A spatial dive into India's growth story*

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1 Introduction

The take-off of economic growth in any country invariably leads to some inequality. The politics of that country (or region) seeks to level the playing field through various redistributive mechanisms of taxes and transfers and wider access to public services such as health and education. The future of sustainability of economic growth then rests on this interaction between economic policies, and social and political mediation.

For example, the seminal work of Alesina and Rodrik (1994) argued that inequality impedes growth. This is because higher tax regimes are more likely to be adopted in unequal democracies with equal representation, which then results in lower economic growth. Addressing the recent debates over inequality in OECD countries, Ostry et al. (2014) present evidence that more unequal societies tend to redistribute more, and that redistribution is mostly benign in its impact on growth; only in extreme cases it may have direct negative effects on growth.

In a similar vein, growth also has a *spatial* dimension that impacts the structure of governance and institutions through the channel of the *federal* compact in the nation-state. The political choices made to resolve spatial inequalities again influence future economic development, both at the regional and national levels. For instance, if economic growth is spatially unequal, then it is possible that a country ends up with curses of internal "foreign" aid.

In the context of India, economic growth has occurred primarily in non-agricultural sectors, so agricultural regions have demanded and implemented more agricultural subsidies and eventually become dependent on them, see (Chatterjee et al., 2022) for a development of this argument. Recent tax collections also indicate that states such as Tamil Nadu, Maharashtra, and Karnataka are allocated resources for public expenditure much less than their tax collections, and others such as Bihar and Uttar Pradesh much in excess (Nihalani, 2023). While this is not unusual per se for a large union, but as we will argue, other confounding factors of population density make India an outlier.

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It is in this theoretical backdrop that we evaluate the spatial nature of India's economic growth in the last three decades. Although India has witnessed steady economic growth since the 1980s, In line with standard theories, this growth has been uneven. Moreover, the population has continued to be concentrated in areas with lackadaisical growth. This poses a puzzle to an empirical regularity of spatial development, that population bulge should migrate away from lesser developed areas to more rapidly developing ones. Against this backdrop, a lack of convergence, in fact divergence, with states as the unit of analysis, signifies adverse welfare consequences for the nature of uneven growth, and its distributional consequences.

Taking the analysis further to districts as unit of analysis reinforces the fact a few districts (disproportionately) propel the Indian growth machine. While this may not be uncommon as a stylized fact when compared to other countries, especially in the initial stages of development, what is again worrisome is that either the population from the less productive regions is not moving rapidly enough to the productive regions or growth is not spreading fast enough to regions doggedly lagging behind.

These facts can be rationalized somewhat through a non-standard structural transformation theory for India. India has jumped the standard sequence of structural transformation—it went from a largely agrarian economy to specializing in high-skilled manufacturing and high-skilled services, leaving untapped the intermediate step of low-skilled manufacturing, which is widely regarded as the initial jobs generator at scale in a country's growth trajectory. So even as the aggregate growth numbers rose, their drivers were concentrated in some parts of the country. Good quality jobs did increase in these regions, but the total number of non-agrarian jobs in what is often called the formal sector, a proxy for good quality jobs, has not kept pace with the population rate of the country.

The goal of this paper is to document in some detail, the divergence story of India's growth; view it through the prism of the aforementioned puzzle on the lack of (spatial) equalization of the standards of living, concomitant with the rise in population in the slow-growing regions; and offer a plausible narrative of anomalous structural transformation that seeks to rationalizes these facts.

2 On Spatial Structural Change

The key to understanding economic growth and its spatial nature is to understand the process of structural transformation, i.e. reallocation of labor from agriculture to non-agricultural sectors. In this section, we provide a brief summary and highlight what we know about India and the world in general.

Caselli (2005) and Restuccia et al. (2008) argue that a major reason why some countries are poor is because (1) they are less productive in agriculture compared to rich countries and (2) because they devote a large fraction of their labor force to agriculture. Thus, a volume of research is devoted to understanding what shapes the allocation of labor across sectors, see Herrendorf et al. (2014) for a survey. Gollin et al. (2007, 2002) illustrate how low agriculture productivity can be the source of large

cross-country differences in aggregate productivity.

Rodrik (2016) documented that the process of industrialization has been heterogenous across countries. In particular, developing countries de-industrialized prematurely i.e. over the course of history the share of the labor force in the industry in developing countries at their peak of industrialization was much lower compared to when modern industrial economies were at their peak. Huneeus and Rogerson (2023) show that these cross-country differences can be accounted for by cross-country differences in agricultural productivity growth. In particular, according to Huneeus and Rogerson (2023), the one reason why India de-industrialized prematurely as compared to say the United States is that its agricultural productivity growth has been relatively lower.

There is limited historical evidence on how economic growth and structural change shape regional inequality within countries. Whatever evidence is available so far points to the fact that in the first phase of structural change, i.e. from agricultural to manufacturing, countries usually witness a reduction in regional inequality. This was true during the post-war industrialization in the U.S. (Barro and Sala-i Martin (1992); Eckert and Peters (2022)) and in Spain (Budí-Ors and Pijoan-Mas (2022)). However, recent evidence shows that most countries in the world have been witnessing an increase in regional inequality no matter where they are in their development trajectory (Chatterjee et al. (2023); Giannone (2017); Eckert et al. (2022)) with the possible exception of China (Fang and Herrendorf (2021)). Lamba and Subramanian (2020) document the lack of convergence in Indian states and how the southern coasts have driven much of the growth spurt.

