

India's Convergence Conundrum

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Introduction

Economic convergence, as a concept, has been at the heart of several discussions in the growth literature. Neo-classical growth theories argue that countries with low levels of per capita income tend to 'catch-up' with countries having a higher level of per capita income. These theories posit that diminishing returns to capital in richer countries, on account of their higher capital-labor ratios, leads to greater capital accumulation in poorer countries and becomes a channel of convergence. Thus, all countries will eventually end up at the same long-run steady state growth path (see Solow 1956). In the last couple of decades, this unconditional convergence hypothesis has taken a backseat and the concept of conditional convergence and resulting convergence clubs have become the focal point. This hypothesis limits convergence to countries having similar characteristics, and thus, allows for groups or clubs of countries to attain different steady state growth paths. In this study, we try to address convergence among 17 largest Indian states, in both economic and social aspects and bring to light some of the channels through which this seems to be working.

Globally, the discussion on convergence was kindled by William Baumol's (1986) seminal paper, which empirically found that industrialized countries had converged in their productivity levels since 1870. This analysis led to the belief that in the long run, developing countries would eventually catch up with developed ones. Yet, this study was later criticized for a selection bias (De Long 1986). Most of the countries in the study were ex-post rich and extending the analysis to more countries led to unclear results for convergence.

Since then, there has been a plethora of research within and across countries and time testing for convergence and India is no exception.

In India, the debate of convergence between the states was propelled, in earnest, by the Economic Survey 2016-17. It documented a slew of stylized facts which showed divergence in economic outcomes between Indian states, in contrast to current trends in numerous other countries against which India is compared to. Contrary to the economic outcomes, however, the survey showed convergence in health outcomes, like life expectancy and infant mortality rate.

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The literature on convergence in India does go back to the early nineties. Cashin and Sahay (1996) were the first to formally test the hypothesis of convergence in India. Studying 20 Indian states from 1961-91, they found presence of income convergence albeit at a slow rate of 1.5% annually. Yet, later studies have gone on to challenge this hypothesis. Rao, Shand, and Kalirajan (1999) found that per capita GDP between Indian states actually diverged, between 1964 and 1994. They restricted their sample to only the 14 major states in India, excluding the small and special category states. Interestingly, they found that divergence actually decreased prior to 1991, before increasing again in its immediate aftermath. This result is corroborated by the recent work of Chakravarty and Dehijia (2017) who extend the analysis to districts of the 12 largest states. They mark 1991 as the watershed year for both intra and inter-state income inequality, suggesting strong divergence in the post reform period as opposed to mild convergence before that.

Are Indian states converging economically?

We begin our analysis by revisiting the much talked about divergence in incomes amongst Indian states. We include 17 largest Indian states¹ (in terms of population) for a 17 year period of 2000-2016 for our analysis. Data has been collected from Database on Indian Economy (DBIE), Reserve Bank of India (RBI). Figure 1 shows the scatter plot for per capita Gross State Domestic Product (GSDP) growth rates (%) of the states. For states to converge in their per capita incomes, the fit of the plot should be negatively sloped. But, the plot shows a clear positive relationship between the average per capita growth rate and the state's per capita GSDP in 2000. States like Gujarat, Kerala, Haryana and Maharashtra which were richer to start off with experienced higher average growth rates than initial poorer states like Chhattisgarh, Uttar Pradesh and Assam.

