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Beyond Piketty: a new perspective on poverty and inequality in India

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Abstract

So far most of the literature on poverty and inequality has focused on how overall inequality in income distribution (frequently measured by the Gini coefficient) undermines the 'trickle down' effect. In other words, the higher the inequality in the income distribution, the lower the growth elasticity of poverty. However, with the publication of Piketty's magnum opus in 2014, and a subsequent 2017 study by Chancel and Piketty of evolution of income inequality in India since 1922, the focus has shifted to the income disparity between the richest 1% (or 0.01 %) and the bottom 50%. Their central argument is that the rapid growth of income at the top end of millionaires and billionaires is a byproduct of growth. This study extends this argument by linking it to poverty indices in India. Using the India Human Development Survey 2005–12 – a nationwide panel survey – we examine the links between poverty and income inequality, especially in the upper tail relative to the bottom 50%, state affluence (measured in per capita income) and their interaction or their joint effect. We also analyse their effects on the FGT class of poverty indices. The results are similar in as much as direction of causality is concerned but the elasticities vary with the poverty index. The growth elasticities are negative and significant for all poverty indices. In all three cases, the disparity between the income share of the top 1% and the share of the bottom 50% is associated with greater poverty. These elasticities are much higher than the (absolute) income elasticities, except in the case of the poverty gap. The largest increase occurs in the poverty gap squared: a 1% greater income disparity is associated with a 1.24% higher value of this index. Thus the consequences of even a small increase in income disparity are alarming for the poorest.

Keywords

1. Introduction

Plutarch was right when he said that an imbalance between rich and poor is the oldest and most fatal ailment of all republics. Much has been written to demonstrate that overall income inequality hurts the poor (Kulkarni and Gaiha, 2018, Gaiha et al. 2009, World Bank 2006, Ravallion, 2016, Imai et al. 2017.). However, following Piketty's (2014) magnum opus, *Capital in the Twenty-first Century*, the focus has shifted to rapid growth of income shares among the top 1% as a byproduct of growth in the developed countries. In a more recent contribution, Chancel and Piketty (2017) offer a rich and unique description of the evolution of income inequality in India in terms of income shares and incomes in the bottom 50%, the middle 40% and top 10% (as well as the top 1%, 0.1%, and 0.001%), combining household survey data, tax returns and other specialist surveys.

The 2006 *World Development Report* (WDR – World Bank, 2006) makes a persuasive case for equity as the guiding principle of development. Equity denotes equality of opportunity to pursue a life of one's choice and protection from extreme deprivation. In this sense, equity is complementary to long-term prosperity. Equity influences development in two ways: inequalities of power and wealth result in waste and inefficient use of productive resources, and they impair institutional development.

There is a strong link between differences in wealth and power and inefficient allocation of resources. No less worrying is the link between inequality in wealth and power and the functioning of local institutions. The WDR is emphatic that unequal power also impedes innovation and risk taking.

In a not-so-subtle and thinly disguised defence of its own agenda, the WDR dismisses the dichotomy between policies for growth and those for equity as false. Subsequently, the report argues that inequitable policy outcomes are better dealt with through a safety net than by fine-tuning of policy reforms (adverse income distributional outcomes of trade policy reforms are better mitigated, for example, through workfare). This is intriguing, as it invokes the dichotomy rejected earlier as false.

The main objective of this study is considerably restricted. We examine the effects of income (measured as per capita income of a state), ratio of income share of the top 1% to that of the bottom 50%, and their interaction or joint effect on the Foster–Greer–Thorbecke (FGT) class of poverty indices.[1] The analysis is based on a nationwide panel survey covering the period 2005–12, the India Human Development Survey (IHDS) (University of Maryland and NCAER, 2015). Accordingly, panel data models have been used to capture state heterogeneity.

The scheme is as follows. Section 2 reviews selected studies that focus on the inter-relationships between growth–poverty and inequality. Section 3 reviews the salient features of the IHDS data. Section 4 discusses our estimates of poverty constructed

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[1] For details of the FGT poverty indices, see the annex.

using IHDS. This is followed by an estimation of different measures of inequality in Section 5. Section 6 discusses the model specification and the results. These results are then reviewed from a broader policy perspective and concluding remarks are made in Section 7.

2.   Evolution of poverty and inequality

Although this is not intended to be a comprehensive survey of contributions to the poverty and inequality discourse in India, a selection of important studies is reviewed below.

Much of the early literature on poverty emphasises an inverse relationship between poverty and economic growth. In the context of rural areas, an important contribution was Ahluwalia (1978), with focus on the poverty-alleviating role of agricultural growth. That agricultural growth reduces poverty is unexceptionable. This effect, however, varies, depending on the nature of the agricultural growth process. If, for example, growth takes place in a setting of extreme inequality in endowments, its benefits are not likely to 'trickle down' to large segments of the poor. In fact, some growth processes impoverish (Bardhan, 1985; Gaiha, 1987). Besides, there is a positive relationship between rural poverty and (unanticipated) consumer price increases – the greater the (positive) deviation from the trend in the latter, the higher the incidence of rural poverty. Rural poverty and the share of large landholders in aggregate agricultural income are also positively related, suggesting that the higher their share, the higher is the incidence of rural poverty.

Datt et al (2014) constructed a new and consistent time series of poverty measure series for rural and urban India over the period 1951 to 2012, based on 51 National Sample Survey (NSS) rounds.

Even though a trend decline in poverty emerged around the early 1970s, the year 1991–92 – the benchmark year for economic reforms in India – stands out as the turning point. There was a significant surge in economic growth, driven by growth in the tertiary sector and, to a lesser extent, in the secondary sector. The pace of poverty reduction also accelerated, with a three-to-four-fold increase in the proportionate rate of decline in the post-1991 period. The acceleration in the decline of rural poverty was even higher than that for urban poverty. This happened alongside a significant increase in inequality both within and between urban and rural areas, in contrast to a decline in rural inequality and no trend in urban inequality pre-1991. Thus, faster growth also appears to have been more pro-poor when the latter is measured by the growth elasticity of poverty reduction.

