

A meta-analysis on the effects of internal migration on economic growth and convergence in the Indian states

Sazzad Parwez¹ and Manas Kumar Pedi²

Abstract

This paper examines the trajectory of internal migration and its impact on growth leading to convergence in India. The analysis is based on secondary data sourced from the Reserve Bank of India, Census and Economic and Political Weekly Research Foundation. It captures the data for a period of 20 years (1991-2011). An initial review indicates internal migration in the form of intra-state migration is very high compare to inter-state migration. The analysis of convergence/divergence suggests dispersion among states has increased in the concerned period. Similarly, absolute β -convergence indicate that rich states are growing faster than poor states. However, when conditional convergence is tested by various variables, conditional convergence among states is evident. However, migration and literacy rate as important indicator not producing the expected results, as migration which is expected to be negatively correlated to economic growth, is positive. The coefficient of the initial level of per capita income is found to be statistically significant, implying conditional convergence across Indian states during 1991-2011. Further, policy makers need to consider migration, literacy rate, investment, and population growth as means to reduce economic disparities among states. Moreover, migration should be encouraged for economic growth and broader convergence.

Keywords: *Convergence; economic growth; India; internal migration*

Introduction

Migration is considered as the movement of people from one place to another and often involve crossing administrative boundaries due to any reason (voluntary or involuntary in nature) in a given period (United Nation, 2002; Srivastava, 2012; and Bhagat, 2016). This movement of people involves various causes and consequences for both sending and receiving regions, causing changes in the labour market, income, consumption, and investment patterns (Srivastava & Sasikumar, 2003; Parwez, 2016a).

Migration affects economic growth and convergence³. According to the neoclassical growth model (Solow-Swan model, 1956), it is an adjustment mechanism, an equilibrating force that narrows the gap between regions as people move from low-income regions to high-income regions. This equalises the capital to labour ratio leading to higher income per capita (Fratesi and Percoco, 2014; Kubis and Schneider, 2015) based on the assumption that people are free to move, labour is homogenous and there is diminishing return to labour. Hence, labour and

¹ Sazzad Parwez, School of Development Studies, Indian Institute of Health Management Research University, Jaipur, Rajasthan-302029, India.

E-mail: sazzad.parwez@gmail.com.

² Manas Kumar Pedi, Centre for Studies in Economics and Planning, School of Social Sciences, Central University of Gujarat, Gandhinagar, Gujarat- 382030, India. E-mail: pedimanaskumar2@gmail.com.

³ Convergence is defined as the process of faster growth of poorer regions compared to region of higher one during the transition path of steady state.



capital tend to move in the opposite directions to reduce spatial inequalities of capital per unit of labour, as well as income.

In other words, migration from an impoverished region to a prosperous region tend to lead to the transfer of capital from the destination region and increases capital in the region of origin, hence accelerate regional convergence (Polese, 1981; Ozen et al., 2010). Further, Barro and Sala-i-Martin (2004) stress that migration is critical for convergence, and if the endogeneity of migration in growth regressions is controlled, then the estimated beta coefficient (the effect of income on growth through the movement to the steady-state growth) should be smaller in regressions including migration variable. So, the same amount of goods is produced everywhere with similar technology and labour with population growth and net inward migration, tend to reduce the rate of growth.

Despite the theoretical expectation, the empirical evidence for the impact of migration on economic convergence is inconsistent. Ozgen et al. (2010) also emphasise on the inconsistency of literature with a diverse narrative on the topic. Some empirical studies (Wolszczak-Derlacz, 2009; Kirdar and Saracoglu, 2008) have found a significantly positive impact of migration on economic convergence while others (Ponton, 1995, Barro and Sala-I-Martin, 2004; and Gezici and Hewings, 2004) did not. Moreover, others, including Ostbye and Westerlund (2007), Peeters (2008) and Bunea (2011) have found negative relations, emphasising the fact that migration has accelerated regional disparity and contributed to regional divergence.

Since economic reforms in 1991, India's economy has undergone some fundamental policy changes, including fiscal and monetary approach via/in Reserve Bank of India, commercial policy, capital market and so on. As a result, the economic GDP growth grew manifold and growing rapidly to become modern and globally integrated (Ghosh, 2008; Bhagat, 2010). This amount of consistent economic growth has also enhanced macroeconomic stability⁴. According to the World Bank (2018), India's economic growth is remarkably stable and robust since the introduction of reforms in 1991. India is expected to remain one of the fastest growing economies in the coming decade.