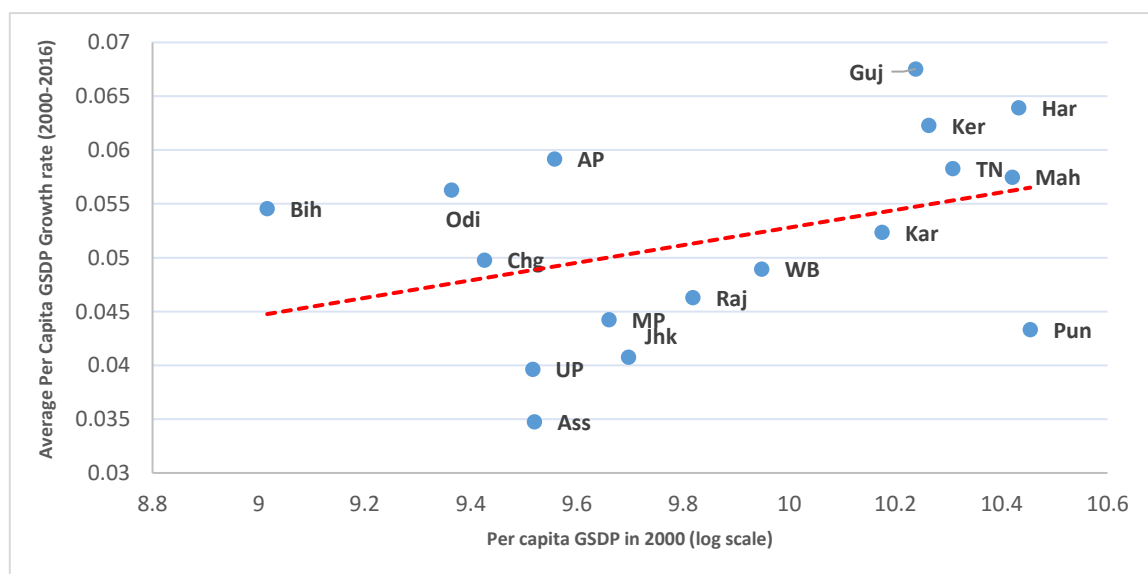


Figure 1: Economic divergence in India for the period 2000-2016

Figure 2 compares the per capita GSDP (log scale) of the 5 richest states and the 5 poorest states in 2000. The two lines comparing the GSDP in richest and poorest states run parallel to each other and have a similar slope clearly contradicting the convergence hypothesis. In the world of convergence, we expect a very different picture, where the GSDP of poorer states has a greater slope, gradually closing the gap with the rich states. Nothing in this regard is seen in India and the findings lend further support to the absence of any economic convergence between Indian states.

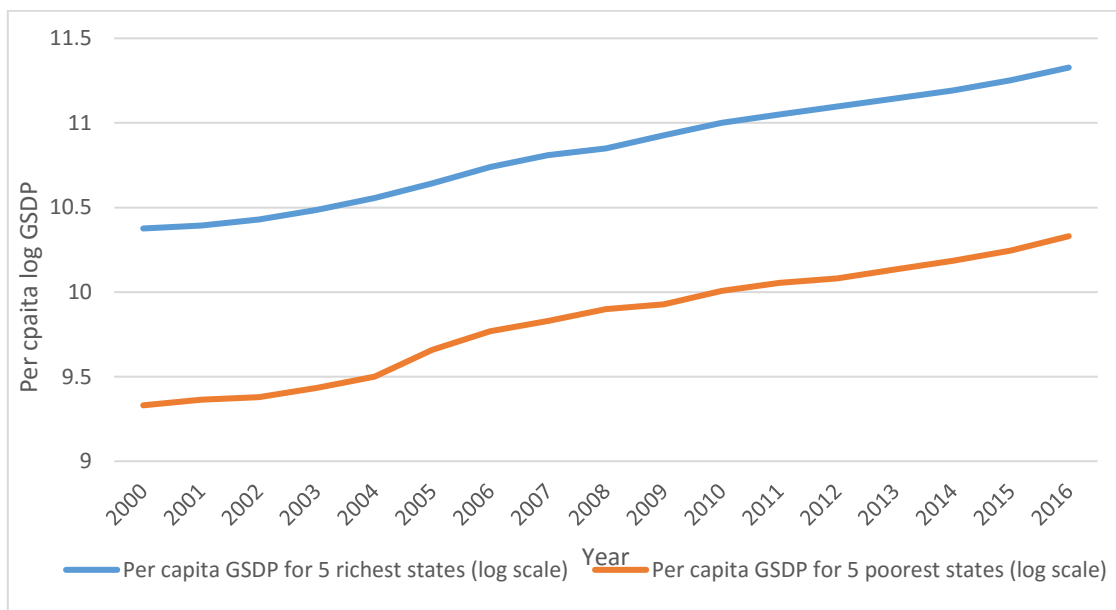


Figure 2. Comparing the output level in rich and poor states

What about social outcomes?