This recent research has brought to the forefront the role of services as a key driver of development, especially high-skilled services. A big open question is whether industrialization is necessary for economic growth in the 21st century? Or can international trade substitute for industrialization and economies can transition to services? Nayyar et al. (2021) and Lamba and Rajan (2022) throw light on these potentially changing realities of structural transformation.

Nevertheless, we do know that high-skill services-driven development most likely exacerbates regional inequality. Fan et al. (2022) provide evidence that in India service-led growth increased inequality. Chatterjee et al. (2023) argue that more broadly, since the 1980s, the world has become more spatially unequal than ever before as growth has been concentrated in a few regions that are rich in services.

The spatial inequality story must also be evaluated under the lens of India's somewhat unusual migration pattern. In most countries, an increase in spatial inequality has been followed by an out-migration of people from the poorest regions. This is not true in India. Migration in India is peculiar wherein a subset of what may be counted as a household migrates to cities, while the other part stays behind. Rai (2021) argues that accounting for these patterns of migration—temporary versus permanent—is essential to understand India's structural transformation story.

3 A spatial development hypothesis: India an outlier

A plausible hypothesis of spatial development is as follows: Within a well defined landmass such as a nation state, some regions start to grow more rapidly than others. This could be for historical or geographical reasons (eg. port cities) or initiation of new technological breakthroughs in the region (eg. the Bay area in the US). With little barriers to migration, the population within nation states starts to move into the productive regions and away from the other regions. Thus, broadly speaking, while total output of the productive regions exceeds that of the other regions, migration forces output per person (or GDP per capita) to equalize across regions.

This hypothesis is supported by Figure 1 which uses data on GDP at the sub-national level for 34 major countries of the world between 1950–2017. Figure 1a plots the coefficient of variation in GDP per capita across states within a country (a measure of spatial inequality) against the GDP per capita of that country. Figure 1a shows that as most countries develop, regional income disparities within that country falls.[1]

Figure 1b plots the share of the national population in any state against its GDP per capita scaled by the GDP per capita of the median state of that country. In this figure, the GDP per capita in any state is averaged for the last three years in the sample, 2015–2017. Figure 1b shows that within most countries fewer people live in unproductive states.[2]

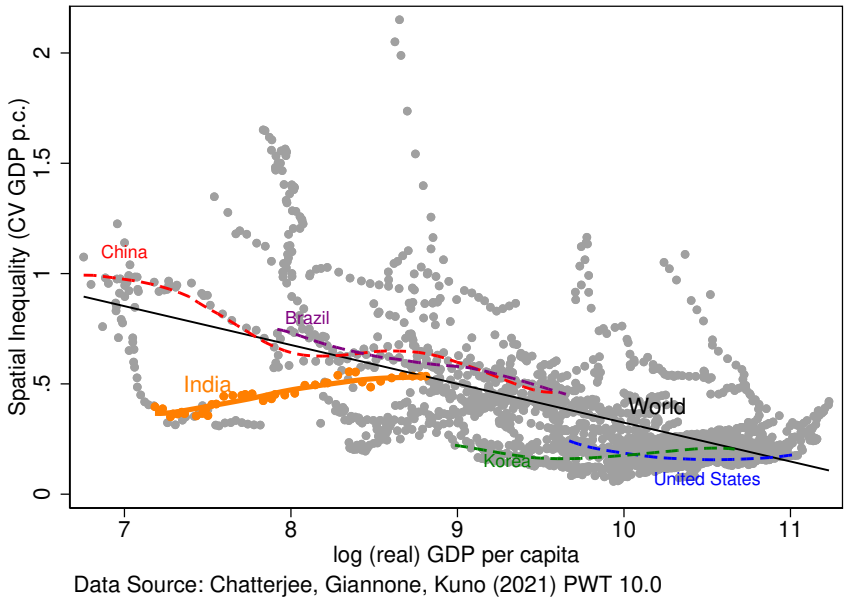
While Figure 1 shows that in general, with development, a country's population thickens around the economically productive regions and thins around the less productive ones, it also shows that India is an anomaly. In India, spatial inequality has increased with development and the least productive regions in the country (eg. Uttar Pradesh and Bihar) have the largest shares of the national population. This presents an interesting stylized fact that is taken to be the salient puzzle for the analysis.

What is the conceptual motivation in framing the analysis in terms of the puzzle? The larger objective is of course to understand how different regions of India are doing relative to another—what is the comparative picture of India's growth story? However, a primary driver in asking this question must be that we want to know if 'people' in these regions have comparable living standards. For why does convergence matter if the region around the Thar desert has low economic growth and Mumbai has high economic growth, but no one lives in the desert and everyone has moved to Mumbai?