These changes have also catalysed massive internal migration from economically backward states to economically growing or developed states (Srivastva and Sasikumar, 2003; Bhagat, 2010; Parwez, 2016b). Therefore, a better understanding of internal migration and convergence in India is critical.

There are several studies (Nagaraj et al., 1998; Ghosh and De, 1998; Aiyar, 2001; Sing and Srinivasan, 2002; Adabar, 2004; Ghosh, 2008; Gunji et al., 2010, Chikte, 2011; and Cherodian et al., 2012) analysing the complex relationship of migration with convergence reflecting on regional economic disparities, which is a highly unexplored subject⁵ in India. While Roy and Debnath (2011), Parida, Mohanty and Raman (2015) and Zachariah and Rajan (2016) have examined the macroeconomic impact of out-migration at the national and state levels.

This study examines the trajectory of internal migration in India and its impact on economic growth leading to convergence. It draws conclusions on the role of internal migration on the convergence path and economic growth. The study has been organised as follows. The

⁴ India Development Update (2018), The World Bank.

⁵ Only one paper Cashin & Sahay (1996) that have analysed impact of migration on regional convergence.



following section presents conceptual references, followed by the data and methods section. Then, we move to analyse trends in internal migration in India since the 1991 economic reforms and subsequently, we discuss the results and present conclusions and suggestions.

Conceptual framework

Orthodox equilibrium theory (Solow-Swan, 1956) predicts that economic disparity between regions should be converging to a common level if savings, investment, population growth and access to technology remains the same. As the neoclassical assumption of diminishing returns to capital implies, marginal product of capital in poor regions should be higher to that of developed regions. Moreover, in the transition period, poorer regions will have growth rates higher than developed regions while converging to a similar steady-state level. Furthermore, the neoclassical growth theory suggests that growth in income is positively related to the time taken to achieve a steady state and negatively associated with the initial income per capita.

Barro and Sala-i-Martin (1992) defined two approaches for economic convergence that 1) the traditional sigma (σ) convergence and 2) beta (β) convergence. The σ -convergence implies that, with a decline in cross-sectional dispersion of per capita income over a period and the β -convergence implies underdeveloped regions to grow faster than the developed regions. Further, the beta convergence is divided into absolute and conditional convergence. Absolute and unconditional convergence tend to assume there are no structural disparities between the regions and all regions tend to converge to the same stationary level of income in the long run. On the other hand, conditional convergence considers structural characteristics of regions.

However, in practice, each region tends to converge to a different level of steady-state. Therefore, it is necessary to introduce a proxy variable for the constant steady-state, so, we have introduced migration and tested its role. According to Barro and Sala-i-Martin (2004), if migration fastens convergence, then the rate of convergence should be lower than the absolute convergence and the impact of migration on the long-run growth rate would be negative.

Data and methods

The study is empirical and mainly based on secondary data. The data is sourced from the Economic and Political Weekly Research Foundation (EPWRF), Reserve Bank of India (RBI) and Census. The study covers the period of 20 years since economic reforms (1991-2011). But data on migration is available only up to 2011, is a limiting factor. Migration data was collected for 15 major Indian states such as Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal⁶. These states account for about 95 percent of the country's population and 90 percent of total income. The NSDP (Net-state Domestic Product) data collected from EPWRF for the same period. The time-series data of four different prices of 1980-81, 1993-94, 1999-00 and 2004-05 is converted to one price for 2004-05 and subsequently, the analysis is done. The price conversion is done by using price deflator (i.e. 1980-81 to 1993-94, 1993-94 to 1999-00 and 1999-00 to 2004-05). However, the data is not

⁶ Importantly, the states such as Andhra Pradesh, Bihar, Madhya Pradesh, and Uttar Pradesh are taken as undivided for comparison purpose.

exactly comparable as data is unable to capture changes in production structure, technology, and other structural over the period (Bhattacharya and Saktivel, 2004).