After establishing the fact that the poor states are lagging behind in the growth race, we move on to analysing how states have fared in social outcomes. Previous studies have found Indian states to be converging in health outcomes like life expectancy and total fertility rate (Economic Survey 2016-17) and in gender outcomes like sex ratio (Economic Survey 2017-18). We extend this analysis to education outcomes, by analysing the Annual Status of Education Report (ASER) reports² from 2006-2014 on the same 17 states. These reports delineates the state-wise performance in several learning parameters of rural education, and we believe these are a useful measure of the status of education in India.

Figure 3 shows the scatter plot for enrolment rates of the states. The plot shows a clear negative relationship between change in average enrolment rate for the period 2008-14 and the state's initial enrolment rate in 2007. States at a high level of enrolment like Kerala, and Tamil Nadu did not gain much, while states with low enrolment rates like Bihar, and Rajasthan improved significantly, catching up with the higher enrolment states in the process. We find a similar pattern for literacy rate over the last two decades, as states with lower literacy levels have made rapid progress recently. Thus, after observing health, gender, and educational outcomes, India seems to be observing social convergence. This conundrum of convergence in social outcomes,

and divergence in economic outcomes has been observed in some other countries like Colombia (Garcia and Royuela 2015), though the literature has been largely silent on the underlying causes behind this phenomenon.

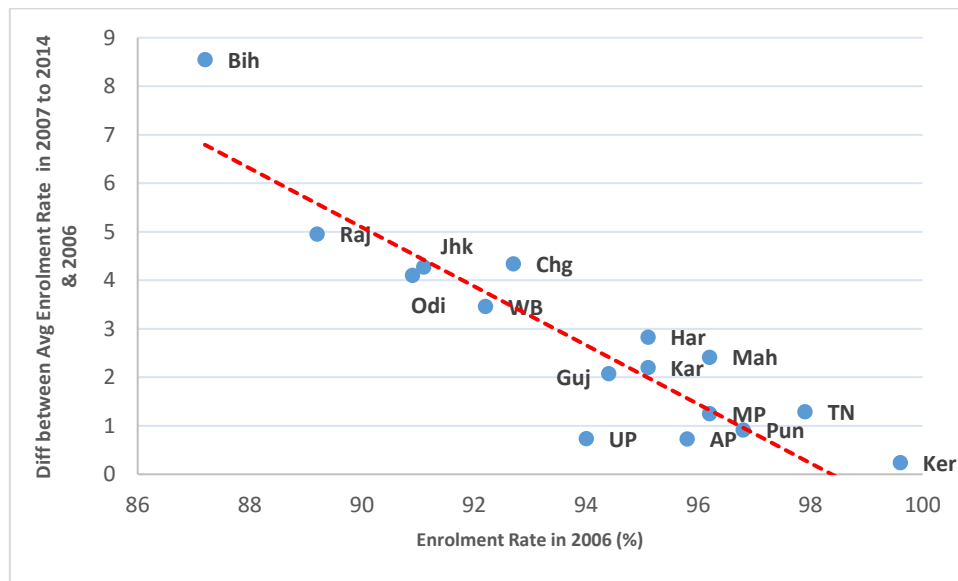


Figure 3: Convergence in school enrolment rate across states

One of the possible reasons for convergence in social outcomes is the upper bound of 100% on many of these ratios. (Economic Survey 2016-17). Yet, we bring to attention a far more interesting trend in the convergence of educational outcomes. Figure 4 shows the trend in arithmetic and reading abilities of Class III and Class V students in the states under study. The negative slope indicates that states are catching up in their education abilities. However, a look at the y-axis on each of these graphs shows a worrying trend. Most of the states have seen a large fall in educational abilities over the time horizon, and thus, when we say convergence is happening in educational outcomes, it seems to be the result of a deterioration in quality across well-off states, instead of an improvement in worse-off states. Hence, while human capital is expanding in most states, the average quality of human capital may be facing serious threats and convergence in broad social outcomes is presenting an overly optimistic picture of development in our poor states.