An important recent contribution is Narayan and Murgai (2016), which reviews India's poverty reduction in the context of the global experience. India accounted for 26% of the global poor at the poverty cut-off of $1.90 a day (2011 PPP). It seems unlikely that

India will meet the Sustainable Development Goal (SDG) of reducing extreme poverty to 3% by 2030.

Between 1993–94 and 2011–12, using the Government of India's official poverty lines, the percentage of poor people declined from 45 to 22. The poverty rate was almost halved in both rural and urban areas, as rural poverty reduced from 50% to 26%, and urban poverty declined from 32% to 14%.[2]

Yet poverty remains pervasive: 270 million still lived in poverty in 2012. Since India is predominantly rural and rural areas are poorer, a huge concentration of poor people (four out of every five) live in rural areas.

One controversial finding is that states with initially higher poverty rates recorded a lower percentage reduction in poverty rates in both periods, implying a divergence in poverty rates. In other words, the poorer states will not be able to catch up fully with the richer states in poverty rates. Our analysis, however, points to a convergence of poverty rates over the period 2005–12. States with initially higher poverty rates witnessed a larger reduction in these rates.[3]

States with higher rates of growth of per capita income (Net State Domestic Product, NDSP) were associated with higher rates of poverty reduction. A more striking finding is that poverty reduction became more responsive to growth of income/consumption during 2005–12 relative to 1994–2005. Whether this finding will remain intact if an allowance is made for a rise in income inequality is not self-evident. Our own econometric analysis shows a dilution of the 'trickle down' effect when income inequality rises.[4]

The analysis of vulnerability measured using twice the poverty cut-off is flawed, as it misses the point that it is not so much the level of per capita income or consumption as its variability that is a defining characteristic of the vulnerable (Gaiha and Imai, 2004; Imai et al, 2015).

Another notable and innovative contribution is Gibson et al (2017), which validates the conjecture that the link from urban development to rural poverty reduction is stronger if urban economic growth stems from India's secondary towns rather than from big cities, given that the former are more closely connected to the surrounding rural hinterland. Recognising the lack of spatially disaggregated production data, the authors use night-lights data to capture components of urban growth and their impact on rural poverty.

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[2] The statement that 133 million poor people were lifted out of poverty is misleading since the NSS rounds do not provide panel data. There is indeed considerable movement into and out of poverty, as shown by Gaiha and Deolalikar (1993) and Gaiha (1992), based on the International Crops Research Institute for the Semi-Arid Tropics panel.

[3] Details are available from the authors upon request.

[4] Narayan and Murgai (2016) observe that the elasticity of poverty reduction to per capita GDP growth is -0.9 for the period 2005–12, which puts India near the bottom third (75th out of 116 countries) among developing countries for this period. India's relatively low elasticity was the reason why, for the period 2005–12, with per capita GDP growth in the top 10% among developing countries, India was just above the 60th percentile of developing countries in the rate of poverty reduction.

These new measures of urban economic activity using night-lights data are associated with sub-national poverty estimates that are constructed at a finer spatial resolution than in the existing literature. Specifically, Gibson et al (2017) used a division of NSS (59th round) into regions that are more finely disaggregated than the division into states and union territories. The analysis is based on four observations on each of these regions between 1993–94 and 2011–12.

When proxied by night lights, economic growth on the extensive margins in urban areas is associated with lower rural poverty measures. When the effects of big-city economic growth on rural poverty are compared with those of secondary towns, growth in towns consistently matters more than growth in cities where reducing rural poverty is concerned. This effect is close to inequality-neutral in as much as it was not associated with higher or lower inequality.

While the model on which this analysis is based and the nature of the data used are promising, the assumption of no inequality within sectors and its relaxation through inequality-neutral growth are far from persuasive.[5] How reliable night-lights data are for measuring the intensity of production is not self-evident. In any case, in a recent study by Imai et al (2017), based on a large cross-country panel, agriculture is still the leading sector in poverty reduction, followed by the rural non-farm sector.

A third and perhaps the most meticulous contribution is by Srinivasan et al (2017). These authors reviewed poverty and inequality trends in India during the period 1951 to 2012–13.

The headcount ratios (HCR) rose and fell within a range of 45% and 65% in rural areas and a narrower 35% and 55% in urban areas during 1951–73. There was a downward trend from 1977–78 to 2012–13, from about 55% to around 25% in rural areas, and from 50% to 15% in urban areas. It is conjectured that reduction at varying rates during the 1980s and from 1991 on was a result of mild and hesitant reforms during the earlier phase and more comprehensive reforms later.

On the basis of trend analysis, it was found that the rate of decline in HCR in rural regressions varied between 0.89% and 1.9% per year and between 0.76% and 1.9% a year in urban regressions.

Estimates of the poverty gap and poverty gap squared over the period 1951–52 and 2010 were examined. The trends in these in rural and urban areas are similar to those in the HCR. No discernible trend was observed until after 1973–74, but there was a likely acceleration in the downward trend in the decade after 2000.[6]

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[5] A spatial Durbin model (SDM) and its special cases were estimated. The results summarised here are based on the SDM. For details, see Gibson et al (2017).

[6] These poverty measures are defined later.

On the basis of trend analysis, it has been found that the rate of decline in HCR in rural regressions varied between 0.89% and 1.9% per year and between 0.76% and 1.9% a year in urban regressions.

Srinivasan (2013) reports comparisons of the (nominal) MPCE Lorenz curves for different years between 2001–02 and 2009–10. The estimated Ginis varied between 0.40 and 0.51 in rural areas and between 0.44 and 0.55 in urban areas. However, no attempt was made to examine the interrelationship between poverty and inequality.