Moreover, the correction in interstate price variation is not possible as price deflator of each state is not available. Credit extended by schedule commercial bank has been sourced from RBI and used as a proxy for private investment. The data are converted to constant price by deflating with GDP deflator. Then taking into ratio to the population makes data ready to be used for analysis. Similarly, literacy rate and population data have been taken from EPWRF and RBI, respectively. And internal migration data has been taken from the 1991 Census, 2001 and 2011 for each state.

Further, σ -convergence has been calculated with a standard deviation of real per capita income, which measures cross-sectional dispersion of income over a period. With a reduction in dispersion over the period, the process of economic convergence prevails, and the other side reflects on divergence. Hence, the following equation has been used to test sigma convergence.

$$\sigma_t^2 = \left(\frac{1}{n}\right) \sum_{i=1}^n [\ln(y_{it} - \tilde{\mu})^2 \dots\dots\dots (1)$$

To estimate absolute β convergence following equation has been used

$$\frac{1}{t} [\ln(y_{it}) - \ln(y_{i0})] = \tilde{\alpha} - \frac{1}{t} (1 - e^{\beta t}) \ln(y_{i0}) \dots\dots\dots (2)$$

Where the left-hand side of the equation (2) represents the growth rate of per capita real income in i states during period t_0 and t , i denotes 15 states. In the right-hand side $\tilde{\alpha}$ represents steady state of states that is taken as constant and β measures the rate of convergence and $\ln y_{i0}$ measures the previous year per capita income. If the $\beta > 0$, then there is convergence among states, low-income states are growing with higher rate to high-income states, and vice-versa.

To measure the conditional convergence following equation has been used, where net migration with investment, literacy rate and population have been introduced as explanatory variables in the model.

$$\frac{1}{t} (\ln y_{it} - \ln y_{i0}) = \tilde{\alpha} - \left(\frac{1-e^{\beta t}}{t}\right) \frac{\alpha}{1-\alpha} \ln y_{i0} + \left(\frac{1-e^{\beta t}}{t}\right) \frac{\alpha}{1-\alpha} \ln s_{it} + \left(\frac{1-e^{\beta t}}{t}\right) \frac{\alpha}{1-\alpha} \ln h_{it} + \left(\frac{1-e^{\beta t}}{t}\right) \frac{\alpha}{1-\alpha} \ln m_{it} - \left(\frac{1-e^{\beta t}}{t}\right) \frac{\alpha}{1-\alpha} \ln(n_{it} + g + \delta) + \varepsilon_{it} \dots\dots\dots (3)$$

In the equation (3), y_{it} is per capita income, $\ln s_{it}$ represents saving or investment (credit extended by commercial banks), $\ln h_{it}$ represents human capital (literacy rate) m_{it} represents net migration. And it is expected that human capital, investment, and migration will positively affect the growth and population growth and population growth will negatively affect the growth rate.

Internal migration in India from 1991 to 2011

Indian constitutions consider free mobility as a basic right and guaranteed for every citizen to live and earn a livelihood of their own choice. But historically, migration in India is low, particularly till 1990, implied to slow and low economic development process (Davis, 1951; Bhagat, 2016; Munish and Rosenzwing 2009; and Remesh, 2016). Is the outcome of the caste



system, low education rate, slow agrarian transformation, joint family system, other cultural practices and political factors are responsible factors?

However, following the introduction of the new economic policy in 1991, internal migration increased in India (Srivastva and Sasikumar, 2003; Parvez, 2018). Both the proponents and opponents of economic reforms of 1991 argued that economic reform had expedited internal migration (Bhagat, 2010; Munish and Rosenzwing, 2009; Remesh, 2016; Parvez, 2018). Further, the sectoral transformation has also catalysed rural to urban migration. Similarly, migration for higher education, economic betterment and improving livelihoods from rural to urban areas has seen massive growth. It was evident in the 1991 Census data that there were 225.88 million internal migrants, and it further increased to 449.91 million in 2011. This means in the period of 20 years, internal migration in India is almost doubled.

Internal migration is the combination of intra-state and inter-state migration⁷. Internal migration comprises a very small amount of Inter-state migration. About 15 percent of all internal migrants are moving state boundaries (Bhagat, 2016). That means 85 percent of internal migration is comprised of intra-state migration. Hence, in India, migration is mainly an intra-state phenomenon (Sharma & Chandrasekhar, 2015). According to Kone et al. (2017) low inter-state migration in India is mainly due to inadequate profitability of social welfare benefits, state employment policies and policies to higher education. Additionally, the inter-state migrants do not get the benefit of social welfare like PDS (Public Distribution System). Further, the state level unfriendly business policies also attributed to the low level of migration in the state. A study by IMPEX index on “India migration now⁸” suggest that vague and heterogeneous policies tend to have a major impact on migration flow across the states. This reflects on responsible reasons for the low level of inter-state migration in India.