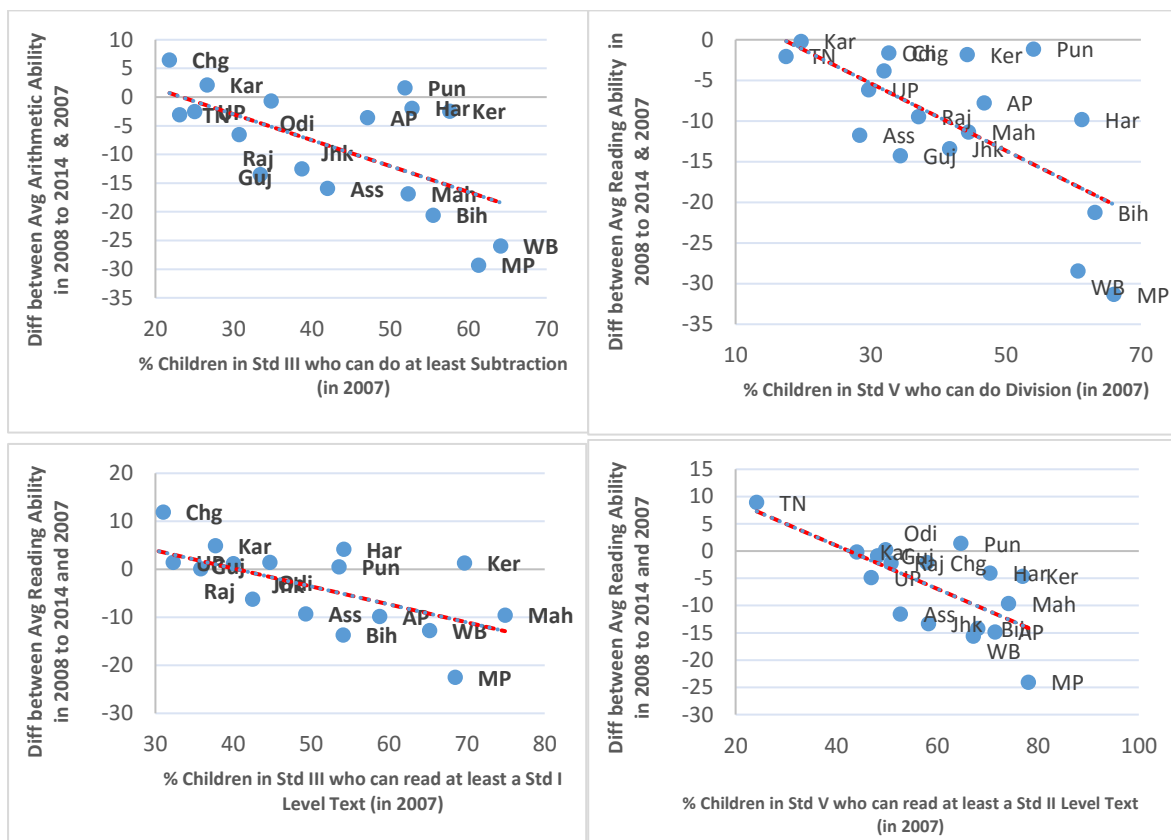


Figure 4: Declining quality of education outcomes

Marginal Product of Capital

The failure of our low income states to outshine the richer states in economic growth, puts into spotlight the hypothesis of diminishing marginal product of capital. It is well documented that capital-labor ratios differ significantly across countries with rich nations employing considerably more capital per worker (Caselli and Feyrer 2007). If the distribution of capital in the world is efficient, all economies should roughly enjoy a similar MPK. As discussed above, this is rarely true and similar countries seem to be converging. But, when we analyse the allocation of capital and MPK in the industrial sector across Indian states, we find results contradictory to conventional wisdom. In Figure 5, we plot the average capital-labor ratio³ for the period 2000-01 to 2015-16 against per capita GSDP of states in 2000. The plot suggests that the average ratio has been similar for states, and in fact, a mild negative trend emerges. Poorer states in India appear to be employing more capital per worker. This would suggest that marginal product of capital is higher in richer states. And Figure 6 validates exactly this.

