.5*** | -0.05 |
| Bihar | 27.8*** | -2.33*** | 27.0*** | 4.72*** | 40.8*** | 1.93*** | 0.02 |
| Gujarat | 22.1*** | -2.62*** | 40.0*** | 6.80*** | 33.8*** | -0.02*** | -0.68 |
| Haryana | 19.4 | -2.88 | -1.49 | -0.22 | 71.5*** | 13.7*** | -0.25 |
| Jammu & Kashmir | 30.7* | -3.96* | 2.90 | -0.56 | 56.2** | 14.7** | 0.01 |
| Karnataka | -19.3 | 4.23 | -14.7 | -1.87 | 106* | 25.4* | -0.47 |
| Kerala | 10.8*** | -2.51*** | 34.2*** | 7.54*** | 43.7*** | 6.28*** | -0.86 |
| Madhya Pradesh | 29.2 | -3.77 | -1.96 | -0.41 | 69.2*** | 7.77*** | -0.13 |
| Maharashtra | 9.63 | -1.99 | -2.84 | -0.01 | 83.3*** | 11.9*** | -0.14 |
| Orissa | -16.0 | 2.08 | 24.7 | 2.13 | 71.4*** | 15.6*** | -0.40 |
| Punjab | 26.8*** | -2.27*** | 44.3*** | 6.94*** | 23.0 | 1.15 | -0.42 |
| Rajasthan | 14.8 | -1.83 | 68.0*** | 7.60*** | 9.94 | 1.56 | -0.85 |
| Tamil Nadu | 3.61 | -1.19 | 12.9 | 1.94 | 72.2*** | 10.5*** | -0.23 |
| Uttar Pradesh | 5.78** | -1.03** | 20.3 | 4.55 | 60.3*** | 10.1*** | -0.56 |
| West Bengal | 29.1** | -1.17** | 13.6** | -1.53** | 53.6*** | 6.46*** | -0.36 |
| Average | 14.2 | -1.60 | 18.2 | 2.52 | 57.1 | 9.54 | -0.39 |

Primary sector: mining and quarrying, forestry and logging, fishery, and agriculture; secondary sector: manufacturing, construction, electricity and gas; tertiary sector: transport, storage, communication, trade, banking, and public administration. The decomposition of explained poverty change into productive sectors corresponds to

$$\Delta \hat{P}_s \approx \sum_{k=1}^3 \beta_{ks} (\bar{s}_{ks} \Delta Y_{ks} + \bar{g}_{ks} \Delta s_{ks}),$$

where $Y_k = \log y_k$, $P = \log \text{headcount}$, $s_k = \frac{y_k}{y}$, $\bar{s}_{ks} = \frac{1}{T} \sum_{t=1}^T s_{ks}$, $\bar{g}_{ks} = \frac{1}{2} \Delta Y_{ks}$. Differences correspond to 1965-1994, s denotes

state, and k denotes sector. Due to data availability, we take data for 1970 for Assam (instead of 1965) and 1991 for Jammu & Kashmir (instead of 1994). Numbers in columns (1)-(6) are percentage contributions to the (explained) change in poverty.

Corresponding β_k : *significant at 10%; **significant at 5%; ***significant at 1% (see Table 9 for β_k values and Table 8 for average shares of sectors).

Table 11. The elasticity of rural and urban poverty with respect to growth, by Indian state, 1958-1997

| <i>State</i> | <i>Rural β_s</i> | <i>Urban β_s</i> |
|-----------------|-----------------------------------|-----------------------------------|
| | (1) | (2) |
| Andhra Pradesh | -0.77 (0.07) | -0.67 (0.04) |
| Assam | -0.31 (0.09) | -1.41 (0.23) |
| Bihar | -0.24 (0.07) | -0.78 (0.14) |
| Gujarat | -0.67 (0.08) | -0.60 (0.07) |
| Haryana | -0.42 (0.11) | -1.14 (0.10) |
| Jammu & Kashmir | -0.43 (0.15) | -1.14 (0.10) |
| Karnataka | -0.41 (0.08) | -0.80 (0.07) |
| Kerala | -1.19 (0.09) | -1.32 (0.11) |
| Madhya Pradesh | -0.37 (0.06) | -0.45 (0.07) |
| Maharashtra | -0.38 (0.05) | -0.32 (0.06) |
| Orissa | 0.71 (0.08) | -0.55 (0.07) |
| Punjab | -0.92 (0.11) | -1.35 (0.10) |
| Rajasthan | -0.32 (0.10) | -0.89 (0.07) |
| Tamil Nadu | -0.62 (0.09) | -0.49 (0.04) |
| Uttar Pradesh | -0.59 (0.09) | -0.93 (0.10) |
| West Bengal | -1.29 (0.09) | -0.68 (0.10) |
| Average | -0.60 | -0.85 |

Notes: for (1): log rural urban headcount regressed on log real income per capita. For (2): log of urban headcount regressed on the log real income per capita. Robust standard errors in parentheses

Table 12. Pro-poor growth measurements, 1993/94–1999/2000,
Rural Households

| All-India | <i>Ordinary growth rate</i> | <i>Rate of pro-poor growth</i> | <i>Distributional effect</i> | <i>Growth Component</i> | <i>Redistribution Component</i> |
|-----------|-------------------------------------|--|----------------------------------|-----------------------------|-------------------------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Extreme | 1.24 | 0.94 | 0.76 | -2.5 | -2.5 |
| Regular | 1.24 | 1.11 | 0.90 | -7.5 | -2.5 |

Note: results in columns (1) and (2) are per annum. Extreme (regular) poverty results are found with a poverty line of 211.3 (422.6) 1993/94 Rs. The extreme poverty line corresponds to the poverty line used by Sundaram and Tendulkar (2003c). See details of calculations in Appendix 1 and the Methodological Appendix.

Table 13. Pro-poor growth measurements, 1993/94–1999/2000,
Urban Households

| All-India | <i>Ordinary growth rate</i> | <i>Rate of pro-poor growth</i> | <i>Distributional effect</i> | <i>Growth Component</i> | <i>Redistribution Component</i> |
|-----------|-------------------------------------|--|----------------------------------|-----------------------------|-------------------------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Extreme | 1.94 | 0.57 | 0.30 | -7.5 | 2.5 |
| Regular | 1.94 | 1.10 | 0.57 | -7.5 | 2.5 |

Note: results in columns (1) and (2) are per annum. Extreme (regular) poverty results are found with a poverty line of 274.88 (549.76) 1993/94 Rs. The extreme poverty line corresponds to the poverty line used by Sundaram and Tendulkar (2003c). See details of calculations in Appendix 1 and the Methodological Appendix.

Table 14. Land reform, Poverty Reduction and Growth in India

| | Rural poverty gap | Urban poverty gap | Rural poverty gap | Log agricultural state income pc |
|---|----------------------|----------------------|----------------------|---|
| | (1) | (2) | (3) | (4) |
| Model | GLS AR(1) | GLS AR(1) | GLS AR(1) | GLS AR(1) |
| Four-year lagged cumulative land reform legislation | -0.281** (2.18) | 0.085 (3.21) | | |
| Four-year lagged cumulative tenancy reform legislation | | | -0.604*** (2.52) | -0.037*** (4.54) |
| Four-year lagged cumulative abolition of intermediaries legislation | | | -2.165*** (4.08) | 0.005 (0.27) |
| Four-year lagged cumulative land ceiling legislation | | | 0.089 (0.11) | 0.019 (1.26) |
| Four-year lagged cumulative land consolidation legislation | | | 0.456 (0.82) | 0.065*** (3.31) |
| Number of observations | 507 | 507 | 507 | 484 |

Source: Besley and Burgess (2000). z statistics in parentheses. *significant 10% level, **significant 5% level, ***significant 1% level. Land reform legislation has been coded from land reform acts and cumulated over time. The regression model used for all columns is Generalized Least Squares (GLS), where the disturbance is assumed to depend on past values. Sample is a panel of 16 main Indian states 1958-1992.

Table 15. Rural Banks, Poverty and Growth in India

| | Rural headcount | Urban headcount | Agricultur al wage | Total state output |
|--|--------------------|--------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) |
| Model | IV | IV | IV | IV |
| Number of branches opened in rural unbanked locations per capita | -4.74** (1.79) | -0.66 (1.07) | 0.08* (0.04) | 0.08*** (0.29) |
| R ² | 0.78 | 0.92 | 0.98 | 0.96 |
| Number of observations | 627 | 627 | 545 | 579 |

Source: Burgess and Pande (2004) and Burgess and Pande (2003) Standard errors adjusted for clustering by state in parentheses. *significant 10% level, **significant 5% level, ***significant 1% level. All columns include as controls the number of bank branches in 1961 per capita multiplied by a 1961-2000 trend, a post-1976 dummy multiplied by a 1977-2000 trend, a post-1989 dummy multiplied by a 1990-2000 trend, population density, log state income per capita, log rural locations per capita, as well as state and year fixed-effects. The regression model used is Instrumental Variables (IV). The IV results in columns (1)-(4) have been calculated using as instrument the number of branches in 1961 per capita interacted with (i) a post-1976 dummy and a post-1976 time trend (ii) a post-1989 dummy and a post-1989 time trend. Sample is a panel of 16 main Indian states 1961-2000.

Table 16. Human Capital and Economic Growth in India

| Annual growth rate of real state income pc | | | |
|--|----------------------|----------------------|-----------------------|
| Model | (1) PMG | (2) PMG | (3) PMG |
| Two-year lagged male high school enrollment | 0.0061*** (2.961) | 0.0059*** (2.778) | 0.0133*** (9.143) |
| Two-year lagged female high school enrollment | 0.0127*** (5.315) | 0.0075*** (3.376) | |
| Two-year lagged male minus female high school enrollment | | | -0.0075*** (3.376) |
| Number of Observations | 360 | 360 | 360 |

Source: Trivedi (2002). t statistics in parentheses. *significant 10% level, **significant 5% level, ***significant 1% level. Columns (2)-(3) include as control the infant mortality rate and physical infrastructure lagged two years. All columns also include year and state fixed-effects. The regression model used for all columns is the Pooled Mean Group estimator. Sample is a panel of 15 main Indian states 1965-1992.

Table 17. Gender and Growth in India

| Log total real output pc | | | | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| Model | (1) OLS | (2) OLS | (3) IV | (4) IV |
| Female-to-male managers | 1.43*** (7.27) | | 5.13*** (2.92) | |
| Female-to-male workers | | 1.00*** (3.45) | | 4.93*** (3.00) |
| Female literacy rate | 1.14*** (3.05) | 0.93*** (2.44) | 1.47** (2.36) | -0.21 (0.22) |
| Male literacy rate | 0.14 (0.13) | -0.19 (0.20) | -0.67 (0.41) | -1.18 (0.60) |
| Adjusted R ² | 0.92 | 0.92 | 0.99 | 0.99 |
| Number of observations | 289 | 289 | 244 | 244 |

Source: Esteve-Volart (2004). Standard errors adjusted for clustering by state. Absolute t statistics in parentheses. *significant 10% level, **significant 5% level, ***significant 1% level. Female-to-male managers (workers) is the ratio of female managers to male managers (total workers). Total workers is the sum of managers, employees, self-employed workers, and family workers). All columns include the following controls: population growth, ratio of urban to rural population, ratio of manufacturing capital to labor, percentage of scheduled tribe and scheduled caste population, total workforce, political competition, voter turnout, and an election year dummy. All columns also include year and state fixed-effects. Two regression models are used: OLS (Ordinary Least Squares) and IV (Instrumental Variables). The IV results in columns (3)-(4) have been calculated using as instrument the number of prosecutions launched divided by the number of complaints received under the Maternity Benefit Act (1961). Sample is a panel of 16 main Indian states 1961-1991.

Table 18. Labor regulation, Growth and Poverty

| | Rural head count | Urban head count | Log total manufacturing output pc | Log registered manufacturing output pc | Log unregistered manufacturing output pc |
|-------------------------------------|------------------------|------------------------|---|--|---|
| | (1) | (2) | (3) | (4) | (5) |
| Model | OLS | OLS | OLS | OLS | OLS |
| Labor regulation lagged one year | -0.821 (0.48) | 2.288** * (3.31) | -0.073** (2.05) | -0.186*** (2.96) | 0.086** (2.46) |
| Adjusted R ² | 0.80 | 0.88 | 0.93 | 0.93 | 0.75 |
| Number of observations | 547 | 547 | 509 | 508 | 509 |

Source: Besley and Burgess (2004). Standard errors adjusted for clustering by state. Absolute t statistics in parentheses. *significant 10% level, **significant 5% level, ***significant 1% level. Total, registered, and unregistered manufacturing output figures are components of state domestic product and expressed in log real per capita terms. State amendments to the Industrial Disputes Act are coded 1=pro-worker, 0=neutral, -1=pro-employer and then cumulated over the period to generate the labor regulation measure. All columns include year and state fixed-effects. The regression model used for all columns is Ordinary Least Squares (OLS), where the disturbance is assumed to depend on past values. Sample is a panel of 16 main Indian states 1958-1992.

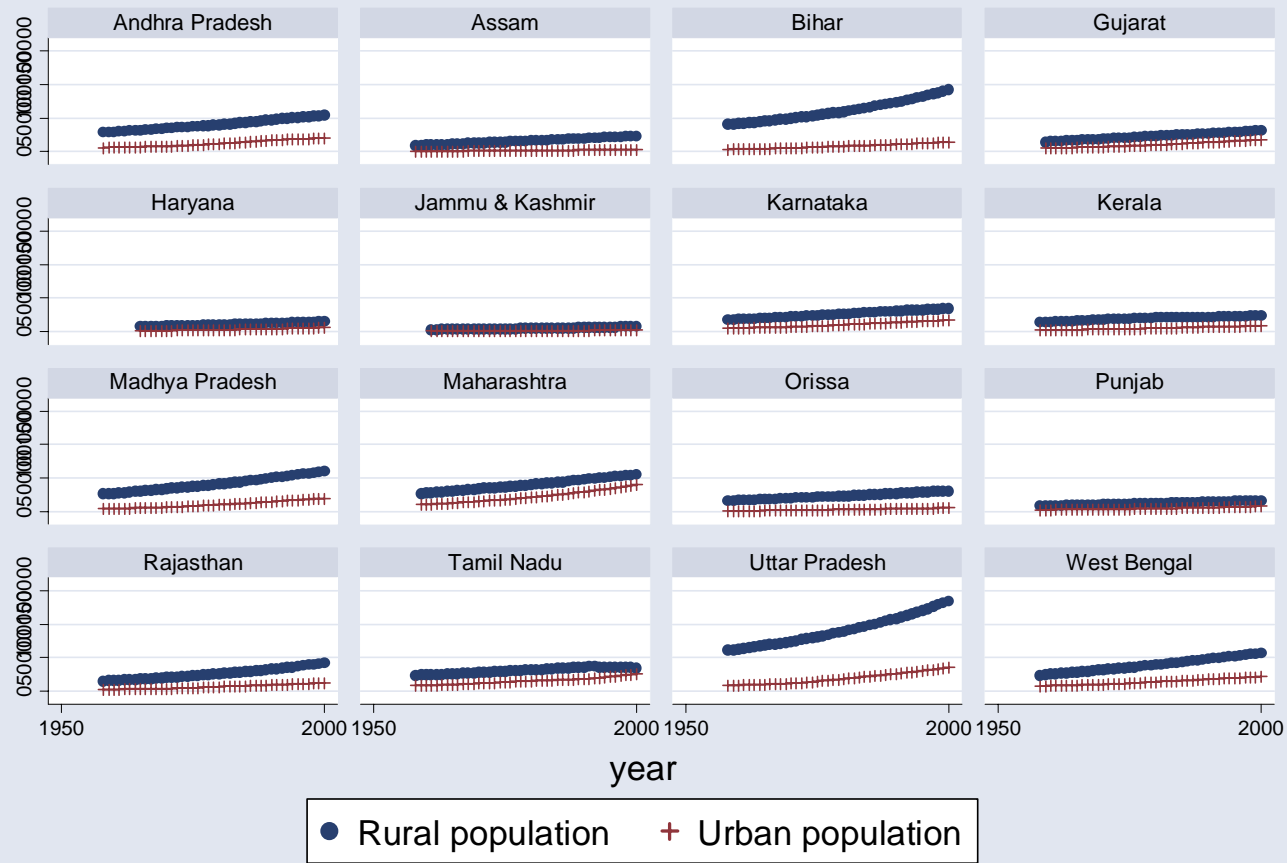
Table 19. Mass Media, Politics and Government Responsiveness

| | Public food distribution | Calamity relief expenditure | Public food distribution | Calamity relief expenditure |
|---|-----------------------------|-----------------------------------|-----------------------------|-----------------------------------|
| | (1) | (2) | (3) | (4) |
| Model | OLS | OLS | OLS | OLS |
| Food grain production | 0.019 (0.98) | | -0.032*** (3.13) | |
| Flood damage | | 0.063*** (2.58) | | 0.222*** (3.39) |
| Newspaper circulation | 146.8*** (4.52) | 19.41 (1.31) | 93.5*** (3.46) | 36.1** (2.22) |
| Newspaper circulation*food grain production | -0.444*** (3.11) | | | |
| Newspaper circulation*flood damage | | 1.677*** (2.83) | | |
| Political competition | | | 12.0*** (3.08) | -0.404 (0.32) |
| Political competition* food grain production | | | -0.027** (2.04) | |
| Political competition* flood damage | | | | 0.182* (1.69) |
| Adjusted R ² | 0.77 | 0.30 | 0.77 | 0.29 |
| Number of observations | 471 | 486 | 471 | 486 |

Source: Besley and Burgess (2002). t statistics calculated with robust standard errors in parentheses. *significant 10% level, **significant 5% level, ***significant 1% level. Calamity relief expenditure and flood damage are in real per capita terms. Public food distribution, food grain production, and newspaper circulation are in per capita terms. Columns (3) and (4) control for turnout and an election year dummy. All columns also include as economic controls the log real state income per capita, the ratio of urban to total population, population density, log of total population, and revenue received from the center expressed in real per capita terms, as well as year and state fixed-effects. The regression model used for all columns is Ordinary Least Squares (OLS). Sample is a panel of 16 main Indian states 1958-1992.