Piketty (2014) produced a monumental treatise, *Capital in the Twenty-first Century*, demonstrating that rising income inequality is a byproduct of growth in the developed world. More recently, Chancel and Piketty (2017) have offered a rich and unique description of the evolution of income inequality in India, combining household survey data, tax returns and other specialised surveys.

Some of their principal findings are:

1. The share of national income accruing to the top 1% income earners is now at its highest level since the launch of the Indian Income Tax Act in 1922. The top 1% of earners captured less than 21% of total income in the late 1930s, before dropping to 6% in the early 1980s and rising to 22% today.
2. Between 1951 and 1980, the bottom 50% captured 28% of total growth and this group's income group grew faster than the average, while the incomes of the top 0.1% decreased.
3. Between 1980 and 2014, the situation was reversed; the top 0.1% of earners captured a higher share of total growth than the bottom 50% (12% versus 11%), while the top 1% received a higher share of total growth than the middle 40% (29% versus 23%).[7]

True to the paper's modest objective, it offers a rich and insightful description of how income distribution, especially in the upper tail, and inequality have evolved. A sharp reduction in the top marginal tax rate, and the transition to a more pro-business environment had a positive impact on top incomes, in line with rent-seeking behaviour.

According to Credit Suisse's *Global Wealth Report 2017*, the number of millionaires in India is expected to reach 372,000, while total household income is likely to grow by 7.5% annually to touch $7.1 trillion by 2022. Since 2000, wealth in India has grown at 9.2% per annum, faster than the global average of 6%, even after taking into account population growth of 2.2% annually. However, not everyone has shared the rapid growth in wealth.

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[7] In a comparison of inequality in India and China, an editorial in *Economic and Political Weekly* (7 October 2017) presents some striking illustrations. While the incomes of the bottom 50% grew in China over 1980–2014 by 312%, those of the bottom 50% in India grew by only 89%. Further, while the growth rate in incomes of the middle 40% over the same period in China was 615%, the corresponding estimate for India was just 93%. Indeed, the growth in incomes at the highest level of the income distribution in India (that of the top 0.001%) was 2,726%; the corresponding estimate for China was lower at 2,546%.

Our research, based on the IHDS 2005–12, focuses on a detailed disaggregation of income inequality, along the lines of Chancel and Piketty (2017), recognising that incomes in the upper tail are under-reported; it also examines the links between poverty and income inequality, especially in the upper tail, state affluence, and the interaction of these two phenomena. The main contribution of the present study lies in demonstrating that the ratios of shares of the top 1% and 0.05 % to that of the bottom 50% of the income distribution have a robust relationship to poverty during this period. A related contribution is that the FGT class of poverty measures, namely the HCR, the poverty gap and the poverty gap squared (a distributionally sensitive poverty index) are used. This allows us to capture the effect of the growing disparity between the richest and most deprived and income growth on poverty indices.

3.   Salient features of the IHDS

This analysis draws upon the two rounds of the nationally representative IHDS data conducted in 2005 and 2012. IHDS is conducted jointly by University of Maryland and the National Council of Applied Economic Research (NCAER). The first round (IHDS-1) comprises a survey of 41,554 households in 2004–05. The second round (IHDS-II) comprises re-interviews of 83% of the original households, as well as split households residing within the same locality, along with an additional sample of 2,134 households. The total for IHDS-II is therefore 42,152 households. The sample is spread across 33 (now 34) states and union territories, and covers rural as well as urban areas.

The goal of IHDS is to document changes in the daily lives of Indian households in an era of rapid transformation. In documenting changes in the way people live, work, educate their children, care for their aged parents, and deal with ill health, the surveys seek to infuse the development discourse with the lived experiences of ordinary people.

Most of the IHDS-I interviews were conducted between October 2004 and December 2005, while most of the IHDS-II interviews were conducted between October 2011 and December 2012.

IHDS-I and IHDS-II collected extensive data on education, health, livelihoods and family processes, as well as on the way in which households are embedded in a broader social structure. Contextual information was also collected in surveys of village infrastructure and markets, and from one private and one government school and medical facility in each village or block. The data of greatest use include those on income and expenditure. The income data are based on nearly 56 sources of income inclusive of wage and salary incomes, self-employment incomes from farms and businesses, and incomes from public and private transfers. The consumption expenditure module mimics the short consumption expenditure module used by the NSS organisation in its employment–unemployment surveys and includes purchases of cereals, sugar and kerosene from both PDS and non-PDS sources.

Repeated interviewing of the same households at two points in time facilitates a richer understanding of which households are able to partake in the fruits of growth, what allows them to move forward, and the process through which they are incorporated into or left out of a growing economy.

Our analysis is unusual in one respect. As most studies of poverty in India are based on NSS consumption expenditure estimates, we have conformed to this practice. A merit of such estimates of poverty lies in the fact that consumption is not as volatile as income mainly because consumption smoothing takes place when income shocks occur (eg deficient rainfall, price fluctuations, floods). But, given our focus on inequality between the top end of the income distribution and the bottom 50%, along the lines of Piketty (2014) and Chancel and Piketty (2017), and as key to understanding variations in poverty, we have chosen to rely on income disparity between these segments. There is reason to believe that consumption expenditure is generally lower than income – especially in the top 1% of income.[8]

Admittedly, the IHDS sample size is small compared with the NSS. But the important point is that, if the sample design is stratified and random, and the standard errors of key variables are low, even a small sample may be used for robust inferences. The IHDS fulfils these criteria.

Since the principal objective of this study is to examine the interrelationship between poverty and a measure of inequality akin to Piketty's, it was difficult to construct such a measure at the village or cluster level, as the observations on extremely rich people were few and far between at these levels.