Table 1 summarises inter-state migration in India. In 1991, inter-state migration involved 26.68 million movers (11.81 percent of internal migration). This increased to 56.24 million in 2011 (12.06 percent of the total). In absolute terms, inter-state migration has been doubled; however, in relative terms, the change was marginal.

Table 1. Inter-state Migration of India, During 1991 to 2011

Type of migration	1991	2001	2011
Internal migration (millions)	225.88	309.38	449.91
Inter-state migration (millions)	26.68	41.16	54.26
% of interstate migration to internal migration	11.81	13.30	12.06

Sources: Census of India 1991, 2001 & 2011

A comparative picture of a state, in terms of in-migrants or out-migrants, can be seen through calculating net migration. Net migration has been calculated by deducting out-migration from in-migration (in-migration – out-migration). The percentage of net migration to the total population is calculated as follows:

$$\text{Percentage of net migration to population} = (\text{Net migration} / \text{Population}) \times 100$$

⁷ Intra-state migration means movement of people within the state boundaries whereas inter-state migration means movement of people between the states.

⁸ India Migration Now is a Mumbai-based non-profit organisation which analyses state-level policies for the integration of out of state migrants.

Table 2 shows net migration rates and their ratio (in percentage) to the populations of major Indian states. Hence, a positive number shows more in-migration and a negative number shows more out-migration.

Table 2. The volume of net migration and net-migration to population ratios in major Indian states, 1991 and 2011

Years	1991	2001	2011
Andhra Pradesh	-232,306(-0.34)	-532,015(-0.69)	-438,114(-0.51)
Assam	134,663(0.59)	-301,233(-1.12)	-163,995(-0.52)
Bihar	-1,993,425(-2.30)	-3,384,124(-3.07)	-5,851,155(-4.26)
Gujarat	529,812(1.28)	835,924(1.64)	2,344,213(3.87)
Haryana	153,078(0.92)	937,361(4.43)	1,310,403(5.16)
Karnataka	153,192(0.34)	212,182(0.40)	744,704(1.21)
Kerala	-531,854(-1.82)	-599,148(-1.88)	-636,902(-1.90)
Madhya Pradesh	1,227,656(1.85)	237,485(0.29)	338,876(0.34)
Maharashtra	2,287,179(2.89)	5,167,271(5.33)	6,019,149(5.35)
Orissa	-28,909(-0.08)	-274,348(-0.74)	-416,025(-0.99)
Punjab	-256,030(-1.26)	116,712(0.47)	747,422(2.69)
Rajasthan	-481,740(-1.09)	-868,144(-1.53)	-1,152,418(-1.68)
Tamil Nadu	-623,014(-1.11)	-743,331(-1.19)	-334,386(-0.46)
Utter Pradesh	-3,880,484(-2.93)	-6,430,511(-3.86)	-8,000,654(-3.81)
West Bengal	865,416(1.27)	769,472(0.95)	-24,477(-0.02)

Source: Author's calculation from Census of India 1991, 2001 and 2011

Note-(i) Net migration is calculated by differentiating out-migration from in-migration. (ii) the numbers in the parenthesis are ratios of net migration to the population of respective states.

Based on the 1991 Census data results shows that eight states (Punjab, Andhra Pradesh, Bihar, Kerala, Rajasthan, Odisha, Tamil Nadu, and Utter Pradesh) have experienced negative net migration, which explains that they have higher out-migration compare to in-migration (table 2). With Utter Pradesh being ranked first with the highest negative net migration of 39 lakhs people. In other words, it has the highest number of people migrating to other states, which comprises about 3 percent of their population. Similarly, Bihar stood in the second position with negative net migration of about 20 lakhs migrants, is attributed to 2 percent of their population. These two states are the major source of inter-state migrants in the country. It is mainly caused by push factors such as low agricultural output, low industrialisation and lack of job opportunities forcing people to a prosperous state for better livelihood opportunities.