Figure 1. Map of India's states



Graphs by State Name

Figure 2. Rural and urban population trends, by Indian state, 1957-2002

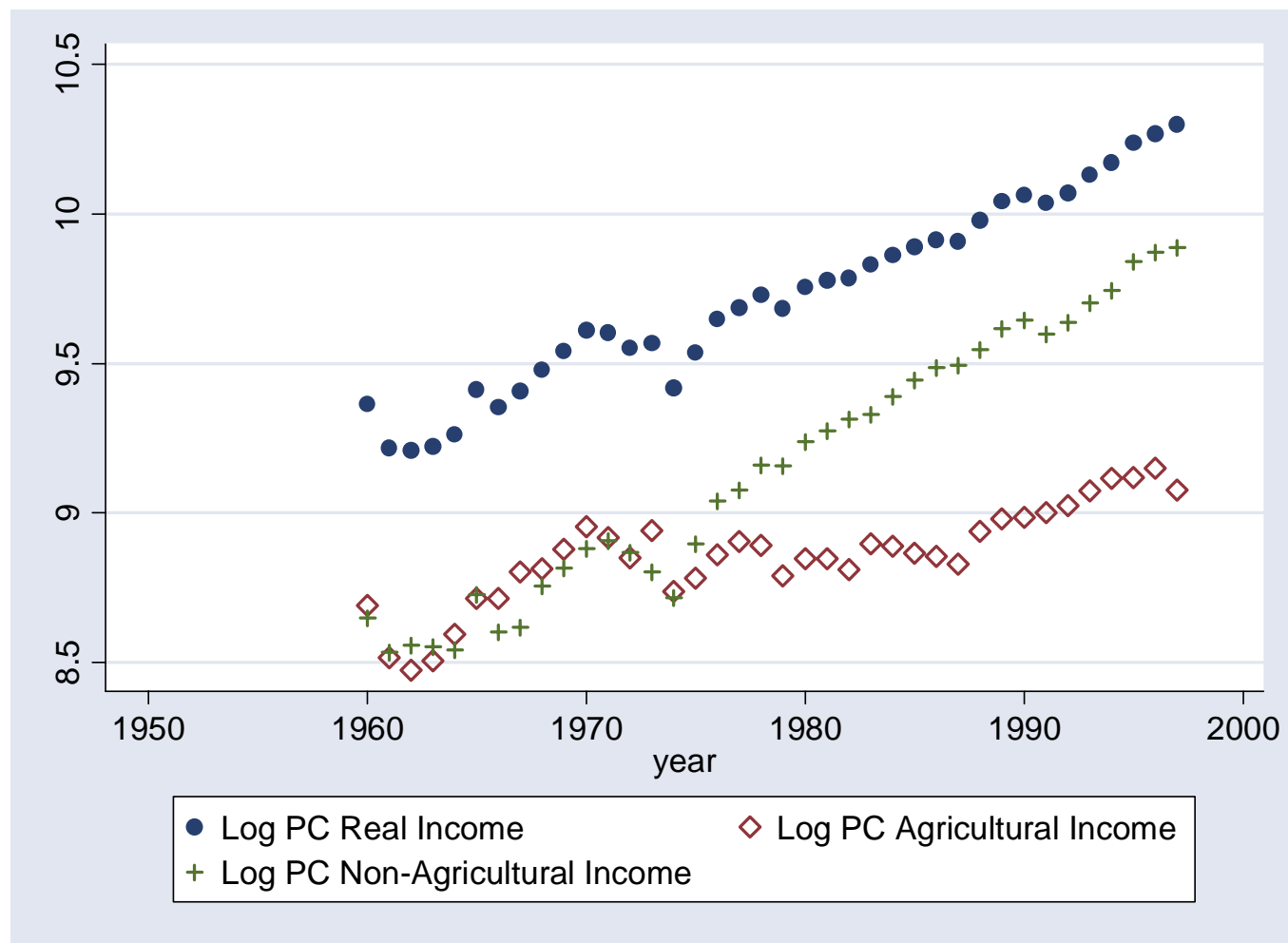


Figure 3. Changes in total real income per capita and of agricultural and non-agricultural components, all-India, 1958-1997

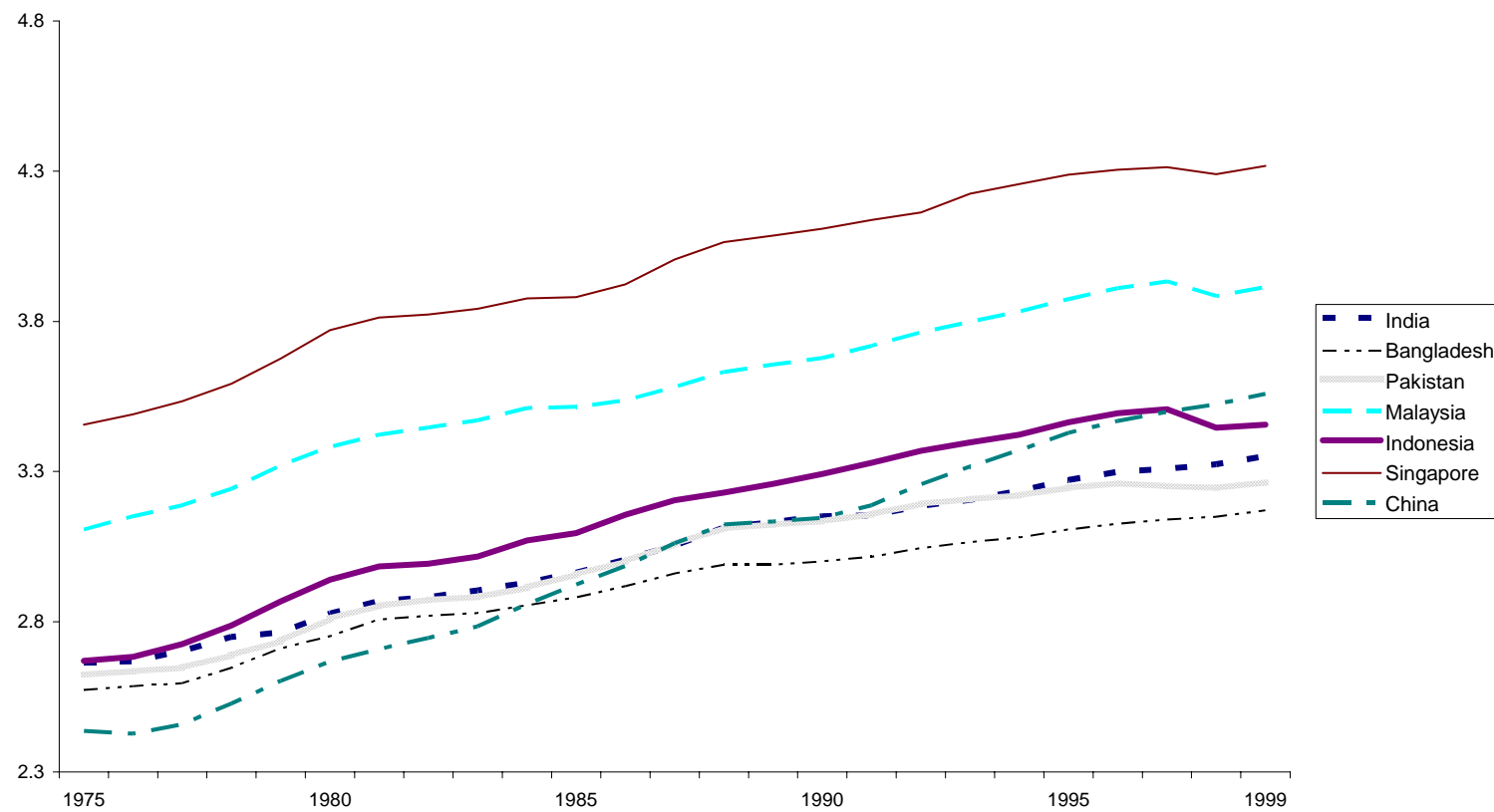


Figure 4. Changes in the log of real income per capita, PPP, India and other Asian countries, 1975-1999

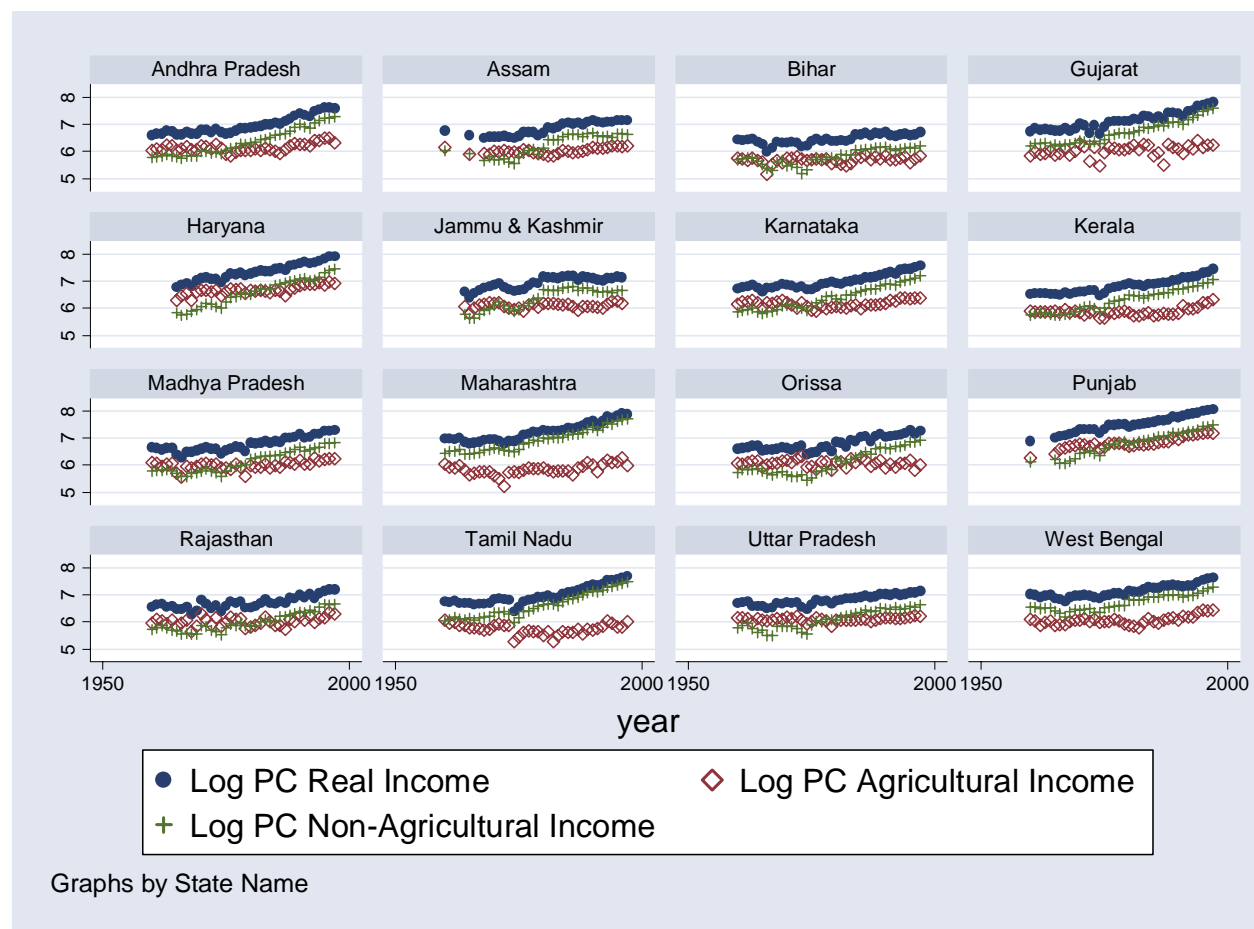


Figure 5. Changes in total real income per capita and of agricultural and non-agricultural components, by Indian state, 1958-1997