Yet another important consideration is that most anti-poverty policies involve an important role for states. So it is helpful to use the state as the unit of analysis despite the caveat.[9]

4.   Poverty estimates

Following convention, we estimate poverty using official poverty cut-off points measured in consumption expenditure. The estimates based on IHDS panel data are

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[8] In an important contribution, Atkinson and Brandolini (2001) point out that one of the main sources of non-comparability of inequality is that some countries use household income as an indicator of wellbeing, while others use consumption expenditure. These two indicators capture different aspects of economic welfare, with the former perhaps better seen as a measure of welfare opportunity and the latter as a measure of welfare achievement. In most countries, measured inequality based on income is higher than if it is based on consumption. But this is not inevitable, and the degree to which the two indicators disagree varies from country to country. But the comparison is complicated by differences in measurement errors of consumption expenditure and income. While little is known about the income of subsistence households with limited, if any market transactions, at high income levels there is a tendency to under-report income for fear of taxation.

[9] We are grateful to an anonymous reviewer for raising this concern.

given in Table 1. Although much of the literature is based on the HCR and sometimes on the FGT class of poverty indices that capture different dimensions of poverty, we supplement the FGT poverty indices with the Sen–Shorrocks–Thon poverty index (see Aguirregabiria, 2006).[10]

The HCR declined from 28.8% in 2005 to 24.5% in 2012 – a reduction of only 4.3 percentage points.[11] The poverty gap index also recorded a small reduction, from 7.5% to 6.2%.[12] The poverty gap squared index fell from 2.9% to 2.3%. Finally, the Sen–Shorrocks–Thon index registered a slight reduction, from 13.7% to 11.5%. Thus altogether the poverty reduction was unimpressive.[13]

Table 1: All-India poverty indices, 2005–12

Poverty index	2005 (%)	2012 (%)	2005-12 (percentage – point reduction)
Head-count ratio	28.8	24.5	4.3
Poverty gap	7.5	6.2	1.3
Squared poverty gap	2.9	2.3	0.6
Sen–Shorrocks–Thon Index	13.7	11.5	2.2

Source: Authors' calculations from IHDS 2015.

There was considerable divergence in poverty reduction between states, depending on the poverty index used.

In order to avoid a tedious discussion, for each poverty index, we focus on the three worst and three best states in 2005 and the outcomes in 2012.

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[10] The formulae for calculating these measures are given in the annex

[11] It is not obvious why these estimates show a lower reduction in poverty than those based on NSS consumption expenditure data.

[12] These three indices are special cases of the FGT class of poverty indices.

[13] Note that these differ from poverty indices obtained from the comparable rounds of the NSS, implying different consumption expenditure distributions. It is difficult to be certain, as NSS consumption expenditure estimates have been systematically questioned.

Table 2: Poverty in states 2005–12

(i)   Head-count Ratio
(a) Worst

State	2005 (%)	2012 (%)	2005–12 (percentage change)
Chattisgarh	65.7	40.3	25.6
Madhya Pradesh	46.5	24.6	21.9
Orissa	42.4	37.6	4.9
(b) Best			
Jammu and Kashmir	1.7	1.1	0.6
Himachal Pradesh	4.5	14.4	-9.9
Punjab	5.3	9.2	-3.9
(ii) Poverty gap			
(c) Worst			
Chattisgarh	24.5	12.0	12.5
Madhya Pradesh	16.8	5.9	10.9
Jharkhand	12.2	8.6	3.6
(d) Best			
Jammu and Kashmir	0.5	0.2	0.3
Himachal Pradesh	0.8	2.8	-2.0
Punjab	0.8	1.4	-0.6
(iii) Poverty gap squared *(e) Worst*			
Chattisgarh	11.4	4.8	6.6
Madhya Pradesh	7.9	2.1	5.8
Orissa	4.5	3.2	1.3

State	2005 (%)	2012 (%)	2005–12 (percentage change)
(f) Best			
Jammu and Kashmir	0.2	0.06	0.14
Himachal Pradesh	0.2	0.8	-0.6
Punjab	0.2	0.3	-0.1
(iv) Sen–Shorrocks–Thon Index *(e) Worst*			
Chattisgarh	37.5	4.8	32.7
Jharkhand	20.6	15.4	5.2
Madhya Pradesh	16.5	10.4	6.1
(f) Best			
Jammu and Kashmir	0.9	0.4	0.5
Himachal Pradesh	1.6	5.5	-3.9
Punjab	1.7	2.7	-1.0

Notes: The worst and best states for poverty are identified on the basis of each poverty index value in 2005.

Source: Authors' calculations from IHDS 2015.

Even among the worst states in terms of the HCR in 2005, there was a huge variation, say, between Chattisgarh and Orissa. The poverty reduction between 2005 and 2012 also varied considerably, from a high of over 25 percentage points in Chattisgarh to a low of 4.9 percentage points in Orissa. Among the best, the contrast is less striking. All three states (Jammu and Kashmir, Himachal Pradesh and Punjab) had extremely low HCRs in 2005. However, the outcomes in 2012 varied. While Himachal Pradesh and Punjab witnessed higher HCRs in 2012, Jammu and Kashmir saw a slight reduction.

The poverty gap was twice as high in Chattisgarh compared with Jharkhand among the three worst states in 2005. Each of these states experienced a reduction in the poverty gap in 2012, with Chattisgarh recording the largest reduction.

Among the best, each of the three states had extremely low values of poverty gap in 2005. While Jammu and Kashmir saw a reduction, Himachal Pradesh and Punjab recorded higher values in 2012, especially Himachal Pradesh.

Among the three worst states in terms of the squared poverty gap in 2005, the range of this index was low. Nevertheless, Chattisgarh's value was twice as high as that of Orissa. The outcomes in 2012 were confined to a narrow range, with Chattisgarh recording the largest reduction, followed closely by Madhya Pradesh.

Among the best, the values of the squared poverty gap were similar and low in 2005 (with differences in the first decimal point). However, the outcomes differed in 2012, with Jammu and Kashmir recording a reduction while the other two saw higher values.

