

Remoteness, Urbanization, and India's Unbalanced Growth

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Summary. — The unbalanced nature of India's growth has caused considerable concern but little is known about its causes. We use a new data set of district-level income and socio-economic data to explore the determinants of transitional growth at the district level. We find that there is absolute divergence across districts but conditional convergence once we allow for district characteristics, particularly urbanization and the distance from a major urban agglomeration. State-level effects have also significantly contributed to India's unbalanced growth. The results suggest that while geography is important, policy differences may also account for much of India's uneven growth.

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1. INTRODUCTION

India's tentative economic miracle faces many hurdles, but one of the chief difficulties is the unbalanced nature of its growth (Pranab, 2010). The resulting income disparities have stimulated considerable debate over how the gains from growth in India are being shared, and may impede the political case for economic reform.¹

Evidence of India's unbalanced growth is apparent from the numerous studies that find richer states are growing faster, so that state average incomes are diverging (Cashin & Sahay, 1996; Rao & Sen, 1997; Rao, Shand, & Kalirajan, 1999; Trivedi, 2003; Bandopadhyay, 2004; Ghate, 2008; Kar, Jha, & Kateja, 2011; Das, 2012; Ghate & Wright, 2012; Bandopadhyay, 2012).² This pattern of divergence might be regarded as unusual given that there are no political barriers to migration, approximately free trade, and a common set of federal institutions.

One possibility is that unbalanced growth reflects policy failures such as poor governance, different levels of public infrastructure across states, or the result of corruption. In particular India faces a severe shortage of public infrastructure which has been claimed to result in regional income disparities (Basu & Maertens, 2009; Cain, Hasan, & Mitra, 2012, Cha 4; Lall, Wang, & Deichmann, 2012; Lall *et al.*, 2010; Sachs, 2009).³ Likewise India's states have had different market reform programs Cain *et al.*, 2012, Chap. 4.⁴

Nevertheless, as emphasized by the new economic geography (NEG) literature, unbalanced growth may also be a natural outcome in a growing economy, World Bank (2009). Differences in incomes can arise due to trade and migration costs, and economies of scale associated with agglomerations. Thus designing appropriate policy responses toward addressing India's unbalanced growth requires an understanding of the relative importance of these different possible causes.⁵

One way to gain a better sense of the sources of the imbalance is to look at the growth experience across India within states, that is, at the district level. The aim of this paper is, therefore, to use newly available data on India's 575 districts to gain a better understanding of the causes of India's unbalanced growth. In particular we wish to see whether the pattern of divergence across states is similar within states, and, if so,

how geographical factors, infrastructure, and other possible factors affect these district-level differences.

We proceed, first, with a descriptive analysis of growth rates and income levels at the district level, between 2000–01 and 2007–08. This preliminary analysis shows a strong imbalance in growth rates across districts, suggesting that the growth in inequality across India runs much deeper than just differences across states.

Second we consider the causes of regional growth explicitly and, in particular, the role of geography, infrastructure, and literacy rates emphasized in the NEG literature. To achieve this we combine our data on per-capita incomes with district-level social and economic characteristics for each district including literacy, infrastructure, and spatial variables. Of particular interest is the role of the spatial distribution of markets faced by each district that captures the districts' remotest or access to markets in terms of trade, migration, and other linkages.

We find that urbanization, irrigation, electricity provision, and state dummy variables are all highly significant factors in explaining differences in transitional growth rates and income levels across Indian districts. Interestingly we find no evidence that literacy and road quality have any impact on these district growth rates or income levels.

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In terms of spatial factors we find very strong evidence that being close to a major city is a significant factor, but that being close to a large number of different markets is not important. We argue that this result is consistent with a setting where trade is largely in primary goods and there is relatively free mobility of labor and other factors across borders.

We also discuss the policy implications of these results. The results confirm that geography is important with significant benefits from urbanization and being close to cities. Nevertheless, even after controlling for these factors, the results suggest that there remains scope to promote more balanced growth through policy reform.

2. PRELIMINARY STATISTICAL ANALYSIS

(a) District GDP data

To investigate the pattern of growth across India we use two new data sets of district-level incomes and social and economic characteristics—respectively the *Indicus* “Development Landscape” and “District GDP” data-sets. The data consist of 575 district-level observations of district income for two years, 2001 and 2008.⁶

The availability of district-level income data provides the opportunity to observe regional disparities in India at a much finer level than previous studies based on Indian states. This is also advantageous insofar as there is likely to be a larger degree of heterogeneity in income levels, growth rates, and other characteristics such as urbanization or literacy, compared to state-level data.