To calculate MPK, we use a simple Cobb-Douglas function of production ($Y_i = A_i K_i^\alpha L_i^{1-\alpha}$) and assume the total factor productivity to be constant across states i.e. $A_i = A=1$. We further set the value of capital share in income (α) at $\frac{1}{3}$ as documented in previous studies (Gollin 2002). It is clear from the figure that richer states have enjoyed a relatively higher return on capital over the time period in consideration. It is not far-fetched to expect that returns would

be even higher if we allow the total factor productivity to vary across states (Chanda 2011). Since, richer states have easier access to better technology, it is quite likely that MPK values in Figure 6 are underestimated for the richer states. Thus, it hardly comes as a surprise that most of the Foreign Direct Investment (FDI) in India is cornered to the high income states, enjoying a higher MPK. Affluent states like Maharashtra, Karnataka, Tamil Nadu and Gujarat alone account for more than 50% of FDI flows in India during April 2000 to September 2017 (CARE Ratings, 2017).

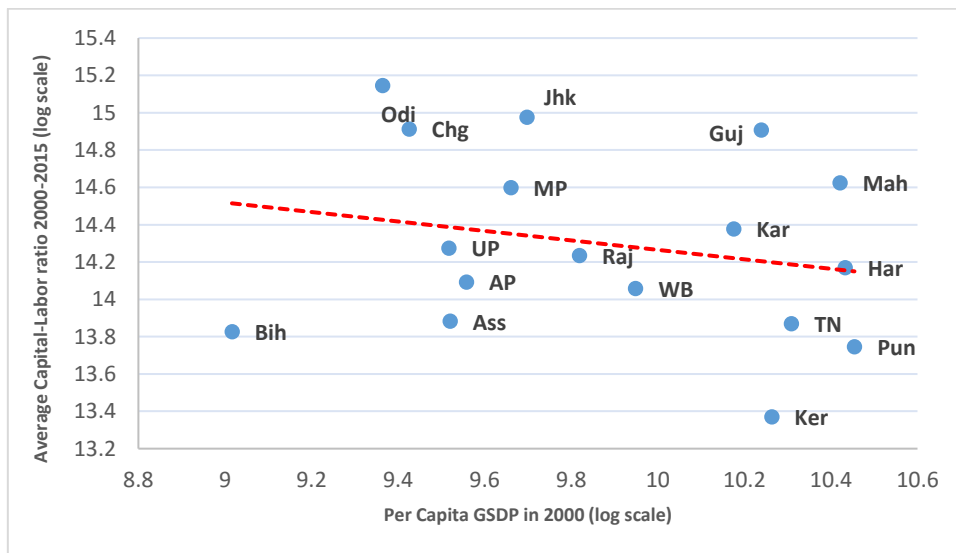


Figure 5: Average capital-labor ratio (2000-2015) across states

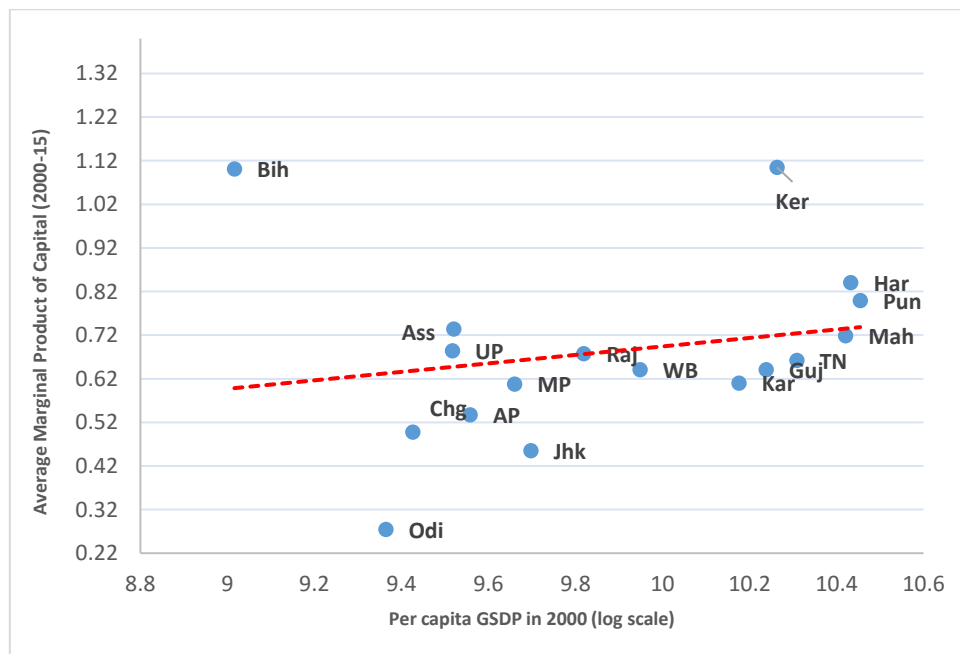


Figure 6: Average Return on capital (2000-2015) across states

Reforms, Decentralisation and Divergence

Economic Survey 2016-17 portrays the regional divergence in income levels of India to be an anomaly, in contrast to regional convergence in the rest of the world. Yet, when we look at countries which have undergone similar significant structural transformations in the recent past, we find that they too faced increasing regional income divergence in the aftermath of those reforms. In China, the economic reforms of 1978 were followed by increased regional inequality, with the coastal provinces growing more rapidly than the poorer inner provinces (Lemoine 2014). It was