The Sen–Shorrocks–Thon (SST) index exhibits a wide range among the three worst states in 2005, with the highest value in Chattisgarh, more than twice as high as that in Madhya Pradesh. Each state saw a reduction, with Chattisgarh recording the largest.

Among the best states, the values were low in each state in 2005. However, the outcomes differed in 2012, with Jammu and Kashmir recording a reduction while Himachal Pradesh and Punjab saw slight increases.

In sum, although there is some overlap between the worst and best states across different poverty indices in 2005, the outcomes varied in 2012 – in a few cases, strikingly.

5. Income inequality

Following Chancel and Piketty (2017), we focus on different measures of income inequality, *despite* familiar caveats about lack of reliability of income in rural and other informal segments of the economy, and large fluctutations therein.[14] The main reason for doing so is that it allows us to measure income inequality in the top percentiles of income distribution – the shares of the top 1% – and to analyse the impact of changes in their shares relative to those of the bottom 50% on different measures of poverty. In a recent assessment of inequality, Deaton (2018) makes some pertinent and insightful observations.

Some of the processes that generate inequality are fair. But others are unfair. This is an important distinction.

Industrial and health revolutions that began around 1750 have since improved living conditions and health outcomes for billions of people around the world. The inequalities stemming from these advances – both within and between countries – are beneficial and fair, and a key feature of progress generally. In sharp contrast, getting rich by bribing the state for special favours is clearly unfair. Evidence has accumulated that

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[14] See, for example, Srinivasan et al (2017).

consolidation of market power and rent-seeking behaviour have promoted a huge accumulation of income and wealth among the top income segments.

According to the eighth edition of the Credit Suisse *Global Wealth Report*, in the year to mid-2017, total global wealth rose at a rate of 6.4%, the fastest pace since 2012, and reached US$280 trillion. The rise in global wealth reflected widespread gains in equity markets and similar rises in non-financial assets. Most of these influences have operated in India too during 2017, where market capitalisation rose by close to 30%, house prices by around 10%, and the Indian rupee rose 4% against the US dollar.

Not unsurprisingly, while wealth has been rising in India, not everyone has shared in this growth. There is still considerable poverty, reflected in the fact that 92% of the adult population has wealth below $10,000.

Although globalisation and technological change have disrupted traditional work arrangements, both processes have the potential to benefit everyone. The fact that they have not done so suggests that the wealthy have captured the benefits for themselves. We will demonstrate that income inequality – especially ratio of the share of the top 1% to that of the bottom 50% of the income distribution – has aggravated poverty in India during 2005–12.

Let us first consider the widely used Gini coefficient. As shown below in Table 3, the Gini coefficient rose between 2005 and 2012.

Table 3: All-India indices of income inequality, 2005–12

Index of income inequality	2005	2012	Percentage change (2005–12)
Gini coefficient of per capita income	0.50	0.54	-0.04
Atkinson Index of per capita income	0.21	0.26	-0.05
Share of top 1% in total income	0.09	0.12	-0.03
Share of top 5% in total income	0.25	0.29	-0.04
Share of bottom 50% in total income	0.17	0.16	0.01
Share of poor in total income	0.14	0.09	0.05
Ratio of top 1% to bottom 50%	0.53	0.76	0.23
Ratio of top 5% to bottom 50%	1.8	1.9	-0.1

Source: Based on authors' calculations from IHDS 2015.

It rose from a high of 0.50 to 0.54. Note the income Ginis among the three states with the highest Ginis are indeed high – above 50% in 2005 – and remained so in 2012. In fact, there was a considerable worsening in Gujarat. Comparison with NSS consumption expenditure Ginis shows that these are considerably lower than the income Ginis. The former was 0.33 in Karnataka, 0.29 in Gujarat and 0.22 in Assam in 2012 using the NSS uniform recall method.[15] One important reason for the lower consumption expenditure Ginis is consumption smoothing when there are income shortfalls.

The Atkinson Index of inequality rose too, from 0.21 to 0.26. As these are measures of inequality of the entire income distribution, following Chancel and Piketty (2017), we also examine how concentration of income changed in the top segments of the income distribution.

The share of the top 1% of households (ranked on per capita income) in total income grew from 0.09 to 0.12 between 2005 and 2012.[16] The share of the top 5% rose as well, from 0.25 to 0.29. In sharp contrast, the share of the bottom 50% nearly stagnated; it was between 0.17 in 2005 and 0.16 in 2012.

More strikingly, the share of the poor dropped from 0.14 to 0.09, partly on account of the reduction in HCR.

More glaring is the spike in disparity reflected in the ratio of the top1 % income share to that of the bottom 50%, which rose from 0.53 to 0.76. The ratio of the top 5% to the bottom 50% was already very high, at 1.8, and rose to 1.9. Thus income disparities accentuated over the period 2005–12 in these cases but especially between the top 1% and bottom 50%.

6.   Methodology and results

6.1 Model specification

In order to examine systematically the role of inequality in explaining the variation in poverty between 2005 and 2012, we use panel data models as specified below, based on state-level estimates of poverty, inequality, per capita income and their interaction. Algebraically, the basic unobserved effects model (UEM) can be written, for a randomly drawn cross section observation i, as

$$y_{it} = \boldsymbol{x}_{it}\boldsymbol{\beta} + c_i + u_{it}, \quad t = 1, 2, \dots\dots T \qquad (1)$$

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[15] Details will be furnished upon request.
[16] Admittedly, these are underestimates as top income households frequently under-report their incomes. To overcome this constraint, Chancel and Piketty (2017) supplemented household survey data with income-tax and other sources of data. Nevertheless, our estimates are suggestive of a high concentration of income in the top segments of the income distribution.

where x_{it} is 1xK and contains observable variables that change across i (in the present context, a state) and over time, t. In addition to the unobserved effect, there are many other names given to c_i in applications: unobserved component, latent variable, and unobserved heterogeneity are all common. If i indexes individuals, then c_i is sometimes called an individual effect or individual heterogeneity (in the present case, a state effect or state heterogeneity). The u_{it} are called the idiosyncratic errors or idiosyncratic disturbances because these change across i and t.