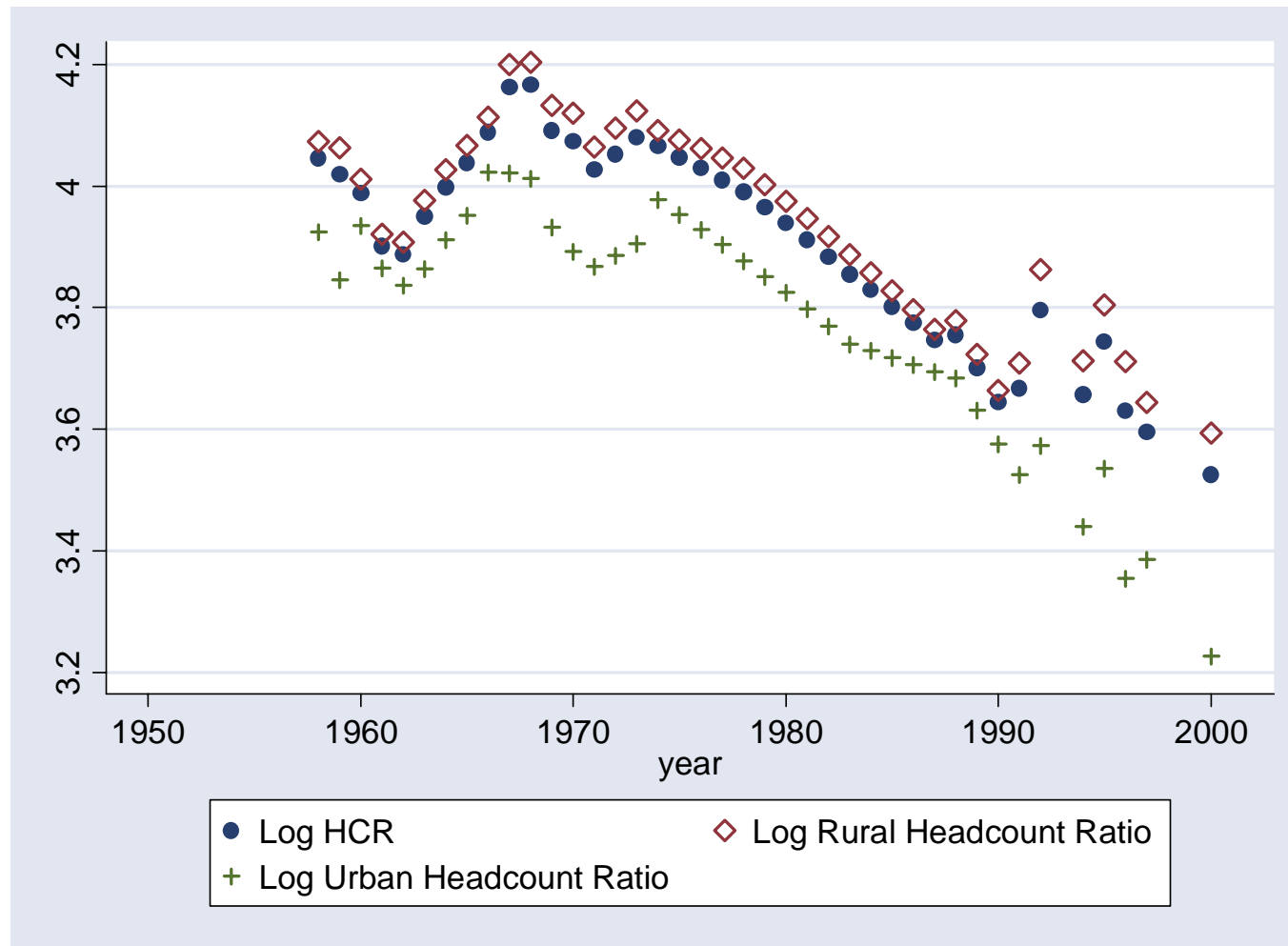


Figure 6. Changes in total, rural and urban poverty, all-India, 1958-2000

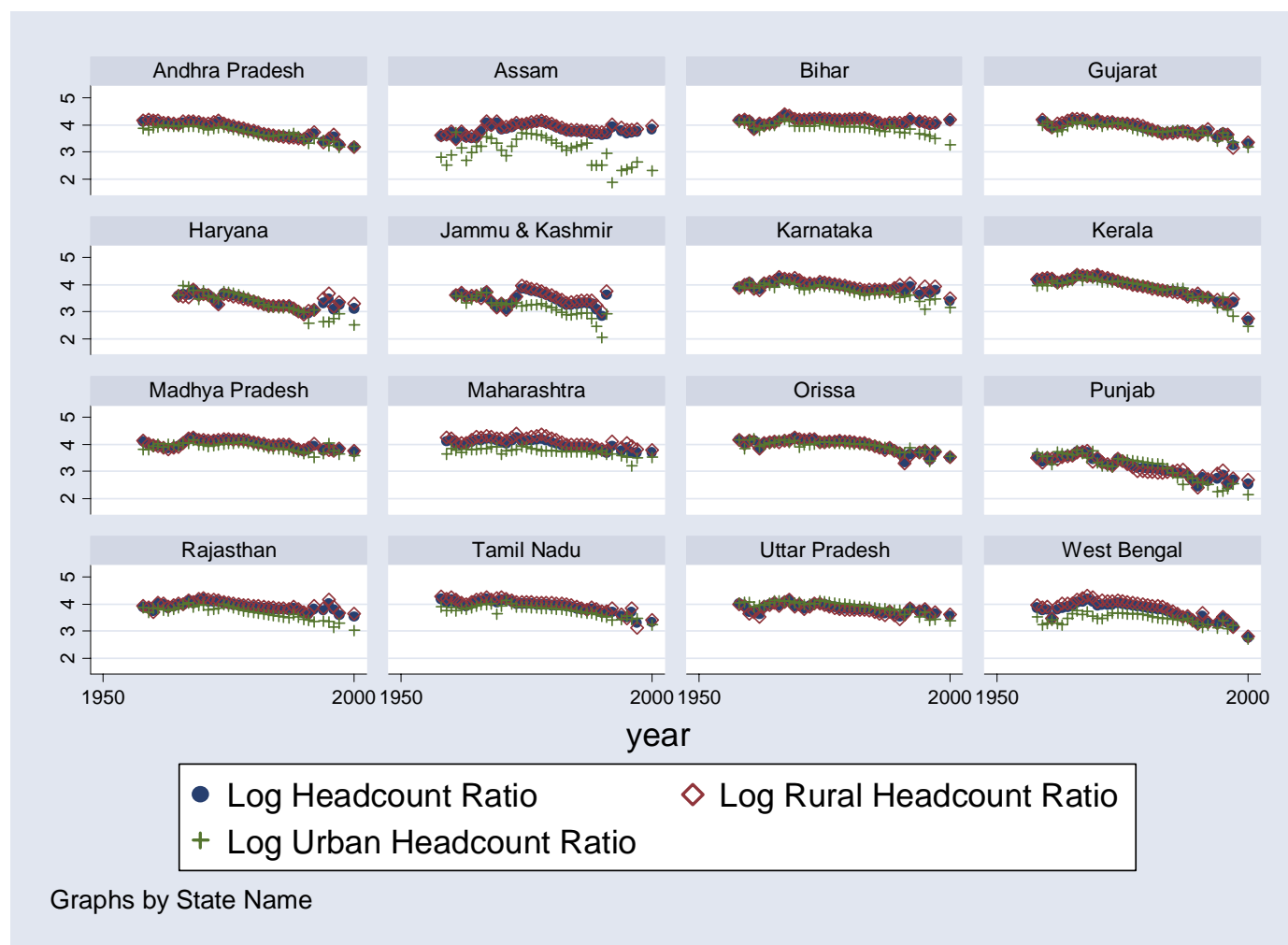


Figure 7. Changes in total, rural and urban poverty, by Indian state, 1958-2000

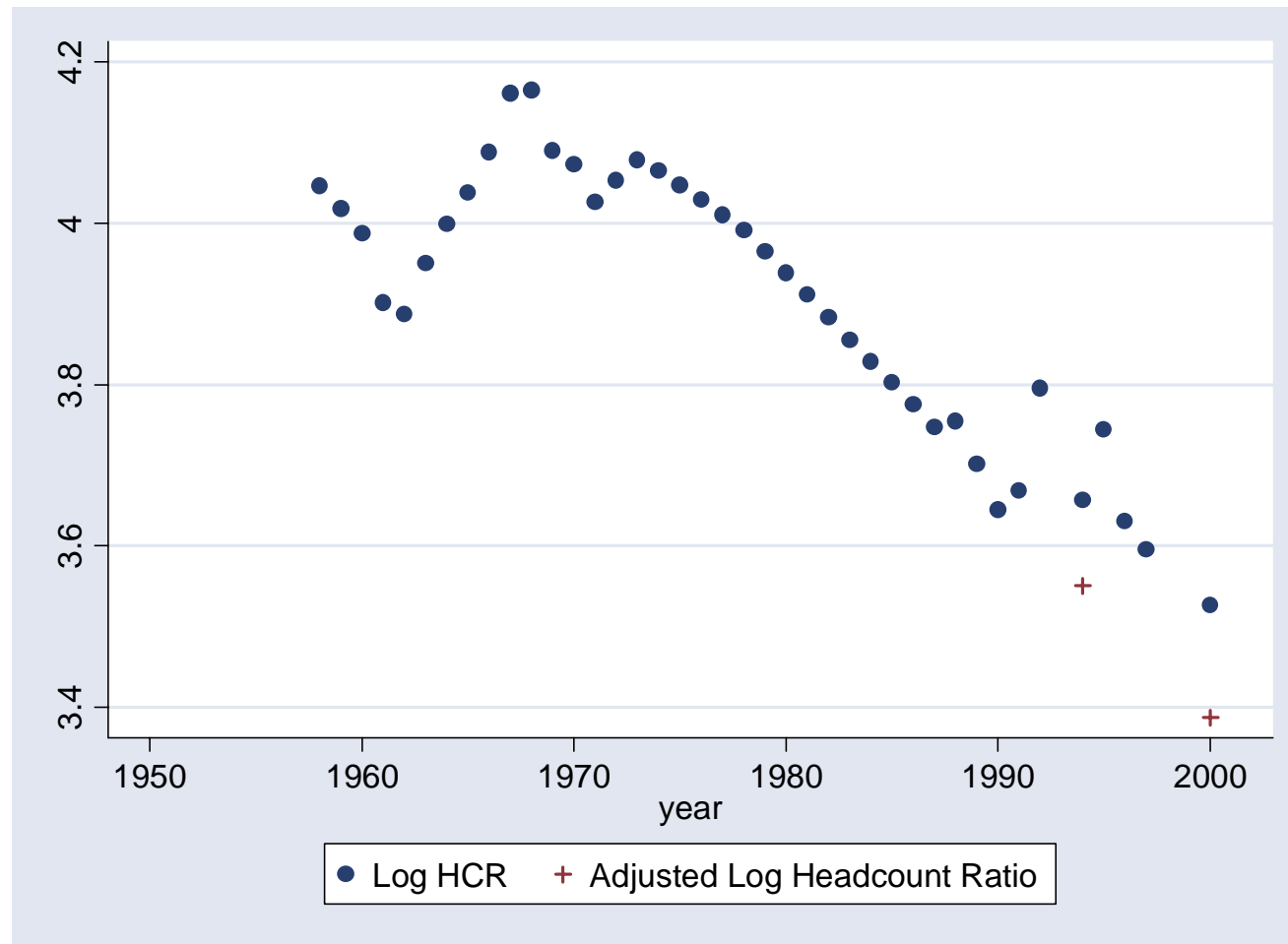


Figure 8. Changes in poverty and adjusted poverty, all-India, 1958-2000

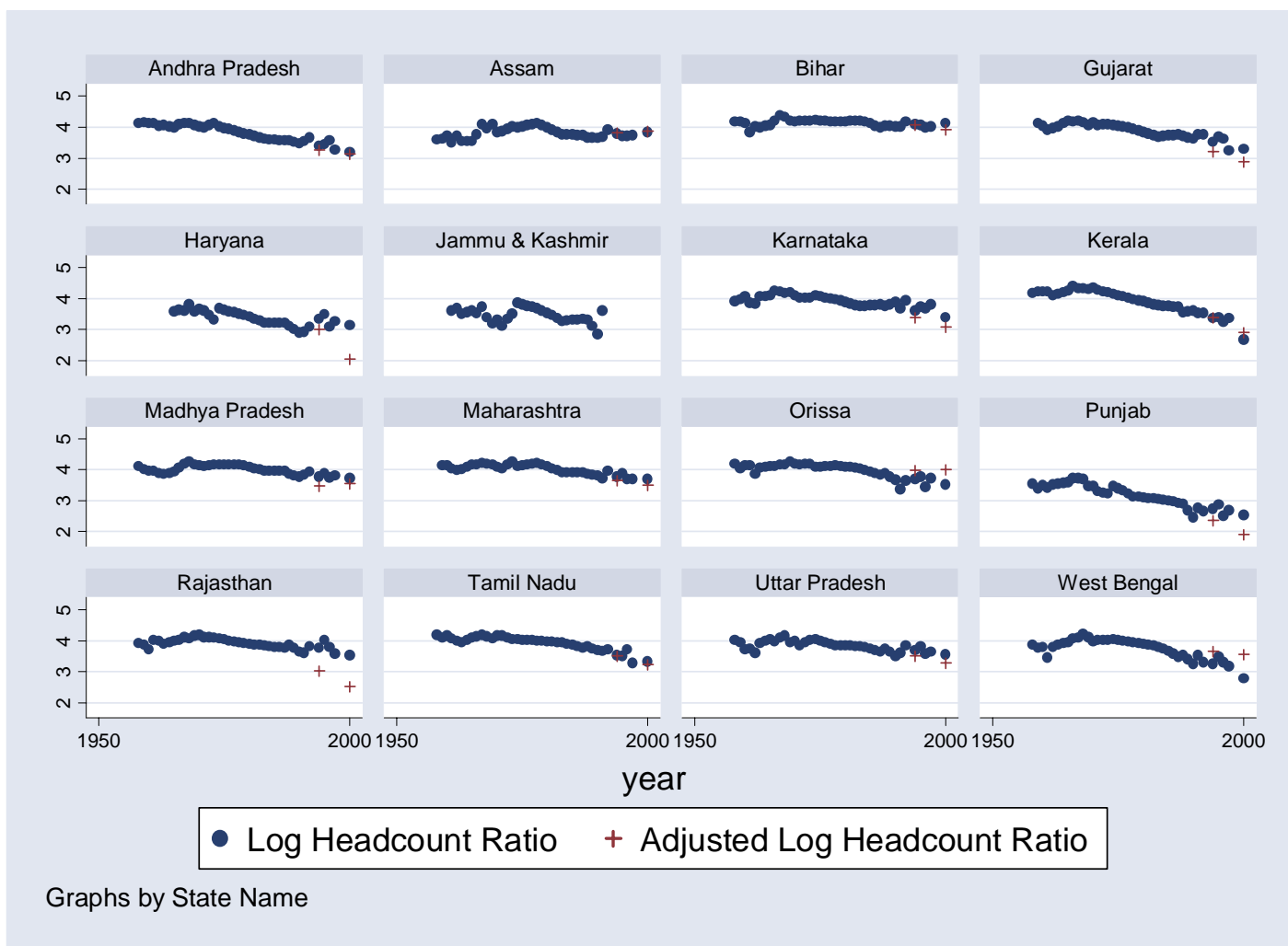


Figure 9. Changes in poverty and adjusted poverty, by Indian state, 1958-2000

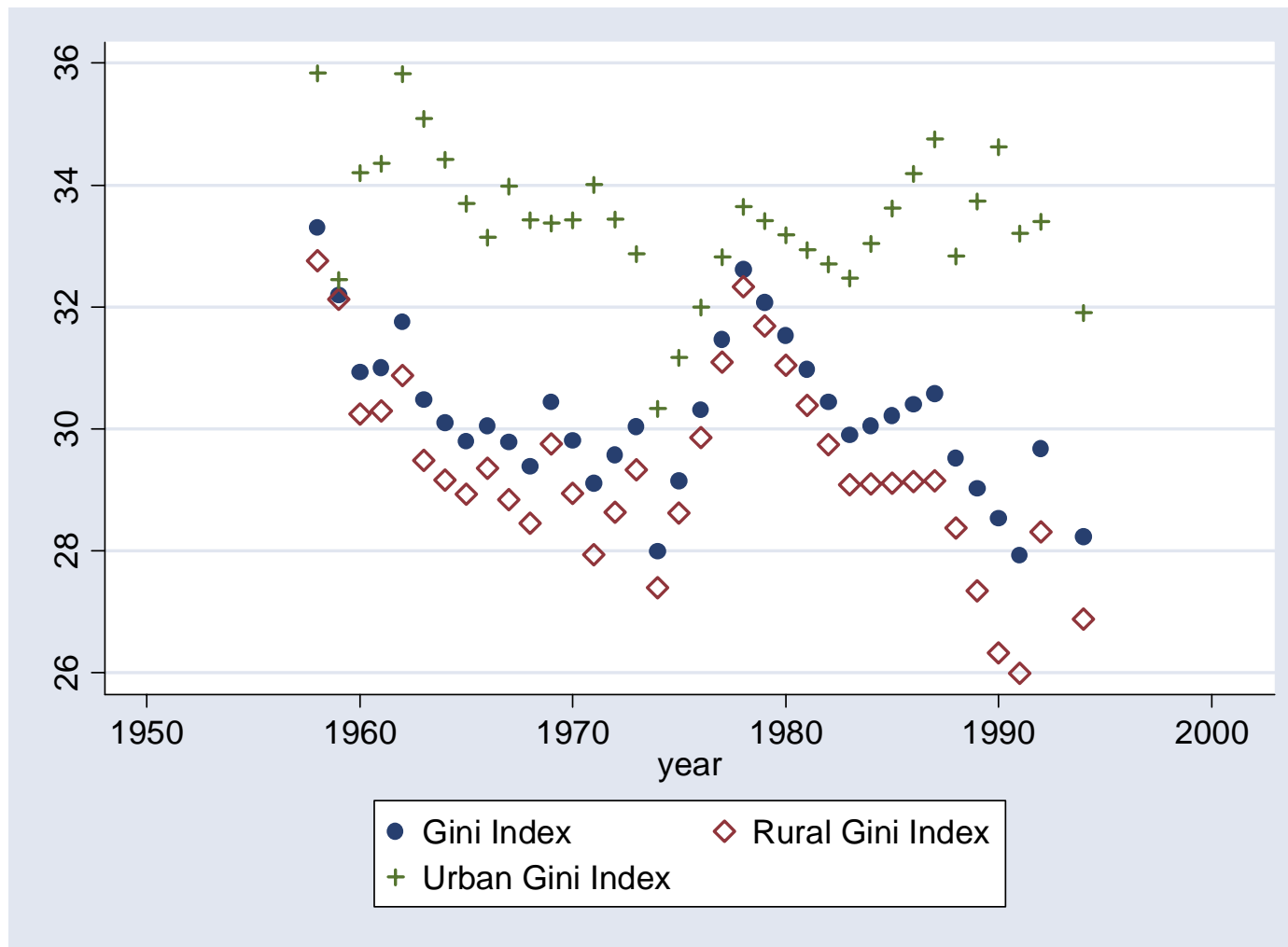


Figure 10. Changes in total, rural and urban inequality, all-India, 1958-1994



Figure 11. Changes in total, rural and urban inequality, by Indian state, 1958-1994