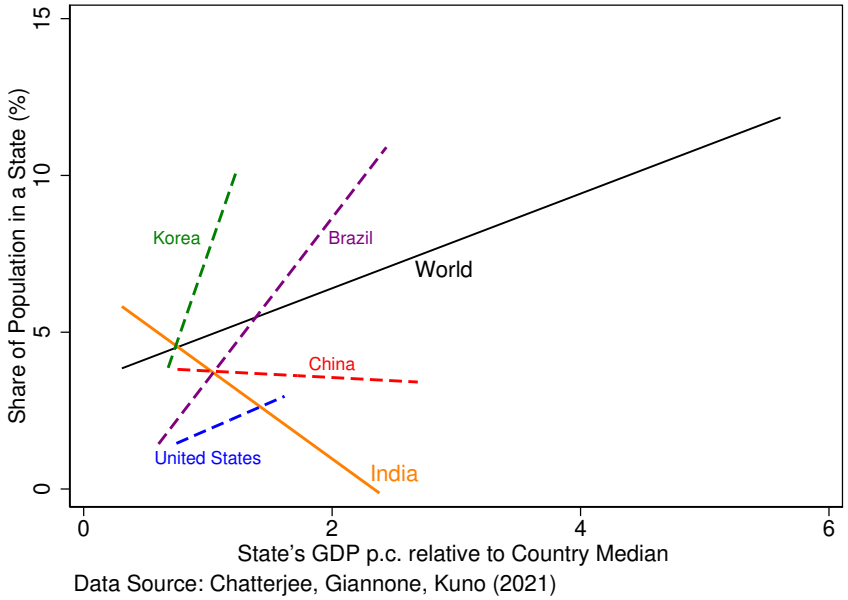
Once framed in this way, the fact that India is an outlier in Figure 1, assumes a large human dimension: uneven growth is deeply affecting human lives. The largest population still lives in the economically least productive regions of the country. In what follows, the problem of convergence (in fact divergence) is described in some detail, and it is then connected to India's anomalous structural transformation story.

[1] In a regression of the coefficient of variation of GDP per capita on log GDP per capita with country fixed effects, the coefficient on log GDP per capital equals -0.07 and is precisely estimated.

[2] In a regression of the share of population in a state on its scaled GDP per capita with country fixed effects, the coefficient on GDP per capital equals 1.52 and is precisely estimated.



(a)



(b)

Figure 1: Economic growth and spatial inequality across states or provinces. Data Source: Chatterjee et al. (2023)

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4 Lack of convergence and classification of states

The idea of convergence, broadly speaking, is that nation states will catch up with each other because less developed states will grow faster than the more developed ones— they simply have more room to grow, and grow quicker. For large nation states, this idea is sometimes pushed further to understand convergence (or lack thereof) amongst regions within the country, and a typical unit used in such analysis are states or provinces.

As India has grown at a brisk pace in the last three decades, a natural question raised repeatedly is how even or uneven has this growth been. A potential way to answer this question is to test for convergence amongst the states in India.

Figure 2 provides this answer. The rate of β-convergence is defined as the rate of growth of GDP per capita of a richer state relative to a poorer state within the country. To be precise, the relative growth of a state whose GDP per capita is one percent higher. Growth is evaluated here in decadel terms—starting in any fixed year, the average growth rate over the next decade is calculated. When the estimated rate of convergence is negative, it implies that poorer states are growing faster than richer states and hence one should expect different regions to converge over time. If the rate is positive, one should expect the regions to diverge as richer states grow faster than poorer states.[3]

This simple calculation, does not account for the fact that some states are larger than the others in terms of population. Uttar Pradesh and Mizoram are both poorer as compared to Delhi. Suppose both UP and Mizoram both grow a percent more relative to Delhi. If we are concerned about the convergence in living standard of the population of India, then U.P.'s growth matters much more since it is shared by a larger number of people.[4]

Specifically, each point in Figure 2 plots the rate of convergence in any given year. The grey dots treat two states within different populations similarly. The blue dots account for population by putting more weight on populous states and thus indirectly answers the question whether "people" within the country are coming close to each other in terms of their standard of living.[5]

The hypothesis of convergence is firmly rejected in the data. In fact, the decadal coefficients of (population weighted) convergence, β, is positive throughout, and in the initial period even the confidence interval is bounded away from zero. This means a robust conclusion of divergence for the first two decades since liberalization; the phenomenon, at best, has muted to some extent in the last decade of 2010s, but is certainly nowhere near convergence.

Arguably the initially richer states bore the fruits of economic reforms of the 90s much more

[3] In practice, a standard unweighted convergence regression is reported, it regresses growth over the next decade on initial log GDP per capita.

[4] The implication here is purely statistical and helps us understand whether people on average are coming closer to each other within India. Each Indian citizen gets the same weight and thus UP gets a higher statistical weight since it is large. This statement shouldn't be interpreted as UP mattering more than Mizoram.

[5] The grey dots in any year correspond to unweighted cross-state regressions of growth in GDP per capita over the next decade on the log GDP per capita in that year. The blue dots are the same regression but weighted by the state's population. The bands around each dots are the ninety five percent confidence intervals.

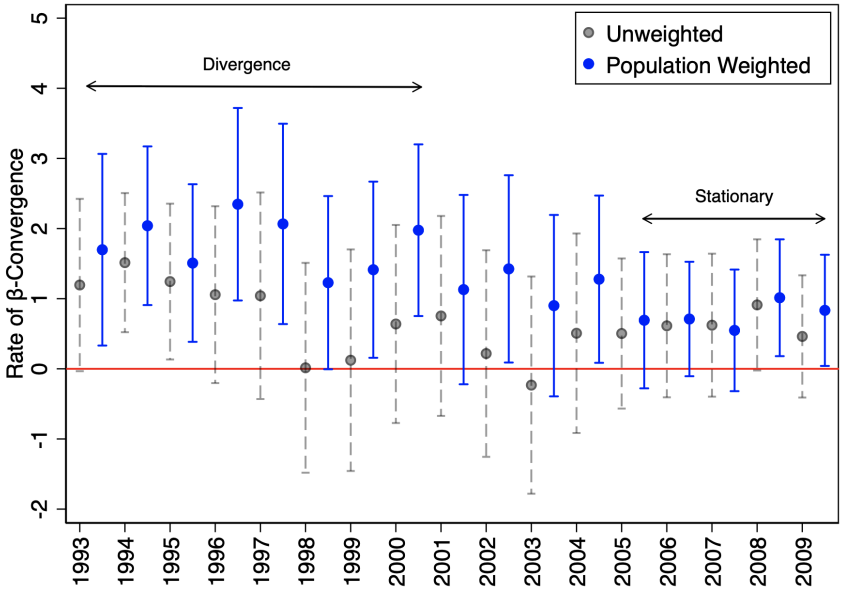


Figure 2: β-convergence, weighted and unweighted.