Other states such as Orissa, Rajasthan, Andhra Pradesh, Punjab, Tamil Nadu, and Kerala⁹ have also witnessed significant out-migration. Similarly, stagnant agricultural growth, lack of industrialisation and developmental work are the main causes of out-migration in the state of Andhra Pradesh and Orissa. However, Andhra Pradesh has experienced low net migration, as less than one per cent of people are migrating to another state.

On the other hands Maharashtra, Karnataka, Madhya Pradesh, Haryana, Gujarat, and West Bengal have experienced positive net migration and developed as the popular destination for inter-state migrants. Maharashtra emerged as the most attractive destination; it has received about 22 lakhs of inter-state migrants that is equivalent to 3 percent of its population. Rapid

⁹ The net migration rate is high for Himachal Pradesh because its population is very low. Thus, the state is not given much importance to discuss it separately.



urbanisation and industrialisation are major factors for attracting migrants and it is mostly linked to economic development and better livelihood opportunities. Similarly, Gujarat, West Bengal and Madhya Pradesh are other major destinations for inter-state migrants, about 1 percent of their population.

The 2001 Census compared to the 1991 Census reflects the population movement and change in socio-economic realities. It has been observed that, Assam which was experienced positive net migration in 1991, witnessed negative net migration in 2001. The state had around 1 lakh net in-migration people in 1991, but in 2001, it saw 3 lakh net out-migrants, reflecting on low and slow economic growth in the state. On the other hand, the state of Punjab has experienced positive net migration in 2001, but it was experiencing negative net migration in 1991. This basically shows that out-migration from Assam has increased (decreased in-migration), and out-migration from Punjab has decreased (increased in-migration).

Maharashtra has attracted more people from other states compared to 1991. More than 51 lakhs net in-migrants were there in 2001, which is 5 percent of its population and the highest among all the states. The second most popular destination was Haryana with 9 lakh net migrants from other states, which is about 4 percent of their population. Haryana also attracted more migrants in 2001 compared to 1991. Similarly, there were more migrants moving to Gujarat in comparison to 1991. At the same time, the percentage of net migration to the state's population in West Bengal and Madhya Pradesh had gradually decreased to less than 1 percent and to 0.23 percent in 2001 in respective states.

Uttar Pradesh, Tamil Nadu, Rajasthan, Orissa, Kerala, Bihar, and Andhra Pradesh saw growing negative net migration (as per Census 2001). On the other hand, Uttar Pradesh had similar patterns in both 1991 and 2001 censuses with the highest negative net migration rates of -4 percent and -3 percent, respectively. Bihar appeared with -3 percent of net migration to their population. This shows that out-migration from these states has increased between 1991 and 2001. This reflects on economic deprivation and lack of livelihood opportunities in Uttar Pradesh and Bihar. In Tamil Nadu, Kerala, Orissa, and Andhra Pradesh, there was little change in net migration.

In 2011, a similar picture was observed for all the states. Uttar Pradesh and Bihar were again the biggest source states for migration while Maharashtra and Haryana were destinations. Further, there were very small changes in the ratio of migrants to the total state population.

Convergence analysis

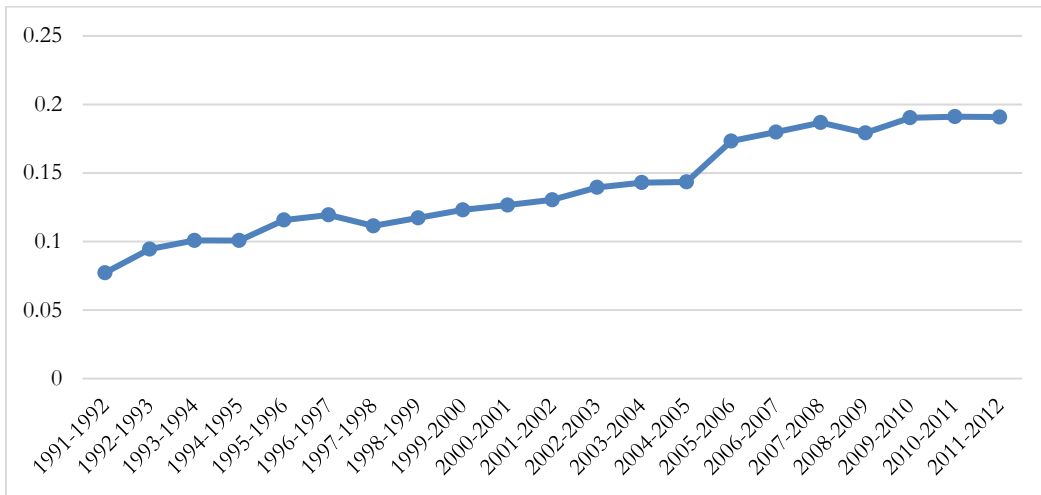
Convergence analysis was done in two phases: In the first phase, σ -convergence and absolute/unconditional β -convergence have been calculated, and in the second phase, conditional β -convergence was calculated by taking migration, investment, literacy rate, population growth as conditional variables.