only through preferential government policies, and a surge in labor productivity, that the inner provinces have been catching up with the coastal provinces since the early 2000s. Similarly in Russia, the economic reforms after the collapse of the Soviet Union in 1990s were followed by increasing regional economic divergence (Lehmann and Silvagni 2013).

Chakravarty and Dehejia (2017) mark 1991-92 as a turning point, when the Indian growth story tilted from convergence to divergence. They classify economic liberalisation of 1991 as a potential cause behind the phenomenon. But what is, perhaps, missing in the Indian convergence literature is the mention of decentralisation reforms of 1992-93. The 73rd and 74th Amendments to the constitution in 1992, gave a statutory recognition to the rural and urban local governments respectively. Furthermore, it became mandatory for the states to form State Finance Commissions and plan on the allocation of funds to the local bodies. Studies in some countries have linked fiscal decentralisation with divergence in regional growth. Tirtosuharto (2013) finds that the introduction of decentralisation reforms in Indonesia in 2001, exacerbated regional inequities, contrary to the purpose of decentralisation itself. Similarly, in both China and Russia, economic divergence seems to have risen initially post introduction of decentralisation reforms, before gradually coming down.

Does this mean that convergence follows a U-shaped curve post reform period? Such a scenario should reflect a better economic performance in poor states in more recent times. A relook at MPK , but this time only considering the recent 5 year period of 2011-12 to 2015-16(Figure 7), seems to be indicating that the wedge in returns between the rich and poor states in on the decline. Although, returns are still higher in richer states, the line has become flatter when compared to Figure 6.