A distinction is made between whether c_i is a random effect or a fixed effect. The key issue is whether c_i is correlated with the observed explanatory variables, $x_{it}, t = 1,2,\dots T$. Essentially, a 'random effect' is synonymous with zero correlation between the observed explanatory variables and the unobserved effect:

Cov $(x_{it}, c_i) = 0, t = 1, 2, \dots T$[17].

The Hausman test is used to choose between the fixed and random effects specifications.

The dependent variable is a measure of poverty – the FGT class of poverty indices including the head count ratio, the poverty gap ratio and the poverty gap squared.[18] The explanatory variables include state per capita income, the Gini coefficient or ratio of the share of the top 1% in total income to that of the bottom 50%, and their interaction.

6.2 Results

Let us first discuss the determinants of variation in the HCR, based on the results in Table 4.

Going by the Hausman test chi-square statistic, the null of random effects is rejected (at $\leq 5\%$ level) and the preferred specification is the fixed effects. In the model specification, in addition to income per capita, the ratio of the share of the top 1% to that of the bottom 50%, and their interaction, we have added the square of the interaction term to capture the exponential effect of the interaction term.

Each coefficient is significant (at the $\leq 5\%$ or $\leq 10\%$ level) except that of the square of the interaction term. After taking into account the (significant) coefficient of the interaction term, income has a negative marginal effect on the HCR, implying that higher income reduces poverty measured by this metric. The greater the disparity between the top 1% and the bottom 50% of the income distribution, the higher is the HCR. As the marginal effects of these variables are not directly comparable, we will comment later on the elasticities in Table 7.

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[17] Actually, a stronger conditional mean independence assumption, $E(c_i|x_{i1},\dots\dots x_{iT}) = E(c_i)$, is needed to fully justify statistical inference (Wooldridge, 2010).
[18] For details of the FGT class of poverty indices, see the annex.

In Table 5, based on the Hausman test chi-square statistic, the null of the random effects is rejected at $\leq 5\%$ level. As in the case of the HCR, all coefficients are significant at the

$\leq 1\% \ or \ the \leq 10\% \ level)$ except that of the square of the interaction term. In addition, the results are similar to those for the HCR but the magnitudes vary. The marginal effect of higher income on the poverty gap is negative, implying that there is a reduction in this measure of poverty or in the intensity of poverty. The higher the ratio of the share of the top 1% of income to that of the bottom 50%, the greater the intensity of poverty.

In Table 6, the null of random effects is not rejected by the Hausman test statistics of ch-square (at the $\leq 5\%$ level). As in the previous case (Table 5), each coefficient is significant (at the $\leq 1\% \ or \ \leq 10\% \ level)$ except that of the square of the interaction term. The marginal effects, net of the interaction effect, are similar to those in the previous two cases but the magnitudes differ.

Higher per capita income reduces the poverty gap squared, which assigns greater weight to the poorest. The marginal effect of higher income disparity between the top 1% and the bottom 50% is positive, suggesting that higher income disparity is associated with higher value of this poverty measure.

The full story is, however, revealed by the elasticities of poverty to these two variables, as shown in Table 7.

Table 4: Determinants of the head-count measure of poverty, 2005–12

HCR

Variables	Fixed effects coeff	Random effects coeff
Ratio income share of top 1% to bottom 50%	-4.141* (2.241)	-3.422 (2.187)
ln per capita income	-0.276** (0.132)	-0.323*** (0.122)
Ratio income share of top 1% to bottom 50% x per capita income	0.454* (0.259)	0.396 (0.252)
Square of ratio income share top 1% to bottom 50% x per capita income)	-0.00147 (0.00257)	-0.00222 (0.00230)
Constant	2.797 (1.169)	3.164 (1.095)
sigma_u	0.11666	0.088236
sigma_e	0.07139	0.07139
rho	0.72756	0.60438
Observations	44	44
Number of states	22	22

Notes: Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Test: Ho: difference in coefficients not systematic

chi2(4) = 9.58

Prob>chi2 = 0.0480.

Table 5: Determinants of variation in the poverty gap, 2005–12

Poverty gap

Variables	Fixed effects coeff	Random effects coeff
Ratio income share of top 1% to bottom 50%	-1.961** (0.862)	-1.536* (0.832)
Per capita income	-0.119** (0.0506)	-0.128*** (0.0461)
Ratio income share of top 1% to bottom 50% x per capita income	0.210** (0.0997)	0.172* (0.0960)
Square of ratio income share top 1% to bottom 50% x per capita income)	-0.000513 (0.000990)	-0.000788 (0.000862)
Constant	1.176 (0.450)	1.236 (0.415)
sigma_u	0.04083	0.02924
sigma_e	0.02746	0.02746
rho	0.68856	0.53138
Observations	44	44
Number of states	22	22

Notes: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Test: Ho: difference in coefficients not systematic

chi2(4) = 8.68

Prob>chi2 = 0.0696.

Table 6: Determinants of variation in poverty gap squared, 2005–12

Poverty gap squared		
	Fixed effects	Random effects
Variables	coeff	coeff
Ratio income share of top 1% to bottom 50%	-0.999**	-0.755*
	(0.412)	(0.397)
Per capita income	-0.0560**	-0.0593***
	(0.0242)	(0.0220)
Ratio income share of top 1% to bottom 50% x per capita income	0.105**	0.0834*
	(0.0476)	(0.0458)
Square of ratio income share top 1% to bottom 50% x per capita income)	-0.000185	-0.000332
	(0.000473)	(0.000410)
Constant	0.556	0.570
	(0.215)	(0.198)
sigma_u	0.01919	0.01304
sigma_e	0.01311	0.01311
rho	0.68178	0.49755
Observations	44	44
Number of states	22	22

Notes: Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

> *Test: Ho: difference in coefficients not systematic*
>
> *chi2(4) = 9.97*
>
> *Prob>chi2 = 0.0409.*

As shown in Table 7, considering the three poverty indices, a 1% increase in income is associated with about a 0.18% reduction in all three poverty indices. In all three cases, the disparity between the income share of the top 1% and that of the bottom 50% is associated with greater poverty. These elasticities are much higher than the (absolute) income elasticities in all cases except the poverty gap. The effect on the poverty gap squared is largest – a 1% greater income disparity is associated with a 1.24% higher value of this index. Thus the poorest are the most serious victims of the rise in income disparity.