Sigma (σ) and absolute beta (β) convergence

σ -convergence has been calculated by using the equation-1, and the result has been presented in figure 1. As mentioned earlier, σ -convergence involved of calculating the standard deviation of real per capita income. The trend line shows an increasing shape, which implies that dispersion of income among states over the period has increased. Hence, it can be said that

there was a diversion of income among Indian states during the period of 1990-91 to 2011-12.

Figure 1. Standard Deviation of log Real Per Capita Income



Note: Calculated using equation 1

Absolute β -convergence in the growth rate of per capita real income was calculated by using equation-2 for the period 1991-2011, 1991-2001 and 2001-2011. Further, the OLS regression technique was used to estimate equation-2 to measure the speed of convergence.

In table 3, the estimation result of absolute β -convergence of real per capita income is presented. The coefficients of the initial level of per capita income for all these periods were positive. But, only for one period (2001-2011) the coefficient was statistically significant as evident from t-values¹⁰. Similarly, these regressions were also not significant, as can be seen from low values of R-squared. The low R-squared values imply that only initial level of per capita income does not explain the variation in growth rate.

Table 3. β -Convergence of Real Per Capita Income 1991-2011

Dependent variable: CAGR of Per Capita Income

Time Period	Variable	Coefficient	β -coefficient	t-Statistic	Prob.	R-squared
1991-2011	log of initial PCNSDP (1991)	1.68	-0.18	1.48	0.16	0.14
1991-2001	log of initial PCNSDP (1991)	1.93	-0.30	0.94	0.36	0.06
2001-2011	log of initial PCNSDP (2001)	2.01	-0.30	2.07	0.05	0.24

Note: (1) Calculated using equation 2

(2) β -coefficient is calculated by this formula $\beta = -\frac{\ln(1+bT)}{T}$

However, the positive coefficients for all these periods indicate that there has been a tendency in per capita real income to divergence across the states during these periods. It is because the

¹⁰ For the other two periods (1991-2011 & 1991-2001), coefficients are not statistically significant from zero.



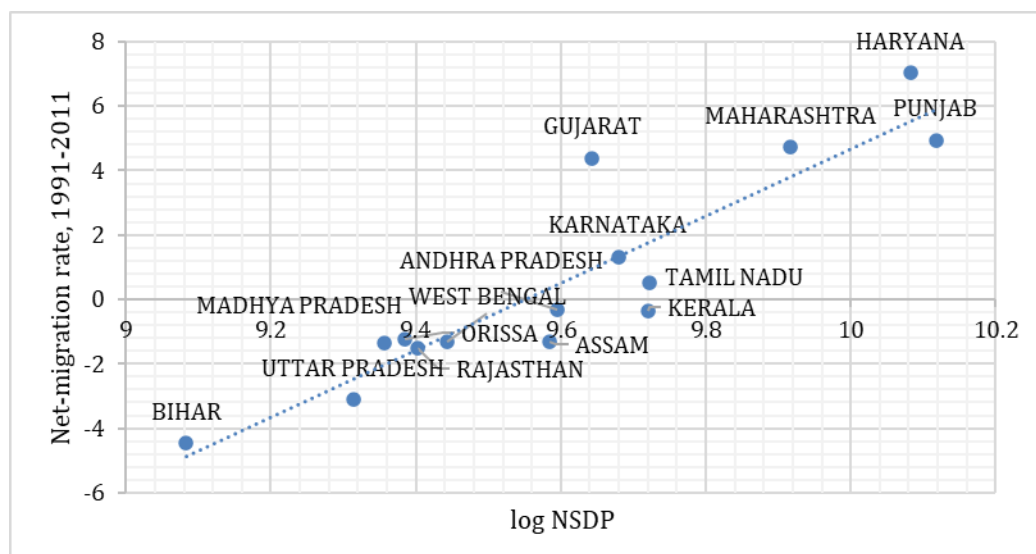
absolute β -convergence/divergence coefficient was retrieved from the estimated OLS coefficient. The negative β -coefficient shows the tendency of divergence. The β -coefficient shows the speed of convergence (divergence). In this analysis, the speed of divergence was less in the period 1991-2011 than other two periods. The divergence among states was high in 1991-2001 & 2001-2011 periods, which implies that the relatively richer states were growing faster than the poorer states during these periods. It means the initial income gap between rich states and poor states tends to prevail with a possibility of further increase.