Figure 12. Poverty-growth elasticity and growth rate – land reform

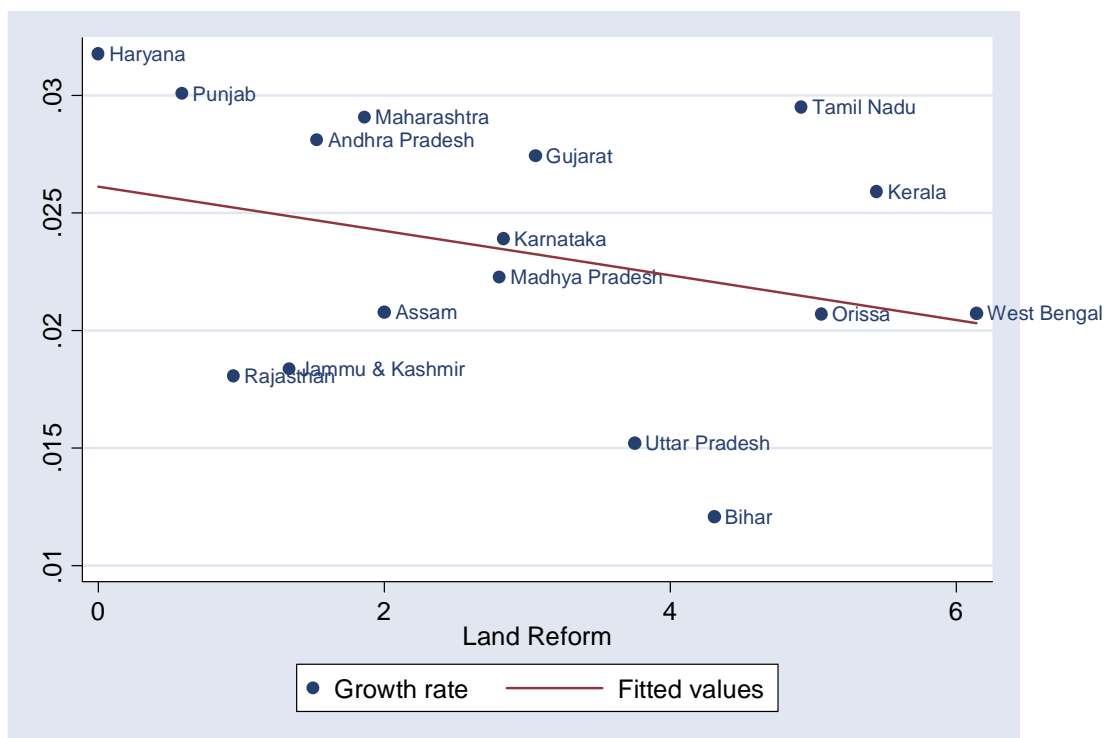
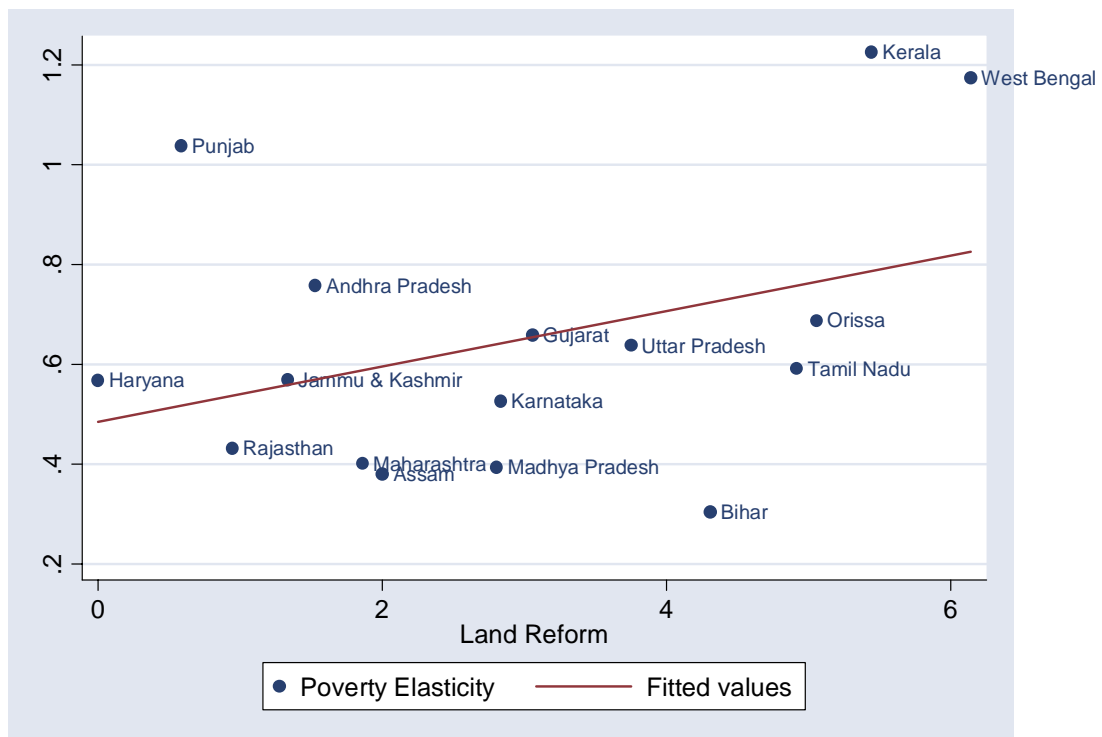


Figure 13. Poverty-growth elasticity and growth rate – agricultural credit per capita

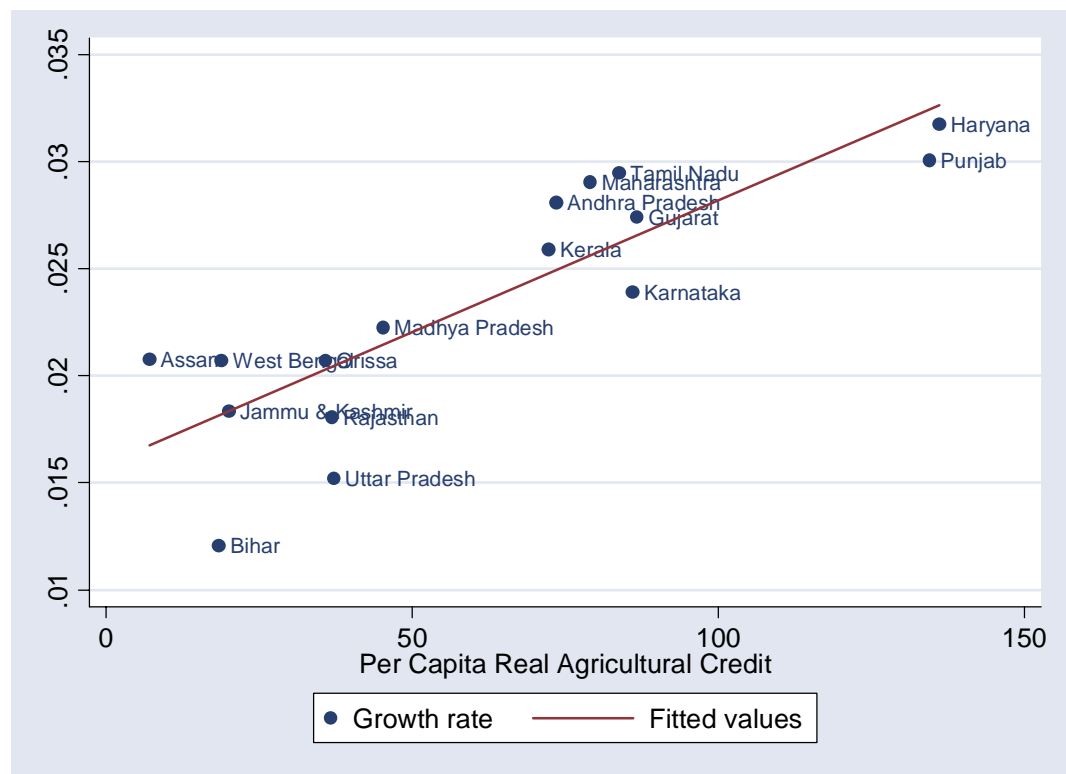
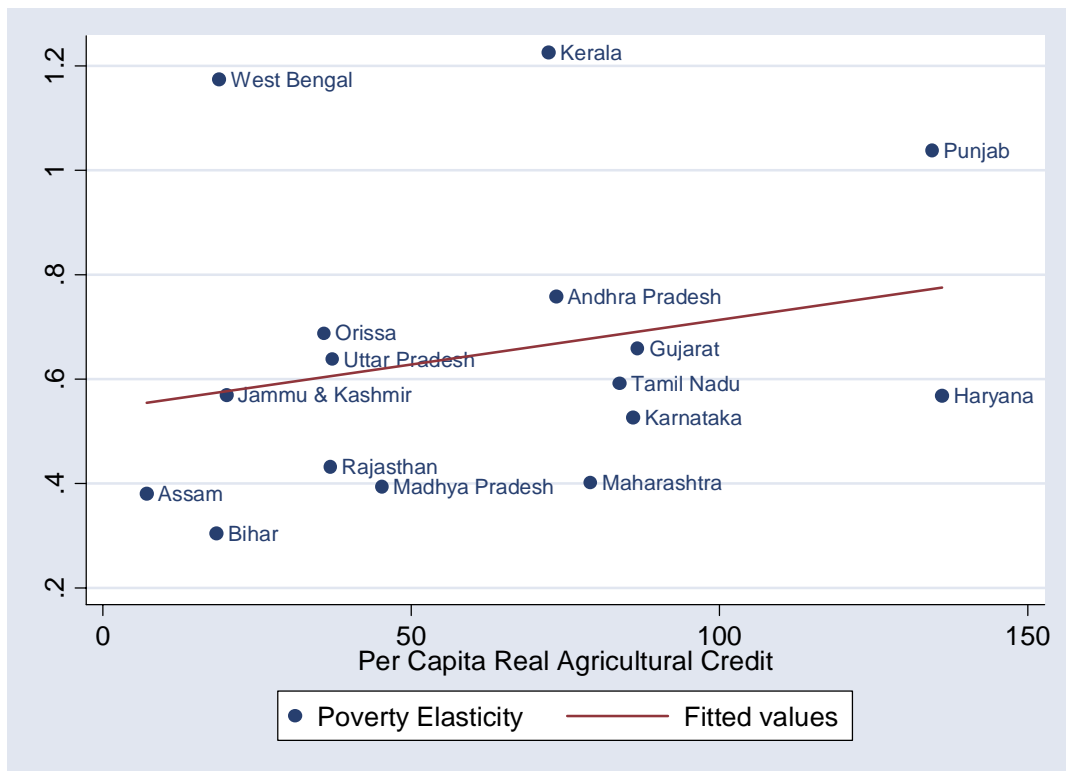


Figure 14. Urban poverty-growth elasticity and growth rate – labor regulation

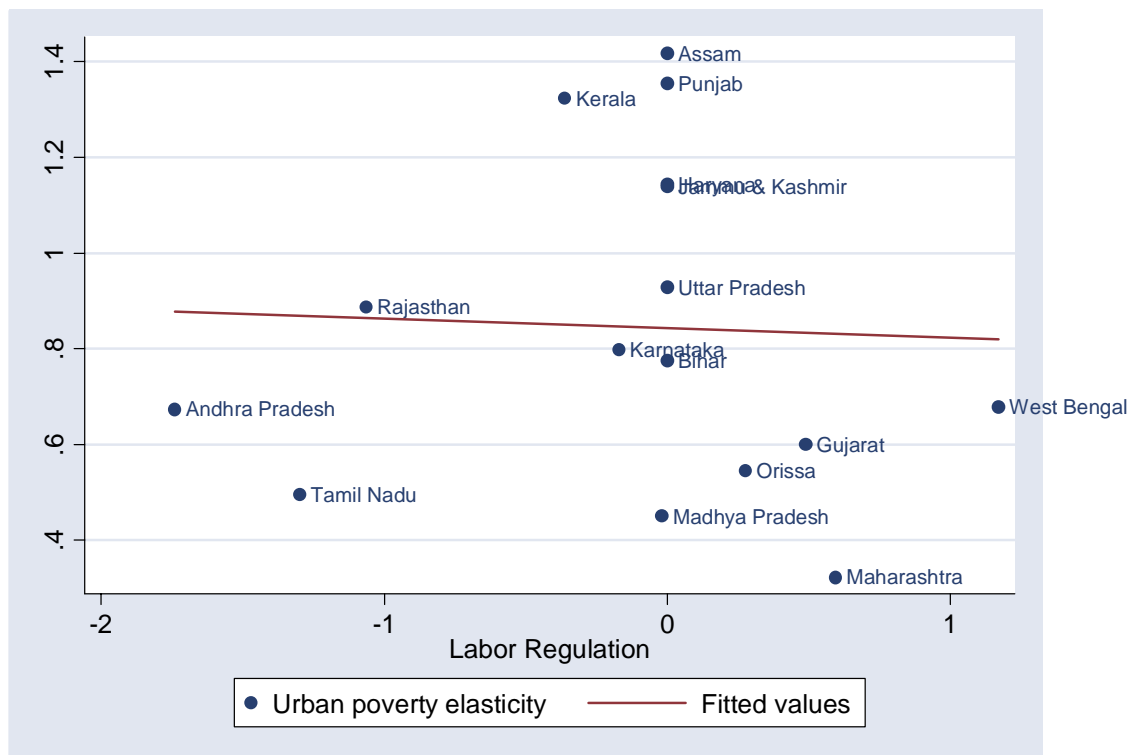


Figure 15. Poverty-growth elasticity and growth rate – education expenditure per capita