Table 7: Elasticities of poverty to income and income disparity

Variables	HCR (FE)	Poverty gap (FE)	Poverty gap squared (FE)
Income	-0.17	-0.18	-0.19
Ratio of share of top 1% to share of bottom 50%	0.23	0.05	1.24

Source: Authors' calculations.

7 Discussion and Concluding Remarks

So far most of the literature has focused on how overall inequality in income distribution (frequently measured by the Gini coefficient) undermines the trickle-down effect (eg Kulkarni and Gaiha, 2018, Narayan and Murgai, 2016; Ravallion, 2016; Gaiha, 1995;; Imai et al, 2017; Gaiha et al, 2009). In other words, the higher the inequality in the income distribution, the lower is the growth elasticity of poverty. However, with the publication of Piketty's work in 2014, and a subsequent study by Chancel and Piketty (2017) of the evolution of income inequality in India since 1922, the focus has shifted to the income disparity between the richest 1% (or 0.01 %) and the bottom 50% (often referred to as the deprived). The central argument is that the rapid growth of income at the top end of millionaires and billionaires is a byproduct of growth. We extend this argument to explain variation in poverty.

Since Piketty's 2014 work is confined to developed countries, the more important contribution in the present context is Chancel and Piketty. They offer a rich and unique description of the evolution of income inequality in India in terms of income shares and incomes in the bottom 50%, the middle 40% and top 10% (as well as the top 1%, 0.1%, and 0.001%), combining household survey data, tax returns and other specialised surveys. Some of their findings are astounding.

The share of national income accruing to the top 1% of income earners is now at its highest level (22%) since the launch of the Indian Income Tax Act in 1922. In addition, between 1980 and 2014, the situation reversed itself; by 2014 the top 0.1% of earners were capturing a higher share of total growth than the bottom 50% (12% versus 11%), while the top 1% received a higher share of total growth than the middle 40% (29% versus 23%).

A sharp reduction in the top marginal tax rate, and the transition to a more pro-business environment had a positive impact on top incomes, in line with rent-seeking behaviour.

According to Credit Suisse's *Global Wealth Report 2017*, the number of millionaires in India is expected to reach 372,000, while total household income is likely to grow by 7.5% annually to touch $7.1 trillion by 2022. Since 2000, wealth in India has grown at 9.2% per annum, faster than the global average of 6%, even after taking into account population growth of 2.2% annually. However, not everyone has shared the rapid growth of wealth.

Our analysis, based on the IHDS panel for 2005 and 2012, examined the effect of growth in income and the disparity between the income shares of the top 1% and bottom 50% of the income distribution in India.[19] Their interaction enables us to capture the joint effect of higher income growth and greater income inequality. Considering the three poverty indices, an increase in income is associated with a reduction in poverty. In all three cases, the disparity between the income share of the top 1% and that of the bottom 50% is associated with greater poverty. These elasticities are much higher than the (absolute) income elasticities – with the exception of the poverty gap. The largest increase is associated with the poverty gap squared – a 1% greater income disparity is associated with a 1.24% higher poverty gap squared index. Thus the consequences of even a small increase in the income disparity between the richest 1% and the bottom 50% are alarming for the poorest.

Why does the rise of *crorepatis*, or multi-millionaires, cause poverty to increase? The Credit Suisse report highlights the fact that much of their wealth gains are due to property and stock market booms, which do not translate into greater employment opportunities. Worse, these gains accrue at the expense of those at the bottom of the income/wealth ladder, who are deprived of remunerative employment opportunities elsewhere.

Building on the comprehensive exposition of inclusive growth in more recent contributions (notably Deaton, 2018; Srinivasan et al, 2017), we delineate a policy perspective.

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[19] Alternative specifications with the income Gini replacing the ratio of share of income of the top 1 % to that of the bottom 50% did not produce robust results. Either the coefficient of income or of the interaction between income and Gini were not statistically significant. Details will be furnished upon request.

While Piketty (2014) is emphatically in favour of wealth redistribution through progressive taxation, it is feared that the incentive to accumulate wealth through fair means will be undermined. This is important, as Deaton (2018) argues that some of the processes that generate inequality are fair and others unfair.

Significant improvements have occurred since 1750 in living conditions and health outcomes for billions of people around the world. The inequalities engendered by these advances – both within and between countries – are beneficial and fair, and a key feature of progress generally. In sharp contrast, getting rich by bribing the state for special favours is clearly unfair. Evidence has accumulated that the consolidation of market power and rent-seeking behaviour has promoted a huge accumulation of income and wealth among the top income segments.

The 2006 WDR offers an all-encompassing strategy. When markets are missing or imperfect, the distributions of wealth and power affect the allocation of investment opportunities. Correcting the market failures is the ideal response; where this is not feasible, or far too costly, some forms of redistribution – of access to services, assets, or political influence – can increase economic efficiency. A balance must be struck, however, taking into account both the immediate costs to individual incentives and the long-term benefits of cohesive societies with inclusive institutions and broad opportunities.

Elaborating further, the WDR observes that the poor generally have less voice, less income, and less access to services than most other people. When societies become more equitable in ways that lead to greater opportunities for all, the poor stand to benefit in two ways. First, expanded opportunities benefit the poor directly, through greater participation in the development process. Second, the development process itself may become more successful and resilient as greater equity leads to better institutions, more effective conflict management, and a better use of all potential resources in society, including those of the poor.