We begin with a preliminary exploration of the data by considering different indicators of convergence and how the shape of the distribution of district incomes has changed over time. First, [Table 1](#) shows the wide disparity in income levels across states. There is a 9.8-fold difference in 2007–08 per-capita incomes between the richest state *Goa*, and the poorest state *Bihar*. This is larger than the real income gap between the GDP per-capita of the USA and Angola, and only slightly smaller than the real income gap between the USA and India.⁷

At the district level, however, that gap is much larger. The range in per-capita incomes in 2008 is from a minimum of Rs. (m) 3,858 in the *Sheohar* district (*Bihar*) to a maximum of Rs. (m) 139,868 in *Jamnagar* (*Gujarat*). This implies an income ratio of 36, which is equivalent, for example, to the ratio between the USA and Rwanda according to the Penn World Tables.

The district data are shown visually in [Figure 1](#). It can be seen that there are generally lower incomes in central districts as well as in the eastern states. Likewise the wealthy western corridor running from the north of Delhi down the west coast of India through Western *Maharashtra*, *Karnataka*, *Goa* and *Kerala* is easily observed. [Figure 1](#) is thus suggestive of a strong geographic pattern in the differences in per-capita district incomes across India.

The fact that the within-India differences are comparable to cross-country per-capita differences is remarkable given that there are no political barriers to migration, approximately free trade, and a common set of federal institutions, policies, and governance. That such differences could persist over time is in stark contradiction to the standard competitive model that motivates the extensive literature on absolute convergence across regions.⁸ In contrast, it points to the potential relevance of trade barriers, transport costs, and agglomeration effects as emphasized in the NEG literature.

(b) Absolute convergence across districts

A simple starting point from which to analyze differences in transitional growth rates across districts is to employ the standard concept of absolute β -convergence ([Baumol, 1986](#); [Durlauf et al., 2005](#); [Sala-i Martin, 1997](#)). This is given by the coefficient β from (1),

$$y_{i,t} - y_{i,0} = \beta y_{i,0} + \varepsilon_i \tag{1}$$

where $y_{i,t}$ is the natural log of per-capita income at time t in region i and $y_{i,0}$ is initial per-capita income.⁹ The left hand side of (1) represents the transitional growth rate over the period $(0, t)$. The results of estimating (1) across Indian districts are given in [Table 1](#). It can be seen that across India there is strong evidence of a small rate of divergence with $\beta = 0.007$, which is statistically significant at the 1% level. Hence, on average, richer districts have been growing slightly faster than poorer districts.

[Table 1](#) also shows the results of estimating (1) for each state separately. Thus we ask whether there is convergence across districts within each state. In four states, *Assam*, *Chhattisgarh*, *Kerala*, and *Rajasthan*, there is significant absolute β -convergence of district-level incomes. However there is also significant within-state divergence in three states—*Haryana*, *Orissa*, and *Uttar Pradesh (UP)*.¹⁰ Nevertheless for the vast majority of states the estimated β -convergence coefficient is insignificantly different from zero. Thus there is little evidence of strong convergence, either across the country as a whole or within individual states.

Next we consider σ -convergence, which is defined as a decline in the variance of district-level per-capita log incomes across time. [Table 2](#) shows the variance of district log per-capita incomes in the two periods, 2001 and 2008. It can be seen that there was a 30.7% increase in the variance of log per-capita incomes across districts—from 0.27 to 0.35. Thus there has also been σ -divergence.

[Table 2](#) reports a simple variance decomposition using log per-capita incomes.¹¹ Here, *within-state* variance, v^w , refers to deviations of district log per-capita incomes, y_{ij} , from their state-level mean log per-capita income, \bar{y}_j , $y_{ij} - \bar{y}_j$, and *between-state* variance, v^b , refers to deviations of state-level mean log per-capita incomes \bar{y}_j from the country-wide mean log per-capita income, \bar{y} , $\bar{y}_j - \bar{y}$. By definition, the total India-wide variance of per-capita incomes across all districts, v^T , is equal to the sum of the within-state variance and between state variance, $v^T = v^w + v^b$. This variance decomposition shows that there has been a similar increase in σ -divergence both within states and between states.

Further evidence on the pattern of Indian growth can be obtained by examining other aspects of the change in the distribution of district incomes. To that end [Figure 2](#) plots the kernel density estimate of the probability density function (PDF) for district log incomes for 2001 and 2008.

It shows the shift in mean income; a fall in peakedness (kurtosis) with a slight increase in concentration on the left tail (skewness). [Figure 3](#) similarly shows the cumulative distribution function (CDF). Together these visual images suggest while the income distribution has widened at the upper tail, incomes have increased at each point on the distribution. There is significant churning within the distribution, and only 16 districts (out of 575) remain in the same position on the distribution during 2001–08. Overall however Kendall's rank correlation *tau* statistic is 0.8, suggesting a high correlation of rankings between the two periods.

Thus, though there is some evidence of convergence within a few states, among most states there is no correlation between

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