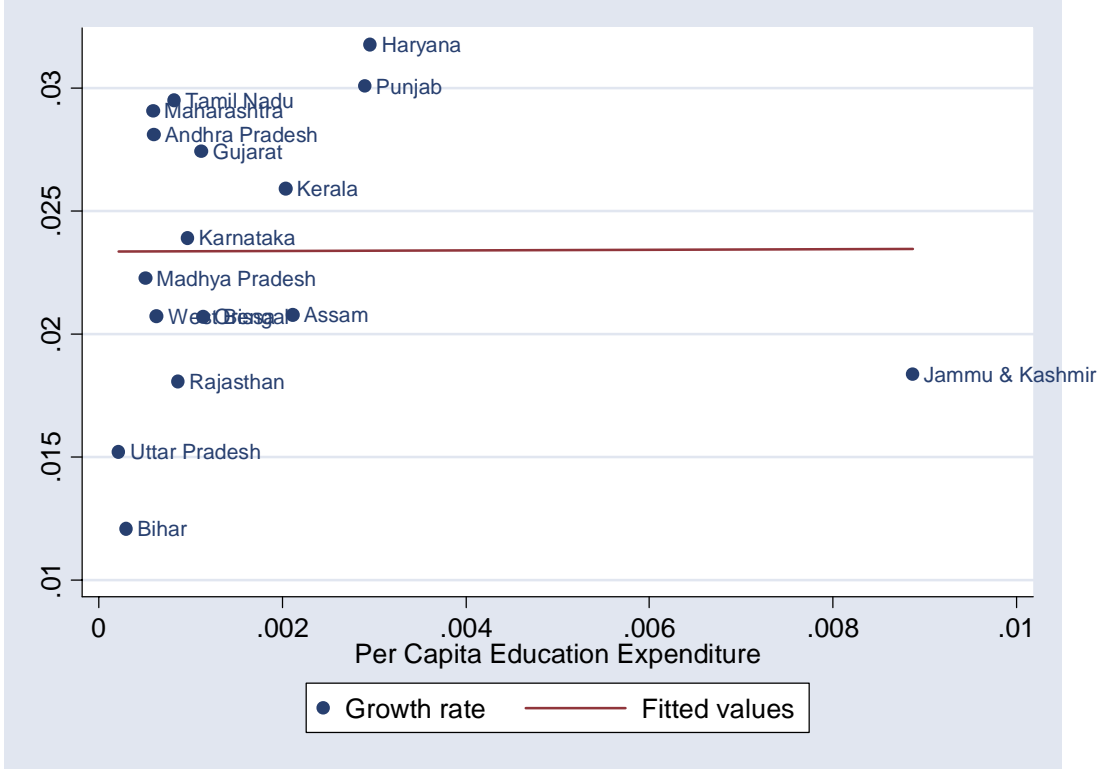
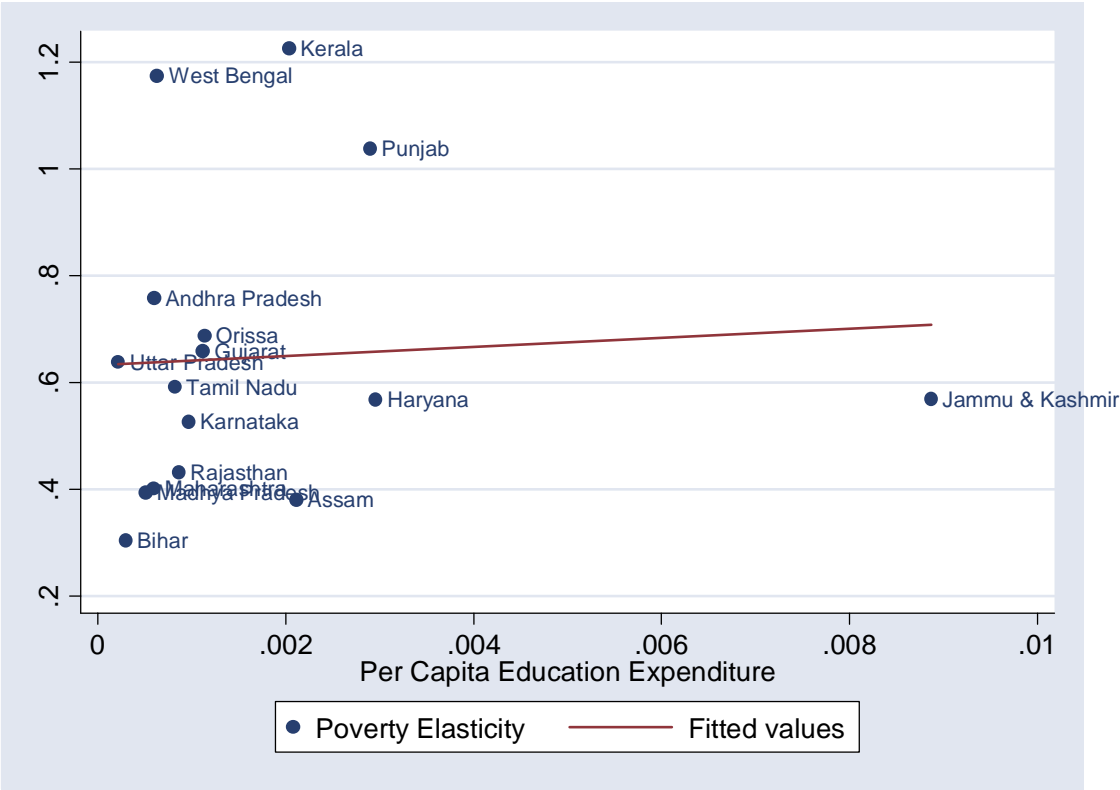


Figure 16. Poverty-growth elasticity and growth rate – 1961
landholding institutions

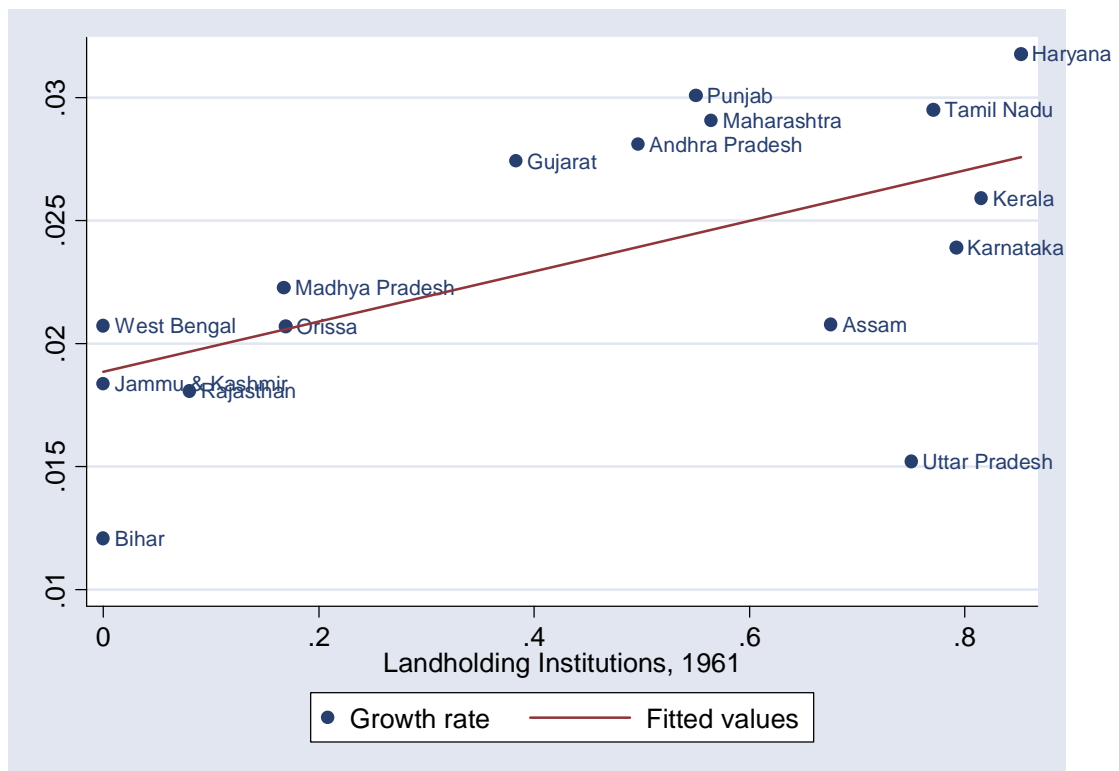
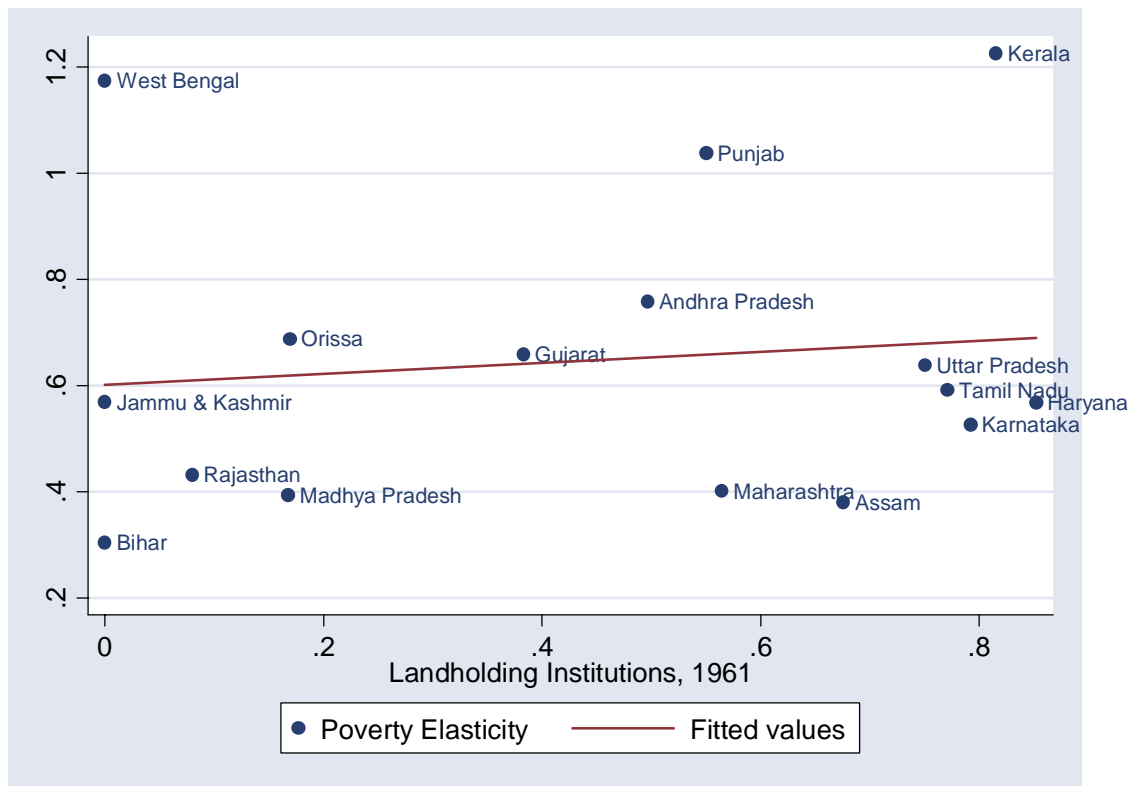


Figure 17. Rural poverty-growth elasticity and growth rate – 1961 landlessness index

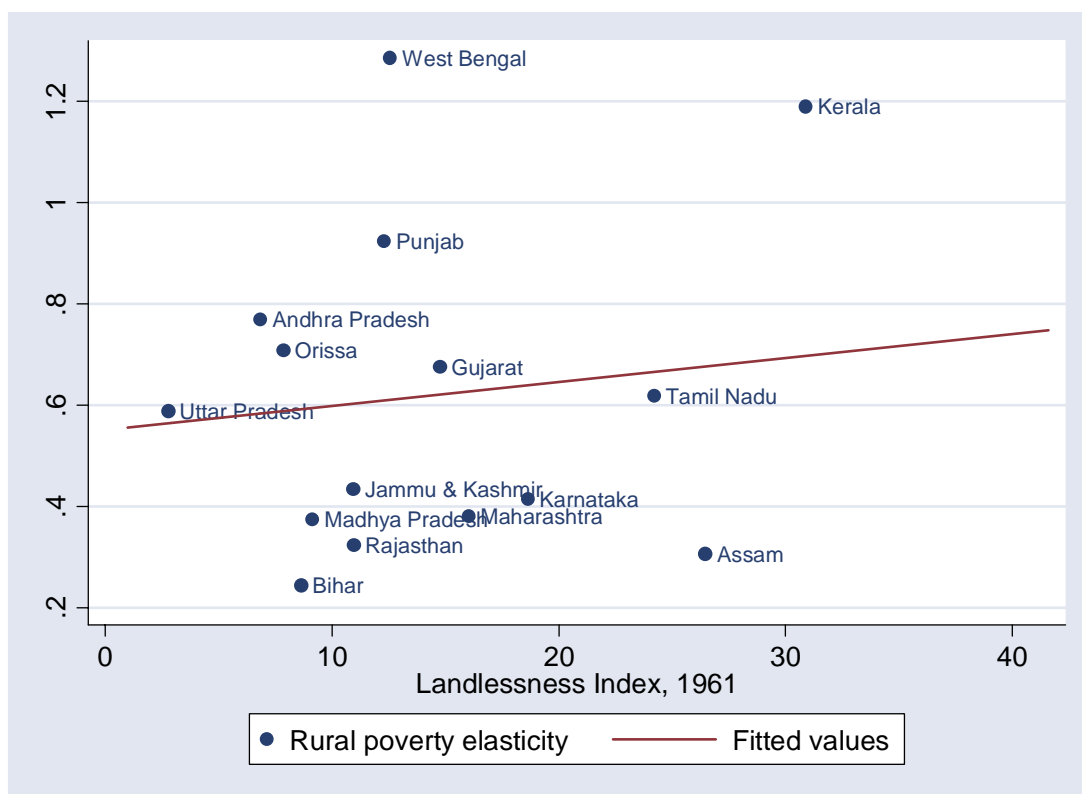


Figure 18. Poverty-growth elasticity and growth rate – 1961
Gini index

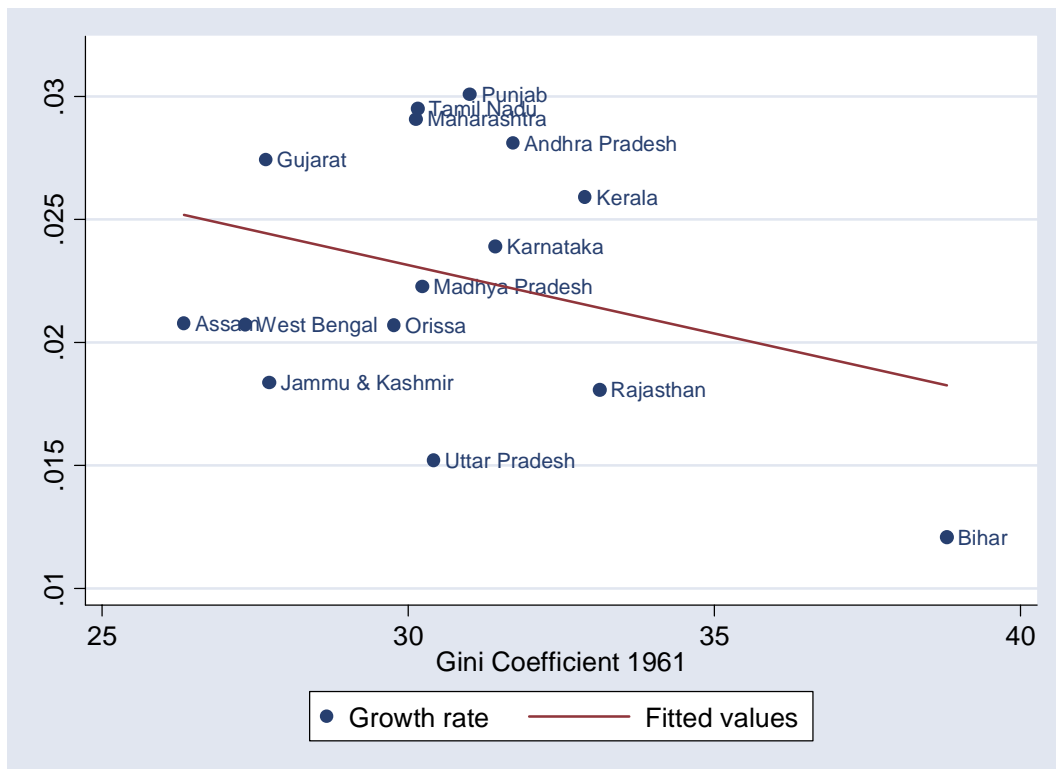
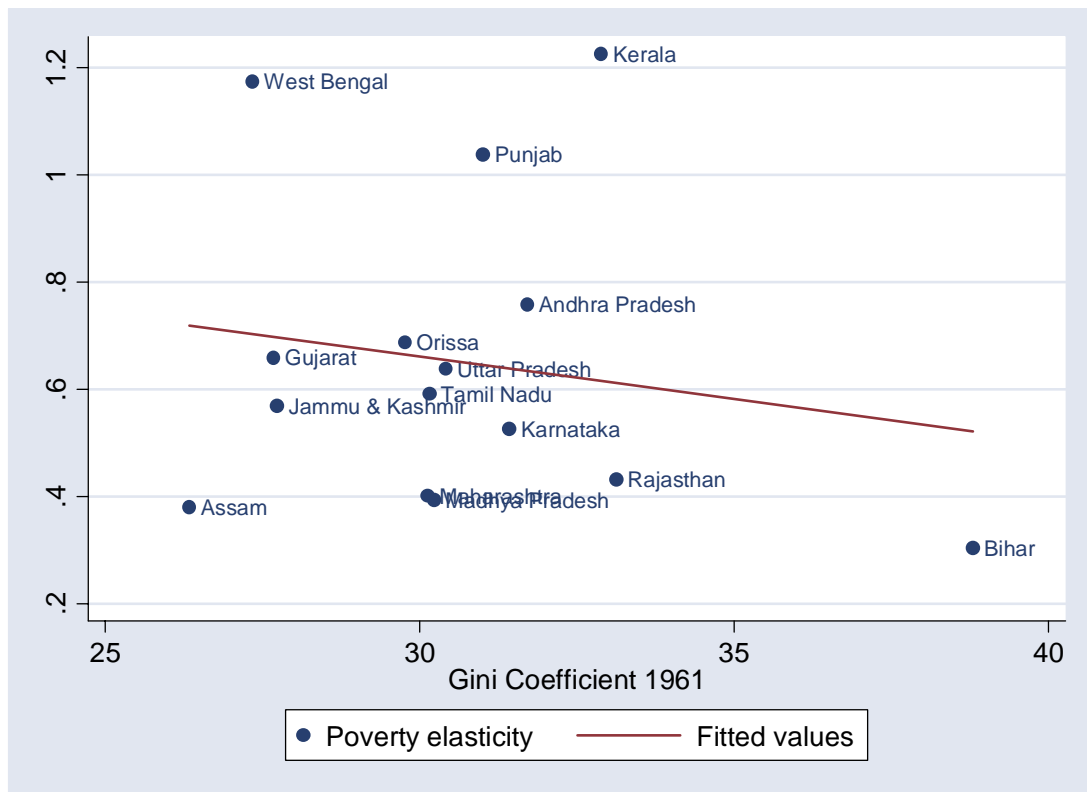