In a not-so-subtle and thinly disguised defence of its own agenda, the WDR dismisses the dichotomy between policies for growth and for equity as false. Consequently, it asserts, inequitable policy outcomes are better dealt with through a safety net than by fine-tuning policy reforms (the adverse income distributional outcomes of trade policy reforms are better mitigated, for example, through workfare). Market reforms must be pursued simultaneously with social safety nets, as discussed below, with due attention to mitigating rural distress, which seems to be spreading like wild fire. Whether hiking Minimum Support Prices is an important part of the solution seems moot.

The official claim that demonetisation and long-term capital gains tax are essentially redistributive is not just misleading but fatuous. Social safety nets (such as MGNREGA and PDS) may help raise the incomes of the poor, but so far their performance has been dismal and is likely to worsen because of budget cuts. Whether the rhetoric of doubling farmers' incomes by 2022 is a distraction from hard reforms of markets or not,

greater public investment in rural areas and enhancing access to technology can't be rejected out of hand.

Drawing upon IFAD (2013), we offer supplementary observations from a largely rural perspective.[20] This is important in the Indian context as a large majority of the poor live in rural areas.

As rural poor people depend on agriculture for their livelihoods, any policy that aims to reduce rural poverty must focus on forms of agricultural intensification and diversification that are both market-oriented and sustainable. To achieve this goal, a multi-pronged strategy is needed, involving simultaneous action on several fronts: building resilience against natural disasters; stabilising food prices; developing a favourable rural investment climate; enabling access to agricultural markets; intensifying and diversifying smallholder farming sustainably; and promoting the rural non-farm economy.

As part of the diversification of rural livelihoods, and of a pathway out of poverty, the rural non-farm economy (RNFE) has considerable potential. Rural households receive substantial income from non-farm activities. With constraints on farm expansion and continued growth of the rural population, development of the RNFE has a major role to play in any poverty-reducing strategy. The *direct* impact of rural non-farm earnings on static indicators of rural poverty is confirmed in most cases. In addition, RNFE performs an important safety-net role, preventing households from falling into poverty when faced with shocks. The *indirect* effects of rural non-farm employment – through labour-market tightening and raising real wage rates – remain substantial. The availability of human, financial and physical capital is a major determinant of participation in non-farm activities. Policy biases and inequity in access to markets and credit must be remedied.

To support and implement these policies, effective governance that ensures more-inclusive growth is crucial. Democratisation, civil society participation, decentralisation, transparency, accountability and corruption control hold great potential for strengthening governance. Effective policies to reduce poverty should include measures that enhance poor peoples' access to assets such as land, water, education and health. This requires significant public investment, well defined property rights and effective land administration.

An ideal set of policies would have all these attributes, but unfortunately we do not live in an ideal world. Government must constantly balance the demands of market-oriented reforms that require less state intervention with the state's obligation to ensure that no citizen remains wretchedly poor. For instance, the government needs to create well defined property rights, which would then enable indigenous peoples to transform their customary rights into legal ones. An imaginative approach to redistribution of land is imperative (eg through efficient land and rental markets). However, the political feasibility of these reforms is not self-evident.

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[20] This study was carried out under the overall guidance of T Elhaut. Gaiha was a principal author of the study.

Good policies and governance are crucial to addressing rural poverty. Government has the prime responsibility to create a favourable environment through macroeconomic and political stability and the rule of law. Further, it has an important role to play in regulation, provision of public goods, investment in infrastructure and in research and development, provision of credit facilities and markets, definition of property rights, enforcement of rules and development of institutions.

A few limitations of our analysis must be emphasised. As already noted, one is the use of a state as the unit of analysis, as this conceals within-state variation. The meticulous and detailed analysis of the top end of the income distribution can't be carried out with a survey such as IHDS because of the underreporting of incomes by the richest. This limitation can only be overcome by supplementing household survey data with income tax records. Time and resource constraints prevented us from carrying out a more detailed analysis. It is nevertheless significant that the disparity between income shares of the top 1% of incomes and the bottom 50% shows up as a key determinant of the FGT class of poverty indices. A third limitation is that, thanks to the paucity of data at the highest end of the income distribution, we could not disaggregate the poverty–inequality analysis into rural and urban.

In conclusion, while the prospects of sustainable growth and poverty reduction may seem daunting to many, the strategy charted here is one of hope and optimism.

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Annex

All-India poverty indices

    (i)   Headcount Ratio

          $P_{0=\frac{N_P}{N}}$, where N_P is number of poor, N is total population.

    (ii)   Poverty gap index

$$P_1 = \frac{1}{N} \sum_{i=1}^{N} \frac{G_i}{z} \text{ , where } G_i (z \ y_i) x \ I (y_i \ z),$$

          I takes the value 1 for poor and 0 otherwise.

    (iii)   Squared Poverty Index

$$P_2 = \frac{1}{N} \sum_{i=1}^{N} (\frac{G_i}{N})^2$$

    (iv)   Sen Index

$$P_i = P_0(1 - (1 - G^P \ )) \frac{\mu^P}{z} \ ;$$

          where G^P is Gini of per capita income of the poor, μ^P is mean income of poor.

All-India income inequality measures

    (i)   Gini Coefficient

          Let x axis represent cumulative population percentiles, say, bottom 5% in terms of per capita income to 100%, using five percentiles (altogether 20 intervals), and y denote cumulative % share of income. When there are N equal intervals on the x axis,

          Gini=1-$\frac{1}{N}$ $\sum_{i=1}^{N}(y_i + y_{i-1})$.

    (ii)   Atkinson's Inequality Measure

          A=1$- [\frac{1}{N} \sum_{i=1}^{N} \left(\frac{y_i}{\bar{y}}\right)^{1-\epsilon}]^{1/1-\epsilon}$, $\epsilon \neq 1$