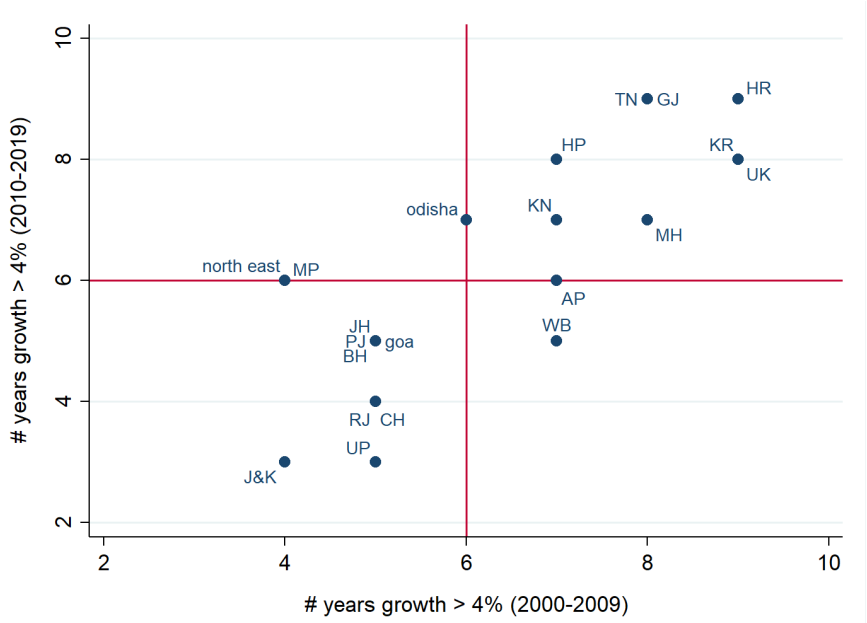
because they were simply more primed to internalize the benefits of liberalization. However, the catch up by the other states since the early spurt has not been significant.

A natural next question is how to unpack this initial divergence and then eventually lack of convergence. Which states have grown more and why? We start with a basic tack at these questions in Figure 3. First Figure 3a plots each state on an (x, y) coordinate; the x-coordinate is the number of years growth above 4% in the decade 2000-2009 and the y-axis plots the same number for the next decade, 2010-2019. A cross is then made at the number 6. So, Tamil Nadu and Gujarat both had a growth rate in excess of 4 percent for eight years (out of ten) in the decade 2000-2009, and the same number for the next decade 2010-2019 is nine; and so on for other states.

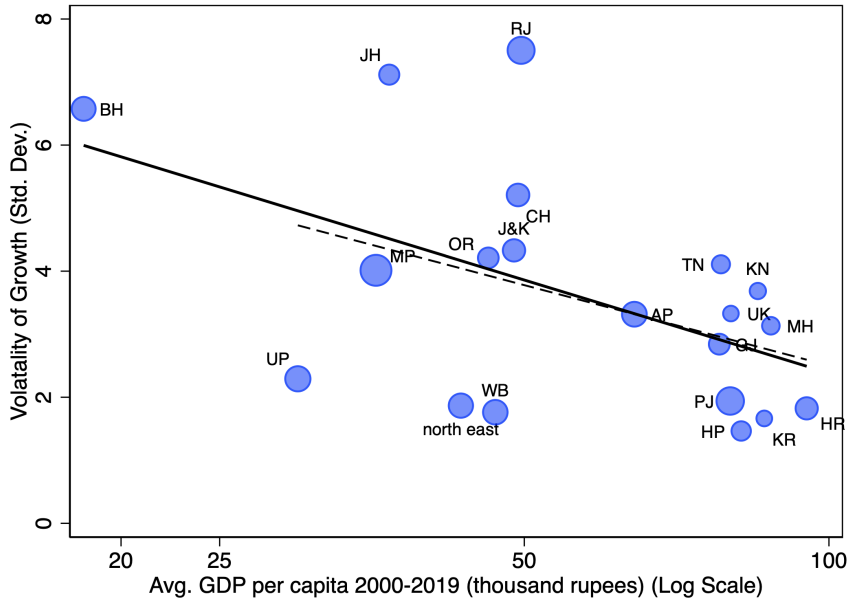
It is striking that the classifications almost completely split states into two subsets: Odisha, Andhra Pradesh, Karnatka, Mahasrhtra, Himachal Pradesh, Tamil Nadu, Gujarat, Kerala, Uttrakhand and Haryana in the northeast block; and Jammu & Kashmir, Uttar Pradesh, Rajasthan, Chattisgarh, Bihar, Punjab, Jharkhand and Goa in the southwest block. The former are the sustained growers are and the latter are the (relative) laggards. The three outliers, as can be seen in the graph, are West Bengal, the seven Northeastern states and Madhya Pradesh.