Figure 19. Poverty-growth elasticity and growth rate – 1961
caste fractionalization

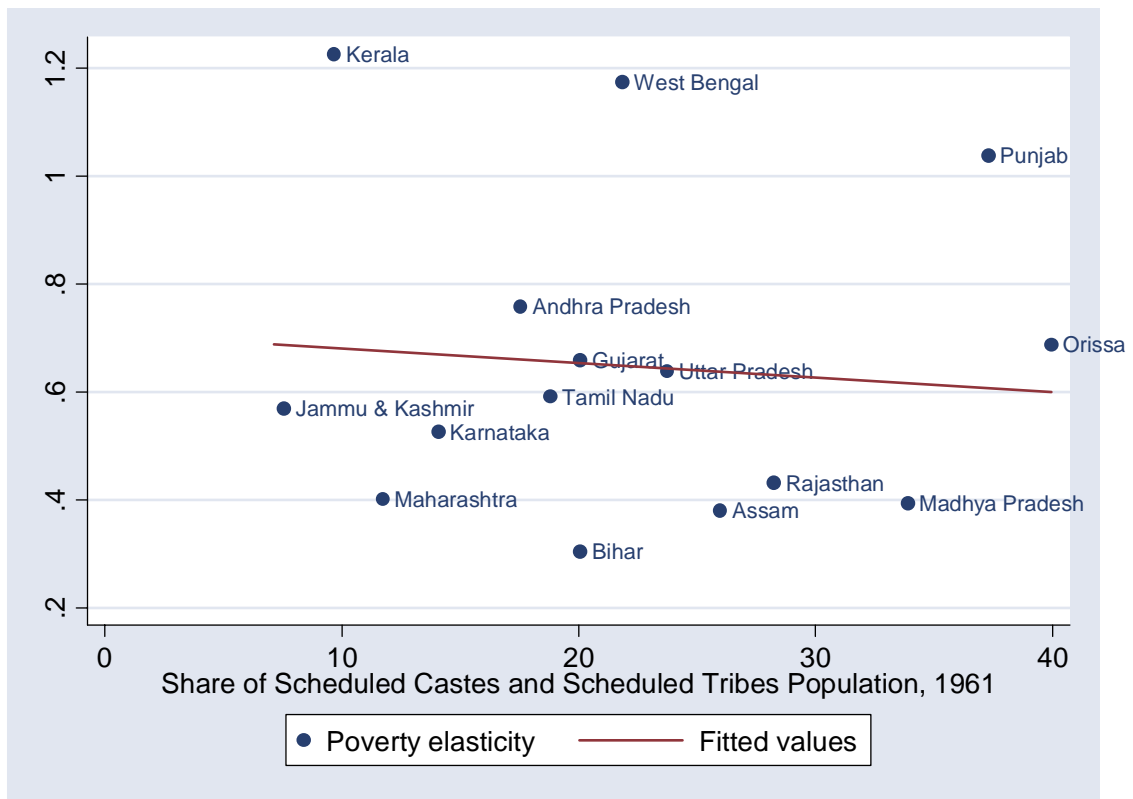


Figure 20. Urban poverty elasticity and growth rate – 1961
unionization rate

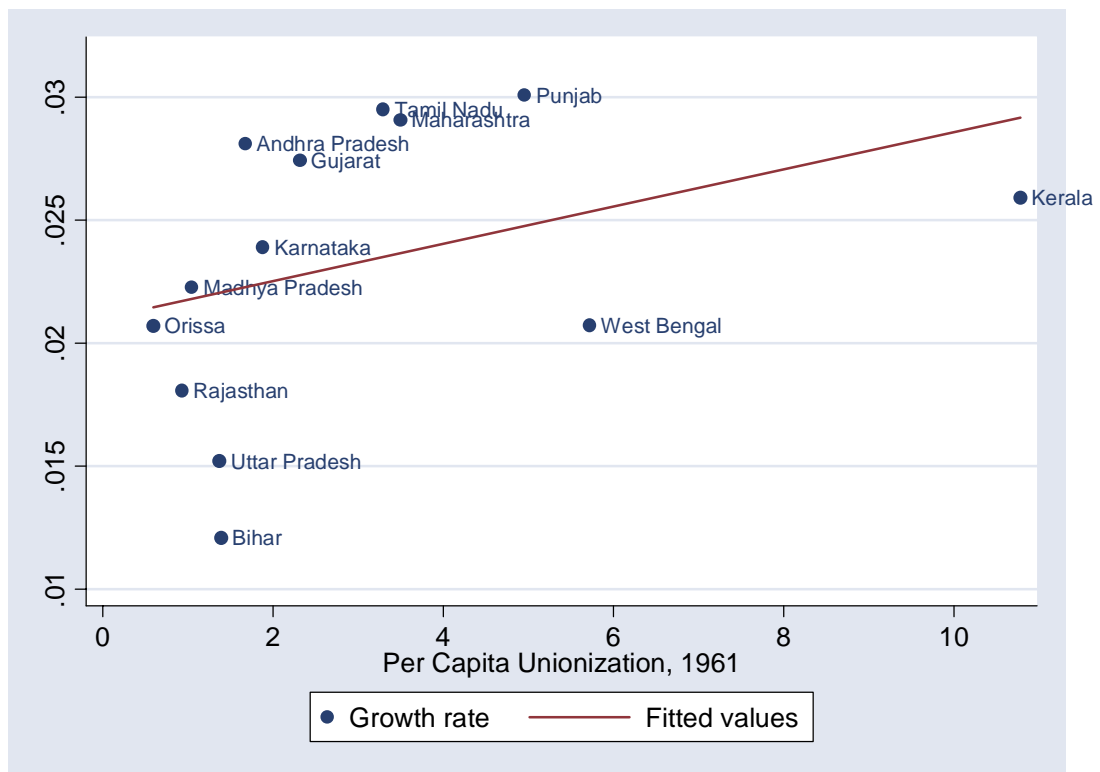
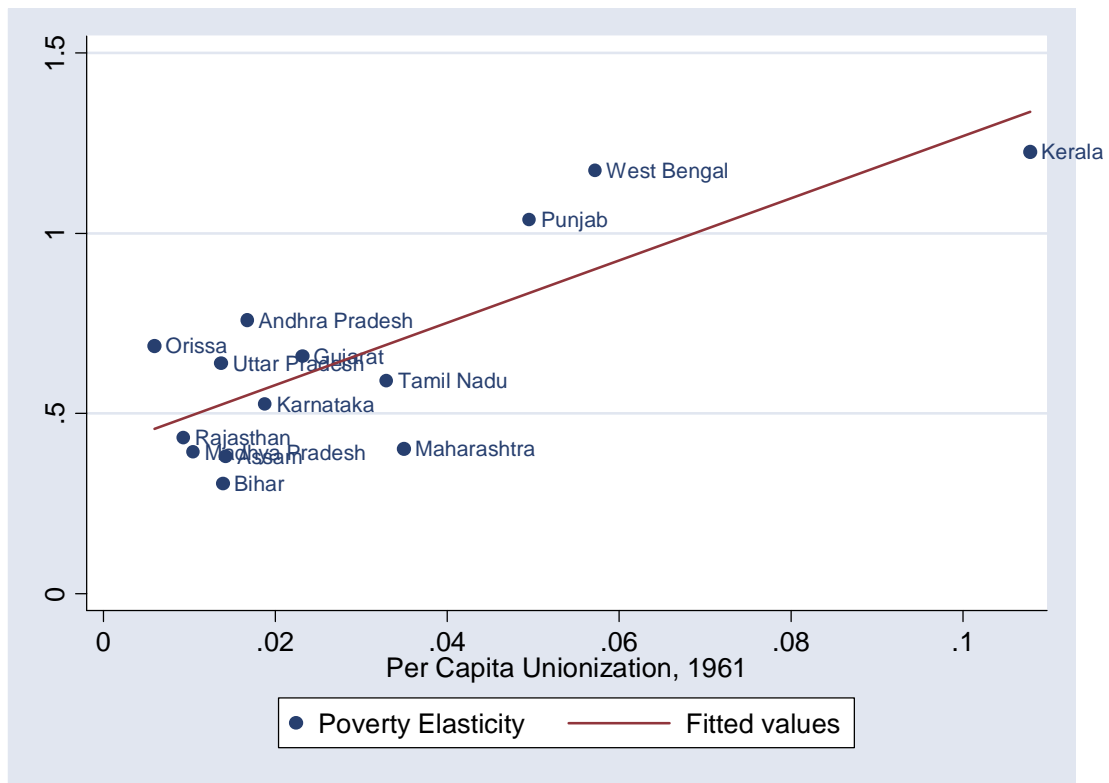


Figure 21. Poverty elasticity and growth rate – 1961 share of manufacturing in total output

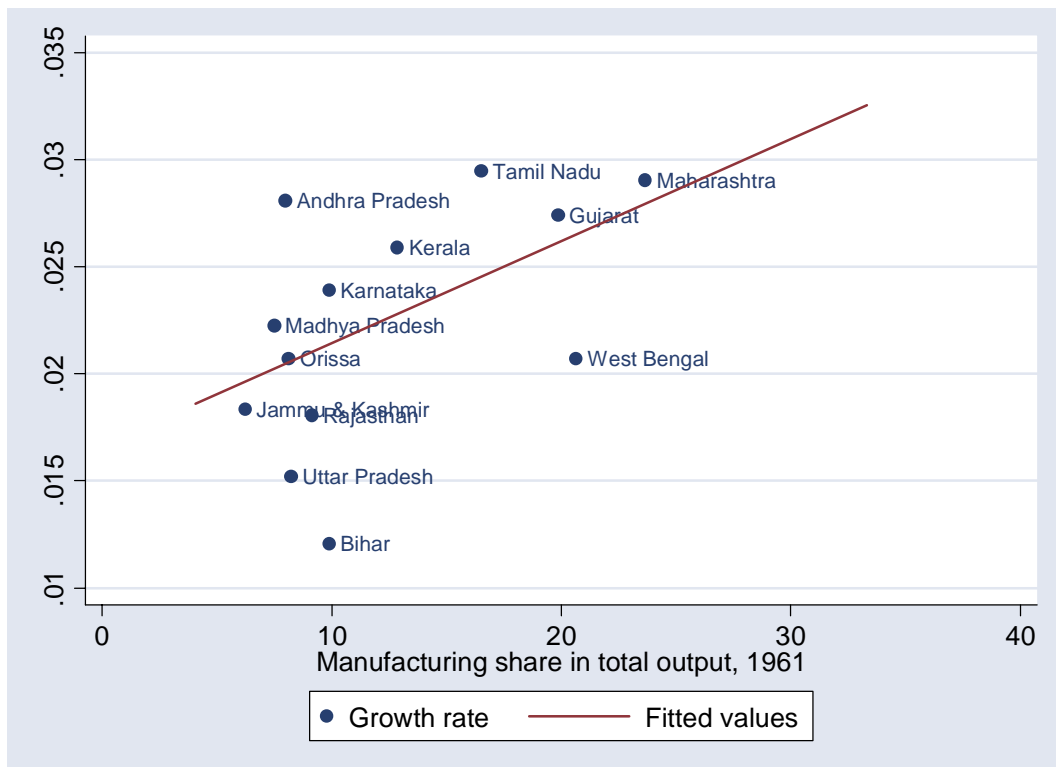
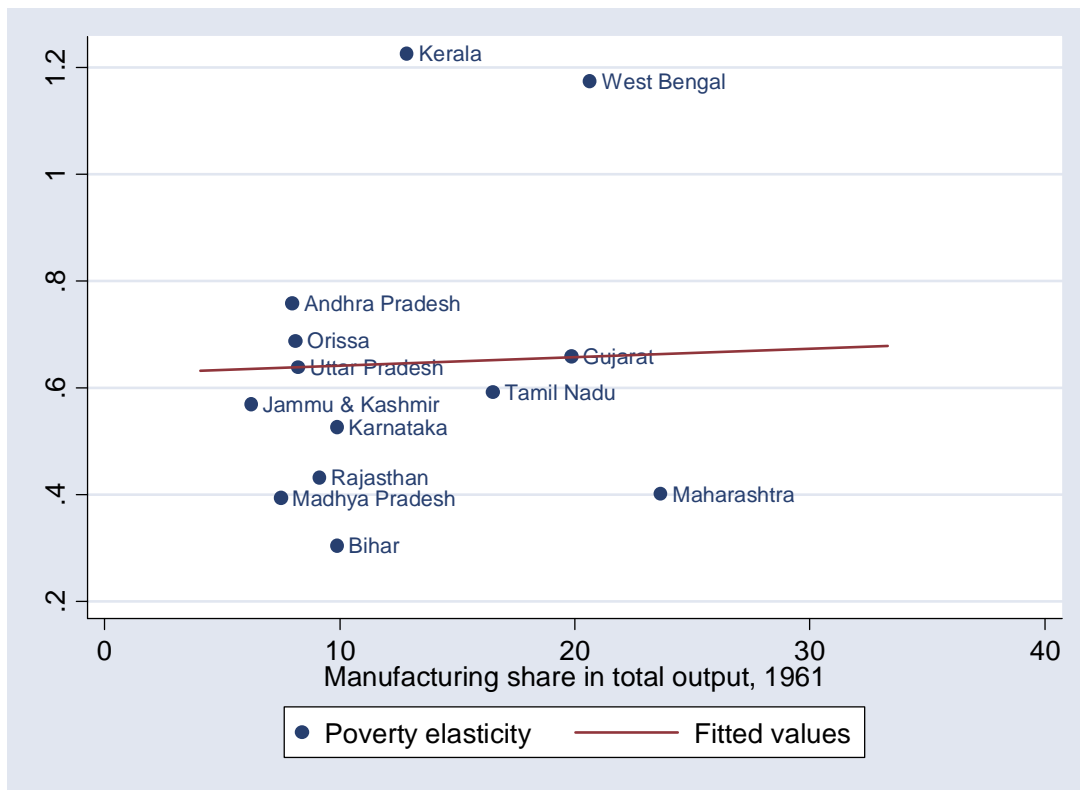


Figure 22. Poverty elasticity and growth rate – 1961 share of the non-agricultural sector in total output