Migration and conditional convergence

Before attempting to test the impact of migration on economic growth and convergence, it makes sense to know the relationship between net-migration rate¹¹ and the log of initial level of per capita real income of the states. In figure 2 the relationship between these two variables has been established and it is clearly visible a positive relationship.

It means states with a high initial level of per capita real income have a greater level of net migration. It is obvious that the states like Maharashtra, Haryana, Punjab, Gujarat, Tamil Nadu, and Kerala have seen positive net migration rate as they are economically prosperous. Whilst negative net migration in states like Uttar Pradesh, Bihar, West Bengal, Assam, Odisha, Madhya Pradesh reflects presence of considerable economic distress. In these states, distress is mainly due to low industrial development, high dependence on agricultural activities resultantly fewer opportunities, this tends to push people to migrate to other states. Hence, it is evident that the low-income state has more out-migration and high-income states have more in-migration.

Figure 2. Relationship Between log Initial Level of PCNSDP and Net-migration Rate 1991-2011



Sources: Authors' calculation

¹¹ Rate of migration = $\left(\frac{\text{migration at period } t - \text{migration at period } t-1}{\text{population at period } t-1} \right) * 100$

Reflecting on the net-migration effects on the economic growth of states and its role in the convergence leads to equation 3, which is calculated by using a cross-sectional regression model. The impact of migration on the growth of per capita income of the states is shown by the migration coefficient. It should be noted that additional variables like investment, human capital, and population growth add to the regression model's robustness (Table 3).

Table 4. The Result of Cross-sectional Regression for the period 1991-2011

Dependent Variable: CAGR of per capita real income

	Model 1	Model 2	Model 3	Model 4
Constant	9.88 (0.41)	8.78 (0.37)	56.92 (2.76)	64.22 (2.59)
Y ₀	-0.59 (-0.23)	-0.66 (-0.27)	-5.44 (-2.57)	-5.63 (-2.54)
NM	0.42 (1.02)	0.35 (0.86)	1.12 (3.23)	1.25 (2.98)
C		0.80 (1.17)	0.36 (0.76)	0.32 (0.64)
P			-3.28 (-3.71)	-4.00 (-2.58)
L				-1.27 (-0.57)
R ²	0.21	0.30	0.70	0.71
Adjusted R ²	0.08	0.10	0.58	0.55
F-statics	1.61	1.57	6.00	4.55
Pro. (F-statistics)	0.23	0.25	0.009	0.02

Note: Estimation has been done by sing equation 5. Figures given in the parentheses are t-values. Y₀ means initial level of per-capita consumption expenditure, NM means net-migration, C means credit extend by commercial bank, P means population, L means literacy rate.

Based on the data for the period of 1991-2011, Table 4 shows cross sectional regression results with four models relying on independent variables. In model 1, the impact of migration along and initial per capita income on economic growth was tested. A negative coefficient value for initial per capita income indicates an inverse relationship between growth rate and initial level of per capita income. Thus poorer states had witnessed higher growth rates compared to richer states. The positive coefficient value for net migration indicates a positive relationship between net migration and the growth rate of real per capita income. Positive net migration means in-migration to a state is higher than out-migration. Hence, positive net migration should negatively affect the growth rate of per capita income of a state according to the neoclassical growth theory. However, the result was the opposite of what the theory suggests. This might be because of taking NSDP growth rate as income¹². Furthermore, in model 1, none of the values was statistically significant as shown in t-values. Similarly, the value of R² and F-statics were not good. The low R² value shows that the model is not well defined by the variables under consideration. Similarly, low F-statics shows that the regression is not good. Therefore, the model cannot predict divergence or convergence of growth rate of real per capita income among the states.