In addition to illustrating the basic growth rates of the state over the last two decades, it also unpacks the divergence story observed in the last section: If instead of the pattern observed here, most of the dots were in the northwestern and southeast blocks, we would have observed some convergence for faster growing states would have slowed and slower to kick off states would have grown faster. The exact opposite seems to be the case, which underlies the divergence pattern.

In Figure 3b, an attempt is made to further understand this variation in the pattern of growth



(a) A classification of level of growth rates over last two decades.



(b) Volatility in growth rates. Size of dots signifies percent of agriculture to total output.

Figure 3: Level and volatility of growth rates across states for the time period 2000-2019.

rates. It plots the volatility in growth rates (as measured by the standard deviation) in the two decades (2000-2019) against the average growth rate in the same time period. The line of best fit is downward sloping confirming that the fastest growing states are also stable in their growth rates, the slowest (on average) growers are also the most volatile in their growth rates.

Since Bihar seems to be an outlier, the dotted line redraws the best fit taking Bihar out of the sample, and the basic downward sloping relationship still holds. Further, the size of the dots (or circles) represents the share of agriculture (on average across the two decades) in the state's GDP. It can be seen that most of the slow growers with high volatility in growth rates have fatter dots, i.e. greater share of agriculture in their total economic output. A plausible hypothesis here is that it is the relative uncertainty associated with agricultural incomes that drives the volatility in the growth rate of the slower growers.

Finally, to expand on how the nature of economic activity is different between fast-growing states and others, Figure 4 graphs the sectoral composition of output for two groups: sustained growth states and all other states.[6] Manufacturing and high value services (professional plus financial services) account for 45 percent of total output in sustained growth states, while it accounts for 29 percent of total output in all other states. Conversely, agriculture accounts for a bigger share of output in rest of India in comparison to the sustained growers. This suggests that whatever structural transformation has happened in India is primarily concentrated in few states which have consistently grown post 2000.

To repeat the puzzle invoked in the introduction, the pattern showcased in Figures 3 and 4 would be in line with a broadly standard sequence of development if the slow growing states had thinned in population over time. On the contrary, the population in some of these states— most notably Uttar Pradesh and Bihar—has increased at a rate significantly faster than the country average. So the spatially lop-sided development story of India assumes significant human costs.

5 Going granular

The previous section argued that there hasn't been any noticeable convergence amongst the states in India over the last three decades. The richer states have grown richer, their growth has been more stable, and a larger share of their growth is coming from industry and services. In this section, we dig a bit deeper by shrinking the unit of analysis further from states to districts.

Table 1 provides a summary of spatial divergence at the district level. It first arranges districts in descending order of per capita income, using GDP numbers from 2011. It then asks what share of total population, GDP and non-agricultural employment lies in the top 10, 25, 50, 100 and 133 districts. The trend seen in the state level data continues to hold robustly in the more granular district level data. In

[6] Sustained growers are defined to be those states which achieve at least 4 percent per capita growth for 6 years or more in the two decades (i.e. both in 2000-2009 and 2010-2019); hence, states in the north-east block of Figure 3a are sustained growers.

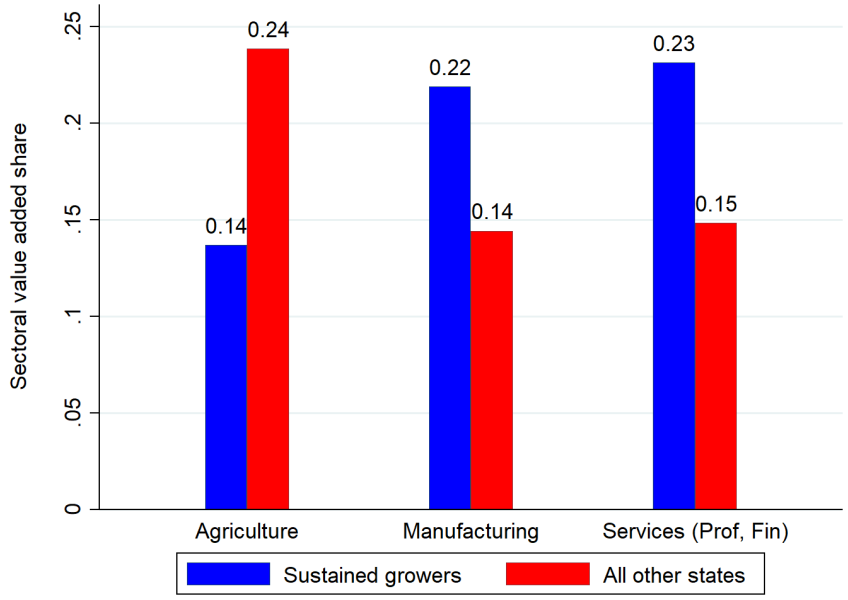


Figure 4: Sectoral composition of growth, separarely for sustained growers and other states.

fact, districts with about one-fourth of the population produce half of the total output in the country, and these same districts constitute 57 percent of the total non-agricultural employment in firms that employ at least ten workers.

Number of districts	Share of population	Share of GDP	Share of Non-Ag employment
10	4.1%	16.2%	14.5%
25	7.1%	22.6%	23%
50	12%	31.2%	33.5%
100	20%	42.6%	49.6%
133	26.2%	50%	57%

Table 1: Distribution of population and growth and non-agriculture employment, where districts are arranged in descending order of per capita income. The district level GDP data is for 2011 and is taken from ICRISAT; and the non-agriculture employment is for 2013 from Economic census for firms which employ at least 10 workers.