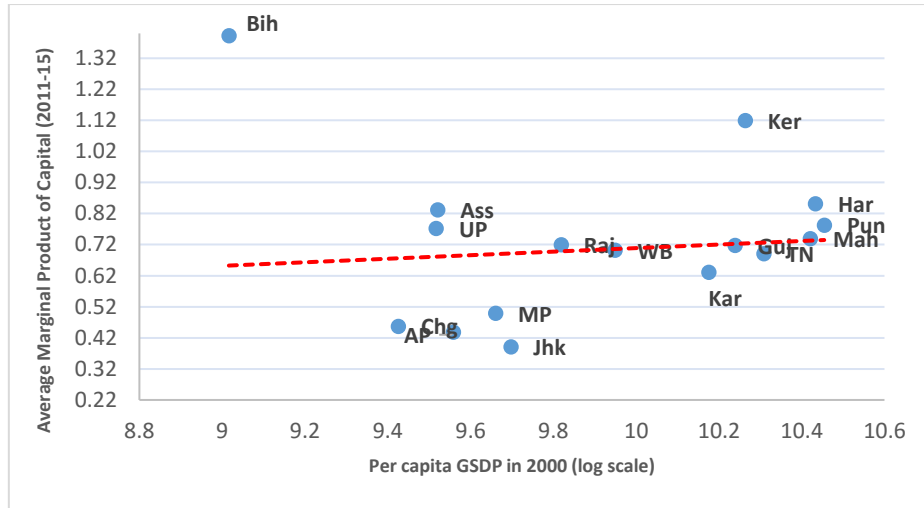


Figure 7: Average Return on capital (2010-2015) across states

This does suggest that the incidence of divergence is losing steam, but making any predictions on when convergence will happen might be chasing tail. Although the findings do instil an optimistic outlook for the future of growth in poor states, strong policy interventions as implemented by China are absolutely crucial. If we just wait for time and markets to take their due course, the process may be painstakingly slow and the damage irreversible.

Notes:

- 1) States included are Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal.
- 2) ASER is an annual household survey, conducted annually since 2005, and designed by ASER Centre, the research and assessment arm of Pratham. It aims to provide estimates of children's enrolment and basic learning levels for each district and state in India.
- 3) Capital-labor is calculated by dividing total invested capital (fixed capital + physical working capital) by the total number of workers employed in the industry in a particular state. Data is available till 2015-16 from DBIE, RBI.

References:

Baumol, William J (1986): "Productivity growth, convergence, and welfare: what the long-run data show," *The American Economic Review*, 1072-1085.

Care Ratings (2017): "Foreign Direct Investment in India," Retrieved from <http://www.careratings.com/upload/NewsFiles/Economics/FDI%20in%20India.pdf>

Caselli, Francesco and James Feyrer (2007): "The marginal product of capital," *The quarterly journal of economics*, 122.2: 535-568.

Cashin, Paul and Ratna Sahay (1996): "Internal migration, center-state grants, and economic growth in the states of India," *Staff Papers*, 43.1: 123-171.

Chakravarty, Praveen and Vivek Dehejia (2017): "Will GST exacerbate regional divergence," *Economic and Political Weekly*, 52.25&26: 97-101.

Chanda, Areendam (2011): "Accounting for Bihar's Productivity Relative to India's: What can we learn from recent developments in Growth Theory," *Techn. Rep*, 11: 0759.

De Long, J Bradford (1988): "Productivity growth, convergence, and welfare: comment," *The American Economic Review*, 78.5: 1138-1154.

Gollin, Douglas (2002): "Getting income shares right," *Journal of political Economy*, 110.2: 458-474.

Ministry of Finance, Government of India (2017a): "Economic Survey 2016–17," New Delhi, MoF, Department of Economic Affairs, Economic Division, January.

- (2018a): "Economic Survey 2017–18," New Delhi, MoF, Department of Economic Affairs, Economic Division, January.

Lehmann, Hartmut and Maria Giulia Silvagni (2013): "Is there convergence of Russia's regions? Exploring the empirical evidence: 1995-2010,"

Lemoine, Françoise, et al (2014): "The Geographic Pattern of China's Growth and Convergence within Industry," No. 2014-04.

Rao, M Govinda, Richard T Shand and Kali P Kalirajan (1999): "Convergence of incomes across Indian states: A divergent view," *Economic and Political Weekly*: 769-778.

Royuela, Vicente and Gustavo Adolfo García (2015): "Economic and social convergence in Colombia," *Regional Studies*, 49.2: 219-239.

Solow, Robert M (1956): "A contribution to the theory of economic growth," *The quarterly journal of economics* 70.1: 65-94..

Tirtosuharto, Darius (2013): "Regional Inequality in Indonesia: Did Convergence Occur Following the 1997 Financial Crisis?."