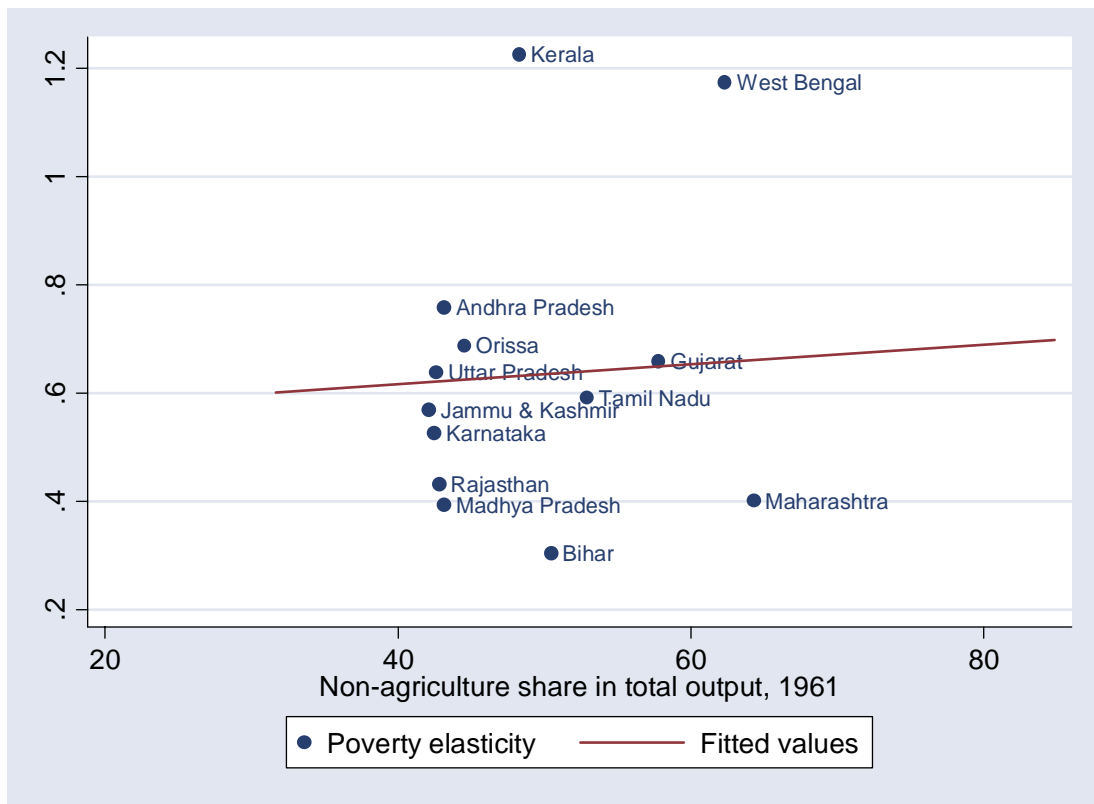


Figure 23. Poverty elasticity and growth rate – 1961 total real output per capita

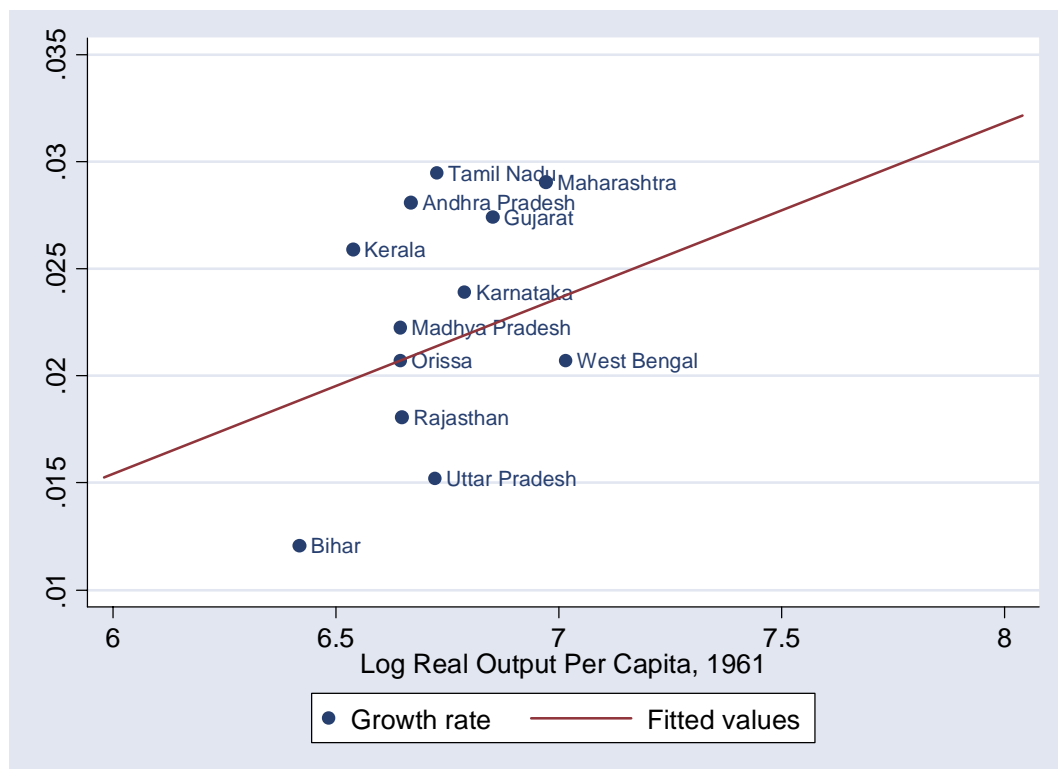
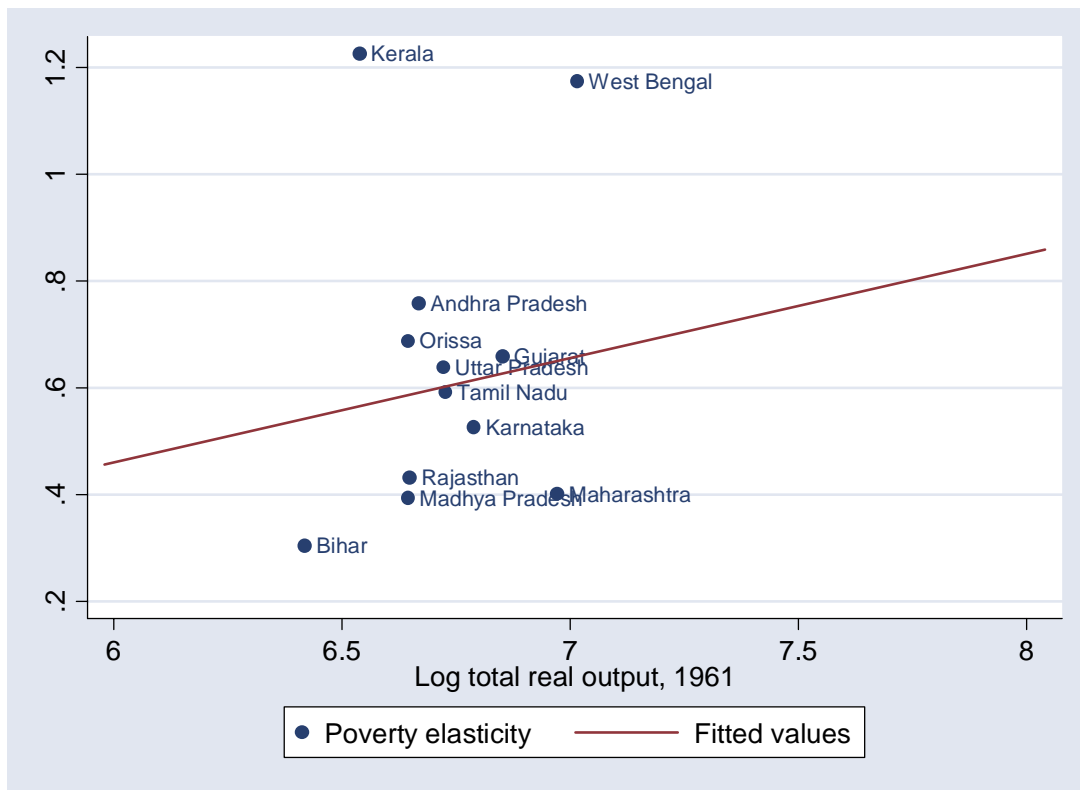


Figure 24. Poverty elasticity and growth rate – 1961 female literacy

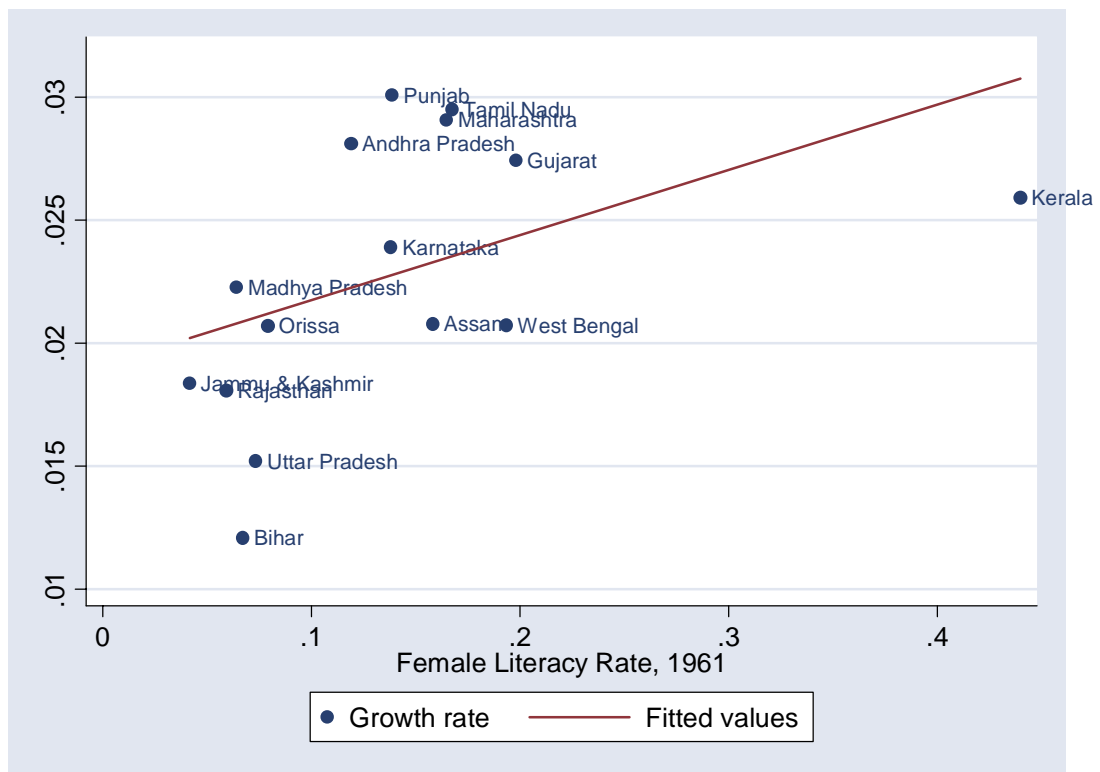
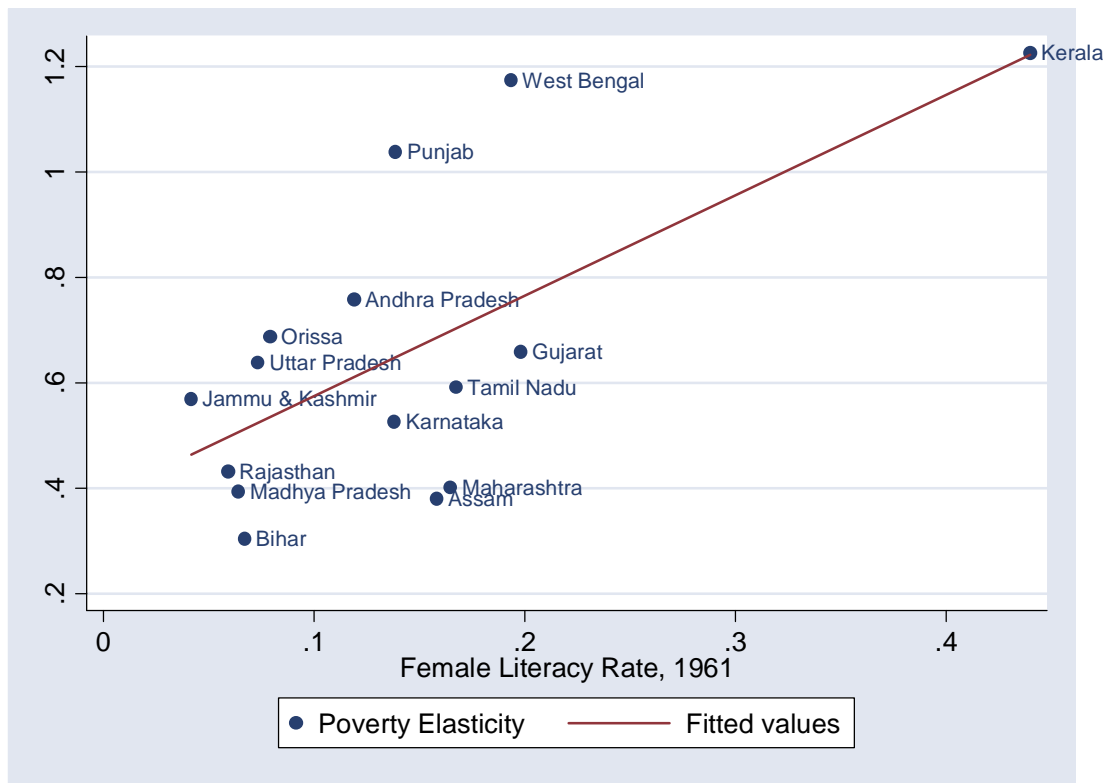


Figure 25. Poverty elasticity and growth rate – 1961 female labor force participation