To give a more visual description of this, Figure 5 breaks down district-wise economic output as a fraction of the national average; more specifically, it measures the GDP per capita of the district as a fraction of the national average (of GDP per capita), again using the district level numbers available from 2011. The 'heat map' showcases darker shades with larger GDP per capita, and lighter with lower GDP per capita. There is economic activity around the Punjab–Haryana–Himachal–Delhi region, and along the coasts. But the heartland, with the largest population share of the country, continues to be laggard. In fact the lighter shades document a GDP per capita that is below 50 percent of the

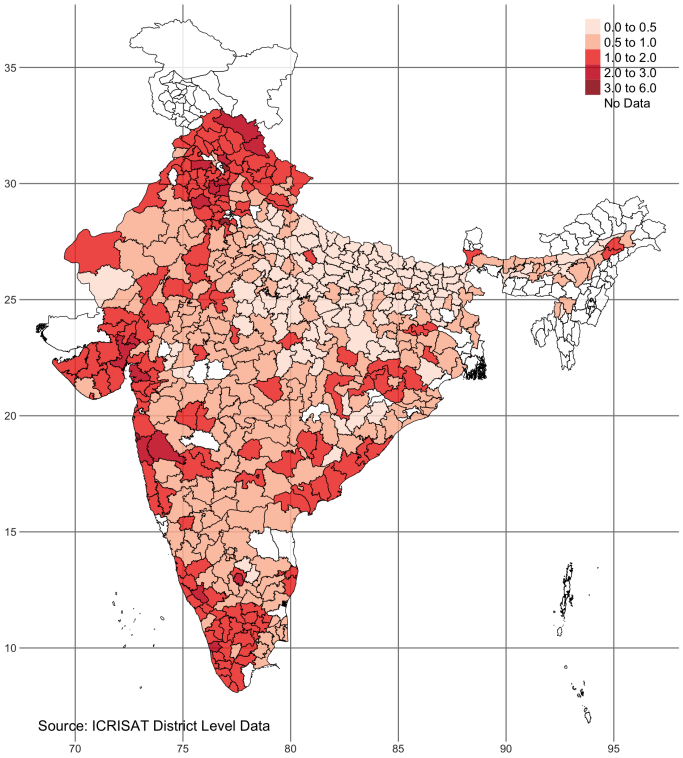


Figure 5: District wise per capita GDP was a fraction of national per capita GDP for 2011

national average.[7]

6 Whither structural transformation?

The standard Lewisian structural transformation postulates that at least since the industrial revolution in Europe, as nation states (or their equivalent notions) grow their economic output, they transition first from agriculture as the main driver of income to low skilled manufacturing and services, onto high skilled manufacturing and eventually to high skilled services.

It is well documented that India has been an outlier in this sequence—it jumped more or less from agriculture as the main driver of growth to high skilled manufacturing is some parts, and low and high skilled services in large parts. It essentially missed the bus, almost completely, on large scale low skilled manufacturing. This section aims to understand the spatial dimension of India's structural transformation.

[7]Note that Punjab appears to be worse in Figure 3a even though it has a darker shade on Figure 5. This is primarily because Punjab starts from a higher base at the turn of the century, but has seem lower levels of growth since. Figure 3a reports growth rates whereas Figure 5 reports growth levels.

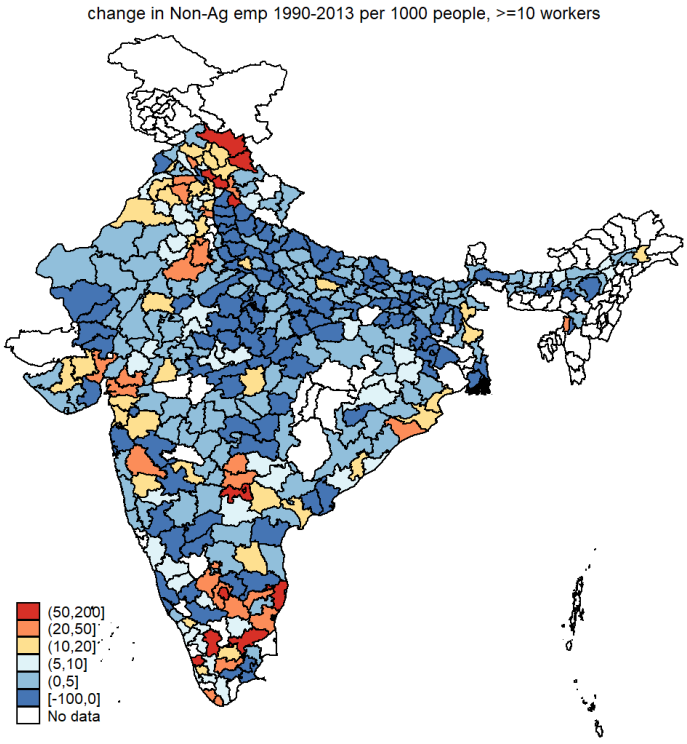


Figure 6: Change in district-wise employment (non-agriculture) per 1000 people, between 1990 and 2013, counting firms that employ ten or more people.

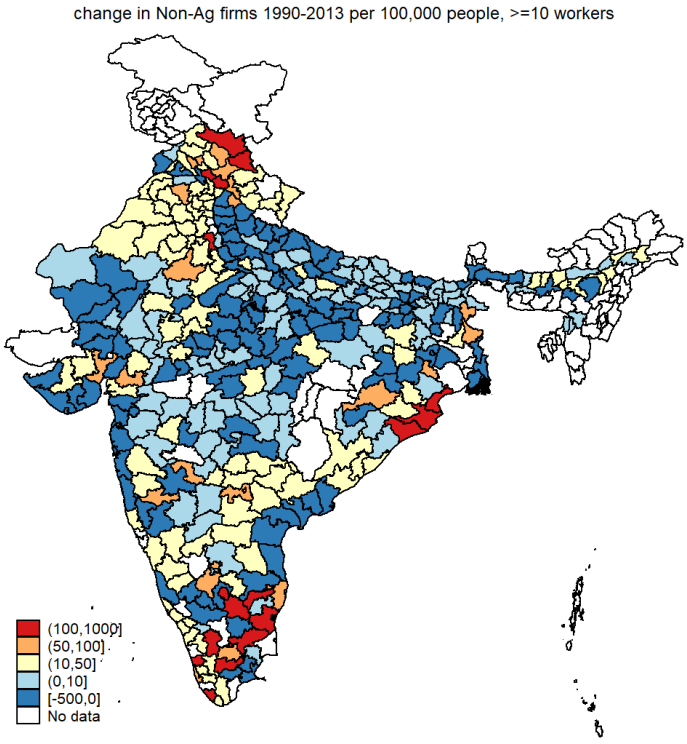


Figure 7: Change in district-wise number of firms (non-agriculture) per 100,000 people, between 1990 and 2013, counting firms that employ ten or more people.

To that end, Figure 6 documents the change in non-agriculture (non-ag) employment between 1990 and 2013, using the measure as a proxy for the evolution of non-agriculture economic activity across Indian districts. Since districts differ in their population, the employment change in each district is normalized by its population (in thousands). The 'heat map' depicts the net non-ag employment change between 1990 and 2013 (per 1000 people) where the non-ag employment declines for districts in dark blue while it only marginally increase for the districts in light blue (net change in non-ag employment is less than 5 (per 1000 people) for the light blue districts).

Figure 7 presents a similar 'heat map', but for the growth in number of firms between 1990 and 2013 that employ ten or more people, per 100,000 people in the district. A higher normalization factor is used because firm growth is obviously much smaller than employment growth. Again the sea of blue signifies a a decrease in the number of productive firms in a large number of districts.

Taken together, the two maps suggest that a vast majority of Indian districts have undergone either stagnant or almost a reversal of structural transformation in last 3 decades. Again, the drivers of growth are concentrated, and arguably the positive externalities generated by them have led to a rise in per capita growth across the country.

7 Conclusions

At a high level, India's development trajectory seems an outlier on many counts. India attempted industrialization before investing enough to increase agriculture productivity. As per canonical models of structural transformation or the arguments made by Studwell (2013), this process was bound to choke off and thus is consistent with data.

However, India's growth since about 1985 has been spectacular. Even more spectacular is the fact that India started specializing, at the turn of the century in– producing and exporting – high-skilled manufacturing such as pharmaceuticals and cars, and high-skilled services, especially those driven by information technology (see Rodrik and Subramanian (2004); Lamba and Subramanian (2020); Chatterjee and Subramanian (2020) for an overview.)

On the spatial front, unlike the post-war industrialization period in the US economy (see Barro and Sala-i Martin (1992); Eckert and Peters (2022)) or the recent growth experience of China (Fang and Herrendorf, 2021), India is witnessing spatial divergence. Furthermore, today when the US is experiencing regional divergence (Giannone (2017); Eckert et al. (2022)), it is also witnessing a depopulation of regions with little economic activity. India is not.

A lot more research – both theoretical and empirical – is needed to understand India's development trajectory and what is in store for the future of its spatial growth. However, as long as the pattern of future economic growth of India is consistent with its past, i.e. driven by high-skill services or manufacturing, it is most likely to increase regional inequality. Such inequality-inducing growth will throw up interesting challenges for democracy and federalism and may at times be in conflict with

other economic objectives such as redistribution and even efficiency.

For how long will states like Maharashtra, Telangana, Karnataka, and Tamil Nadu continue to "bail out" Bihar and Uttar Pradesh? Is that even a fair statement for a union of states, especially since many of the poorer states supply, perhaps increasingly so, cheap labor for industrialization and services in the richer ones? Given the delicate political economy associated with the impending redistricting of electoral constituencies, will states demand that the nature of democracy change from proportional representation in terms of population to account for contribution to GDP? How will regional preferences be aggregated in a more unequal India? Will richer states also ask for a larger share of resources from the center?

We are already witnessing some of these cleavages. Last year the state of Telangana locked horns with the central government over the procurement of paddy at MSP by the Food Corporation of India. As is well-known, since the green revolution the output subsidies for paddy and wheat have mostly gone to the states of Punjab and Haryana. Over time more and more states have claimed a share of this pie. With a bountiful harvest in 2021, Telangana pressed the center to increase rice procurement further. For now, a cash-strapped center has resisted but it is only a matter of time before the situation could worsen.

There have also always been protests in states like Maharashtra against labor migrating from the northern states. Such fissures will widen as income gaps between regions open up further. How do you box a linguistic or regional cultural identity with inward mass migration of labor? The challenge of maintaining the balance between regional and national objectives, preserving federalism, and the nation-state is thus bound to increase. Economics of regional inequality could have profound effects on culture, democracy, and in turn the economy.