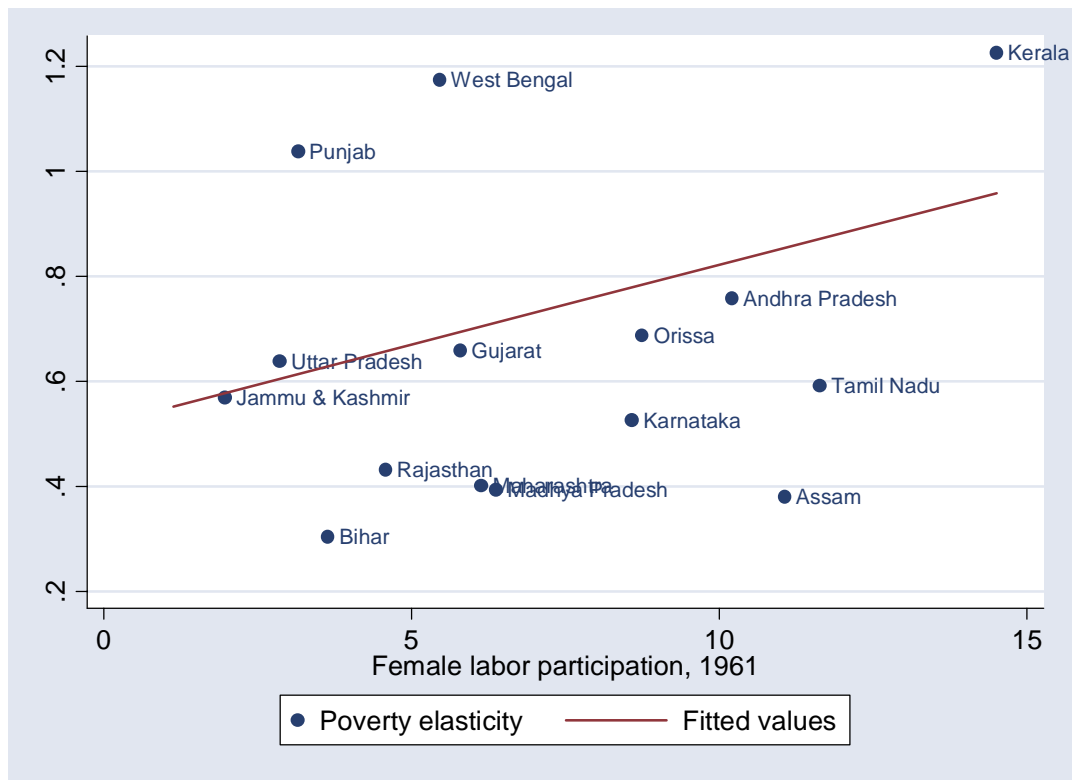
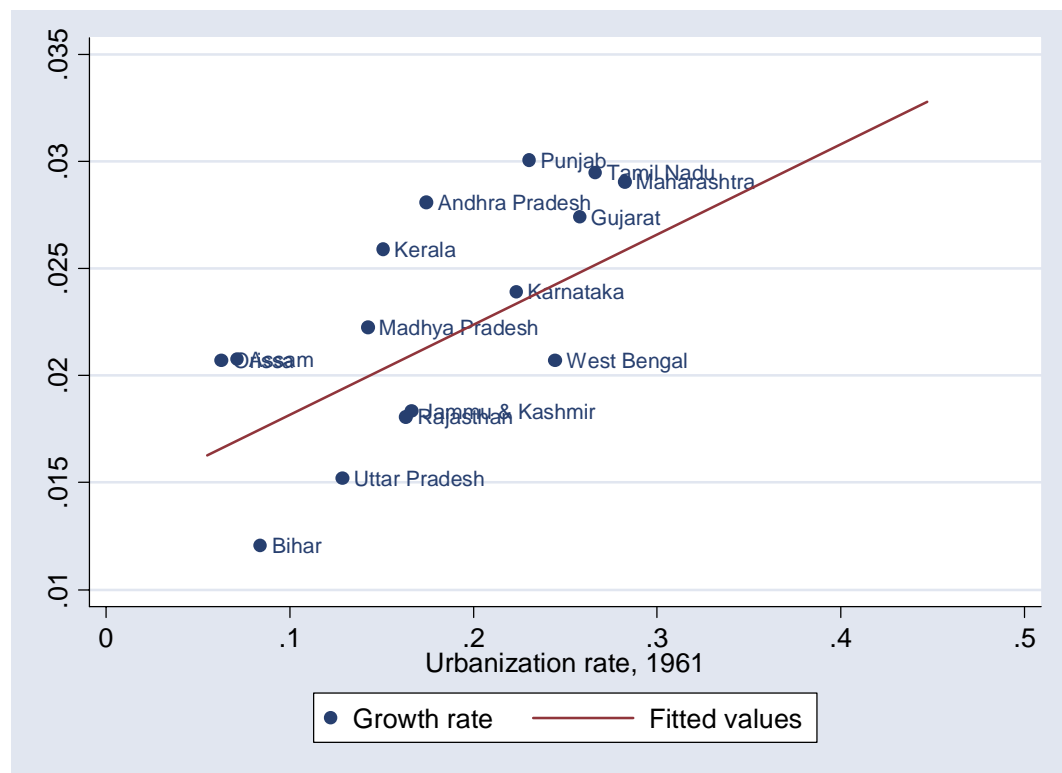
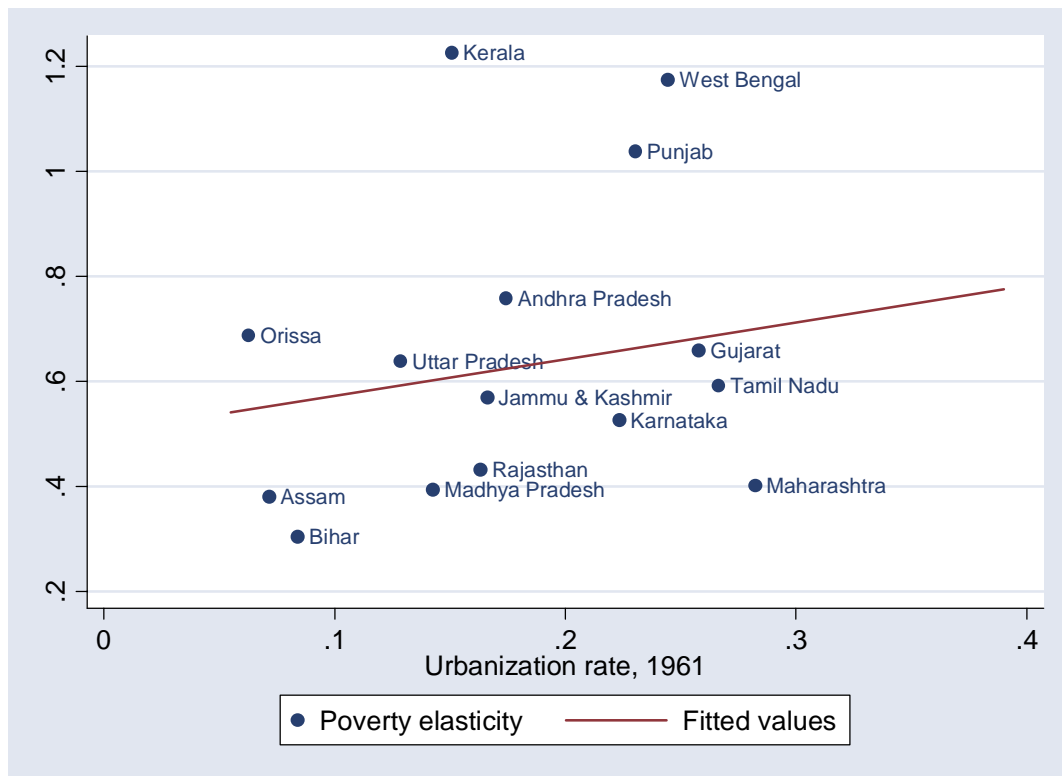


Figure 26. Poverty elasticity and growth rate – 1961 urban to rural population



APPENDIX 1¹

MEASURING THE IMPACT OF GROWTH ON POVERTY

¹ A summary of results is provided in section 3.5 in the main draft, with corresponding Tables 12 and 13. Details of all calculations are in the Methodological Appendix (section 7 in the main draft).

PART 1

ELASTICITY OF POVERTY TO GROWTH

Table A1. The elasticity of total poverty with respect to growth,
by Indian state, 1958-1997 – headcount index

| <i>State</i> | β_s | <i>Standard error</i> |
|-----------------|-----------|---------------------------|
| | (1) | (2) |
| Andhra Pradesh | -0.76 | 0.05 |
| Assam | -0.38 | 0.09 |
| Bihar | -0.30 | 0.07 |
| Gujarat | -0.66 | 0.05 |
| Haryana | -0.57 | 0.08 |
| Jammu & Kashmir | -0.57 | 0.17 |
| Karnataka | -0.53 | 0.06 |
| Kerala | -1.23 | 0.06 |
| Madhya Pradesh | -0.39 | 0.06 |
| Maharashtra | -0.40 | 0.04 |
| Orissa | -0.69 | 0.08 |
| Punjab | -1.03 | 0.07 |
| Rajasthan | -0.43 | 0.09 |
| Tamil Nadu | -0.59 | 0.04 |
| Uttar Pradesh | -0.64 | 0.08 |
| West Bengal | -1.17 | 0.09 |
| Average | -0.65 | 0.08 |

Notes: log head count regressed on log real income per capita. Standard errors are robust

Table A2. The elasticity of total poverty with respect to growth,
by Indian state, 1958-1997 – poverty gap index

| <i>State</i> | β_s | <i>Standard error</i> |
|-----------------|-----------|---------------------------|
| | (1) | (2) |
| Andhra Pradesh | -1.33 | 0.09 |
| Assam | -0.56 | 0.16 |
| Bihar | -0.87 | 0.16 |
| Gujarat | -1.08 | 0.11 |
| Haryana | -1.02 | 0.12 |
| Jammu & Kashmir | -0.87 | 0.25 |
| Karnataka | -0.84 | 0.13 |
| Kerala | -2.00 | 0.14 |
| Madhya Pradesh | -0.78 | 0.13 |
| Maharashtra | -0.63 | 0.07 |
| Orissa | -1.17 | 0.17 |
| Punjab | -1.79 | 0.13 |
| Rajasthan | -0.73 | 0.18 |
| Tamil Nadu | -0.80 | 0.08 |
| Uttar Pradesh | -1.03 | 0.15 |
| West Bengal | -1.94 | 0.23 |
| Average | -1.09 | 0.14 |

Notes: log poverty gap regressed on log real income per capita. Standard errors are robust

Table A3. The elasticity of total poverty with respect to growth,
by Indian state, 1958-1997 – squared poverty gap index

| <i>State</i> | β_s | <i>Standard error</i> |
|-----------------|-----------|---------------------------|
| | (1) | (2) |
| Andhra Pradesh | -1.72 | 0.10 |
| Assam | -0.75 | 0.20 |
| Bihar | -1.34 | 0.22 |
| Gujarat | -1.40 | 0.16 |
| Haryana | -1.19 | 0.16 |
| Jammu & Kashmir | -1.14 | 0.34 |
| Karnataka | -1.05 | 0.16 |
| Kerala | -2.56 | 0.19 |
| Madhya Pradesh | -1.09 | 0.17 |
| Maharashtra | -0.76 | 0.07 |
| Orissa | -1.58 | 0.23 |
| Punjab | -2.31 | 0.19 |
| Rajasthan | -0.94 | 0.23 |
| Tamil Nadu | -0.98 | 0.11 |
| Uttar Pradesh | -1.33 | 0.20 |
| West Bengal | -2.53 | 0.33 |
| Average | -1.42 | 0.19 |

Notes: log squared poverty gap regressed on log real income per capita. Standard errors are robust

PART 2

RATE OF PRO-POOR GROWTH AND GROWTH INCIDENCE CURVES (RAVALLION-CHEN)

Figure A1. Growth Incidence Curve for Rural All-India, 1993/94 – 1999/00

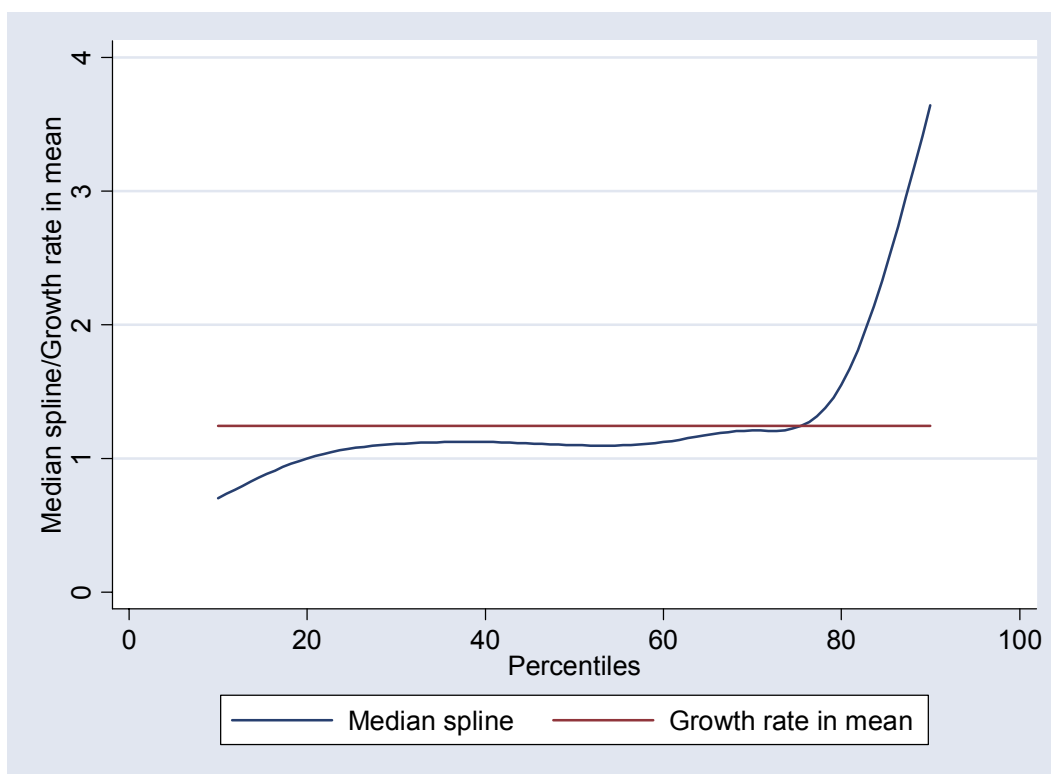
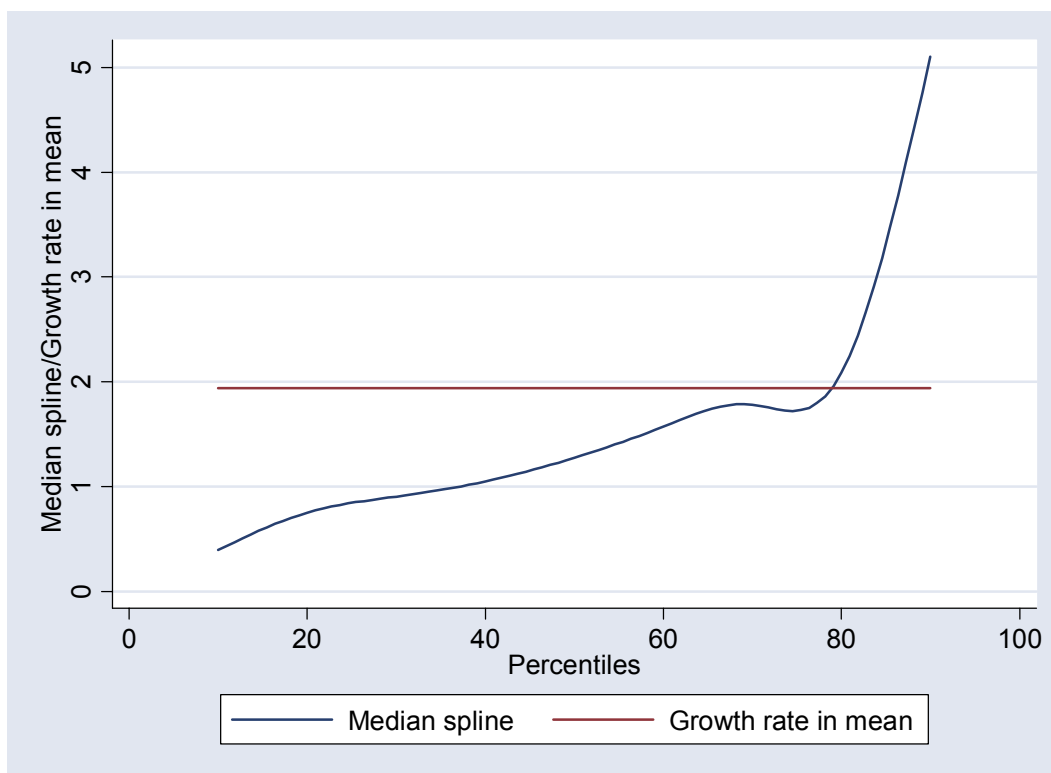


Figure A2. Growth Incidence Curve for Urban All-India, 1993/94 – 1999/00



PART 3

GROWTH AND INEQUALITY POVERTY
DECOMPOSITIONS (RAVALLION AND DATT, 1992)

Table A4. Rural All-India, *extreme* poverty line

| | | | |
|--------------------------|-------------|-------------|----------------|
| Poverty rate in year 1 | 35 | | |
| Poverty rate in year 2 | 30 | | |
| | Base year 1 | Base year 2 | Average effect |
| Change in poverty | -5.0 | -5.0 | -5.0 |
| Growth component | -5.0 | 0.0 | -2.5 |
| Redistribution component | -5.0 | 0.0 | -2.5 |
| Residual | 5.0 | -5.0 | 0.0 |

Table A5. Urban All-India, *extreme* poverty line

| | | | |
|--------------------------|-------------|-------------|----------------|
| Poverty rate in year 1 | 25 | | |
| Poverty rate in year 2 | 20 | | |
| | Base year 1 | Base year 2 | Average effect |
| Change in poverty | -5.0 | -5.0 | -5.0 |
| Growth component | -5.0 | -10 | -7.5 |
| Redistribution component | 5.0 | 0.0 | 2.5 |
| Residual | -5.0 | 5.0 | 0.0 |

Table A6. Rural All-India, *regular* poverty line

| | | | |
|--------------------------|-------------|-------------|----------------|
| Poverty rate in year 1 | 90 | | |
| Poverty rate in year 2 | 80 | | |
| | Base year 1 | Base year 2 | Average effect |
| Change in poverty | -10 | -10 | -10 |
| Growth component | -5.0 | -10 | -7.5 |
| Redistribution component | 0.0 | -5.0 | -2.5 |
| Residual | -5.0 | 5.0 | 0.0 |

Table A7. Urban All-India, *regular* poverty line

| | | | |
|--------------------------|-------------|-------------|----------------|
| Poverty rate in year 1 | 75 | | |
| Poverty rate in year 2 | 70 | | |
| | Base year 1 | Base year 2 | Average effect |
| Change in poverty | -5.0 | -5.0 | -5.0 |
| Growth component | -5.0 | -10 | -7.5 |
| Redistribution component | 5.0 | 0.0 | 2.5 |
| Residual | -5.0 | 5.0 | 0.0 |