8 Data appendix

Figure 1

Chatterjee et al. (2023) collect time-series sub-national (at the state level) GDP data and population on a broad set of 34 countries that account for more than 70% of world's GDP. The starting years differ across countries. Advanced countries like the US start fairly early in the 1950s and India in the 1980s. Besides Africa, the dataset has good coverage across all other contitnents.

In figure 1a each observation is a country x year. The above data is used to calculate spatial inequality for each country for different years as the coefficient of variation in its sub-national GDP per capita for a particular year. This is plotted against the real GDP per capita of that country to understand the evolution of spatial inequality within a country over development time.

In figure 1b each observation is a sub-national region within a country. The idea of the graph is to check whether the sub-national regions that have lower GDP are also less populated. Since this is a cross-sectional relationship, the numbers are averaged over the last two years in the sample, 2015–2017. For the x-axis the GDP per capita of the sub-national regions is normalized by the GDP per capita of the median region in that country. This normalization facilitates a comparison of countries on the same scale. The figure then plots the relationship between the share of population and the (normalized) GDP per capita across sub-national regions within a country.

Figure 2

The state GDP and population data is taken from Handbook of Statistics on Indian States published by Reserve Bank of India. The net state domestic product at factor cost (constant price) is used as the measure of state GDP. A consistent time series of State level GDP, accounting for multiple base year changes in last 3 decades, is constructed. Further, all north-eastern states are combined together and "north-east" counts as one state in the analysis. For each year on the x-axis, the average annual growth in per capita state GDP over next 10 years is regressed **against** the log of per capita state GDP in that year. The β coefficient from the regression along with the 95 percent confidence interval is plotted for each initial year from 1993 till 2009. A positive β implies that initially richer states grow at a higher rate over next 10 years.

Figure 3 a

The state GDP and population data is taken from Handbook of Statistics on Indian States published by Reserve Bank of India. The same steps as in figure 2 are repeated to create a time series of state level per capita GDP. The post 2000 time period is divided in two 9 year intervals (2000-2009 and 2010-2019) and states are evaluated based on the annual per capita GDP growth in each interval. More specifically, for each state the number of years the annual per capita GDP growth was above 4 percent during the first period (2000-2009) is plotted on X axis and the number of years the average growth was above 4 percent during the second period (2010-2019) is plotted on Y axis). The red lines at 6 years

on each axis partition all states into four groups which exhibit one of following: sustained growth, growth acceleration, persistent low growth and growth slowdown.

Figure 3 b

The state GDP, population and the sector wise state GDP is again taken from Handbook of Statistics on Indian States published by Reserve Bank of India. The graph is a scatter-plot of the standard deviation of annual per capita GDP growth for each state between 2000-2019 against the mean per capita GDP of that state in same duration. In the scatter-plot, each state is represented as a circle where size of the circle is proportional to the share of agriculture in the state GDP. Two linear fit lines, one for all the states (solid line) and the other (dashed line) excluding Bihar, are drawn to show how growth is more volatile in the poorer states.

Figure 4

The sector wise state GDP is again taken from Handbook of Statistics on Indian States published by Reserve Bank of India. The sustained growers are defined to be those states which achieve at least 4 percent per capita growth for 6 years or more in both the 9 year intervals(i.e. both in 2000-2009 and 2010-2019). Based on the above criterion, following states are sustained growers: gujarat, haryana, himachal pradesh, karanatka, kerala, uttarakhanda, andhra pradesh, tamilnadu, maharastra, orissa. Sustained growers and all other states are combined in two groups and for both groups value-added in following three sectors is computed: Agriculture, Manufacturing and High value Services (professional services which includes IT and IT enabled services and finacnial services). Finally, the share of each of these sectors in the total value-added is computed for both groups. The value added shares do not add to 1 for either group because we only consider two high value services (professional and financial services). Other services account for similar value added share in both groups and our aim to highlight the differences in the sectoral composition of economic activity in between sustained growers and all other states.

Figure 5

The district level per capita GDP data is taken from the "District Level Data for India" of ICRISAT. The per capita district GDP in year 2011 at the current prices is used as measure of district per capita GDP. Foe each district, its relative per capita GDP is computed by dividing the district per capita GDP by the national per capita GDP. Darker shades of red indicate that the district has higher per capita output, relative to the national average.

Figure 6

This map plots how the non-agriculture employment (in firms with at least 10 workers) has changed between 1990 and 2013 at the district level. The non-agriculture employment in each district is computed from the third and sixth Economic Census (year 1990 and 2013 respectively). It is worth noting that the Economic Census is supposed to capture the universe of all non-Ag economic activity. The

map represents the change in the non-Ag employment for each district between 1990 and 2013, normalized by the district population. In the map, darker shades of red denote greater increase in non-Ag employment while the districts in dark blue see a net decline in non-Ag employment.

Figure 7

This map plots how the total number of non-agriculture enterprises have changed between 1990 and 2013 at the district level. the total number of non-agriculture firms in each district is computed from the third and sixth Economic Census (year 1990 and 2013 respectively). It is worth noting that the Economic Census is supposed to capture the universe of all non-Ag economic activity. The map represents the percentage change in number of firms for each district between 1990 and 2013. In the map, green denotes increase in number of non-Ag firms while red indicates fewer firms in 2013 relative to 1990.

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