In model 2, one additional variable, 'investment' was added but the results did not change significantly (see R² and F-statics). There was a positive impact of migration on income growth. Hence, model 2 too was not conclusive. In model 3, by adding one more variable, 'population', we have observed some significant changes. The value of R² and F-statics were improved significantly. This represents a correct model specification and suitability of the regression. The coefficient of migration was positive and significant, which implies a positive

¹² NSDP based only on production approach originated within the state boundaries. However, the migrants send their income in the form of remittance to the home state that may well captures through consumption expenditure.



impact of net migration on economic growth. The coefficients of initial level of per capita income and population were negatively significant, while the coefficient for investment was not significant. Similar results were found with model 4, where 'literacy rate' was added to the model. Surprisingly, the negative sign for literacy rate suggests that literacy rate tend to have no or negative effect on economic growth. The coefficient for literacy rate was not statistically significant. Thus, the results for model 3 and 4 were similar. Hence, it can be concluded that there was convergence in terms of economic growth rate between 15 major Indian states when migration, population growth, investment and literacy rate were controlled.

Discussion and concluding remarks

Economic reforms facilitated migration along with economic distress leading to economic convergence in India. As a result, there was massive intra-state migration compared to inter-state migration. This also affected the convergence process by making it volatile and inconsistent.

We have tested the relationship between internal migration and economic growth with convergence in 15 Indian states from 1991 to 2011. Internal migration during this period increased significantly due to the new economic policy introduced in 1991. This led to economic development in few states in India, and as a result, led to massive intra-state migration compared to inter-state migration.

Further, findings suggest presence of convergence in real per capita income in all major Indian states. Convergence happens when initial per capita income is held constant and explanatory variables are considered. States have shown homogeneous characteristics with respect to the steady-state level for per capita income while having heterogeneous initial per capita income. Resultantly, convergence took place, and few initially poor states have rapidly caught up the initially rich states.

In the analysis of convergence/divergence through σ -convergence and absolute β -convergence, it is found that there was divergence among Indian states. σ -convergence conveys that cross-sectional dispersion among states has increased in the concerned period. Similarly, absolute β -convergence suggests that rich states were growing faster than poorer states. The impact of migration is more in line with endogenous growth than with neoclassical convergence. Hence, the neoclassical conditions about the impact of migration on convergence were limited; net migration accelerated regional disparities caused by human capital distribution with migration flows.

However, when conditional convergence was tested by capturing various conditional variables, we found that there was conditional convergence among the states. Migration along with investment, population growth and literacy rate were conditioned in the regression model. Nonetheless, two variables (migration and literacy rate) did not produce expected positive results. Migration was expected to have a negative impact on economic growth, but it showed a positive relationship. This problem may be solved by taking consumption expenditure as a measure of economic growth as the remittances are not included in GSDP. Despite these, the coefficient of the initial level of per capita income was statistically significant, implying a conditional convergence across Indian states during 1991-2011.

India exhibits absolute β -convergence at the subnational level, which results from economic policy and structural change. But this has also increased regional disparity in the country as

observed in the presence of many fiscally backward states and a few fiscally developed states. This outcome may not be in line with neoclassical assumption. However, the impact of migration led convergence tends to differ due to time frames, socio-economic conditions, migration characteristics and societal/individual behaviour. Thus, our empirical results are informative and useful for future policies.

Both policy makers and researchers need to factor in migration, literacy rate, investment, and population growth to understand the migration and convergence relationship to mitigate economic disparities. Furthermore, it can be argued that migration should be encouraged and protected for broader economic growth and convergence.

References

- Adabar, K. (2004). *Economic Growth and Convergence in India*, Working Paper, Institute for Social and Economic Change. Retrieved from <http://www.isid.ac.in/~planning/ka.pdf>
- Aiyer, S. (2001). Growth Theory and Convergence across Indian States: A Panel Study. In: Callen, T., Reynolds, P. and Towe, C eds., *India at the Crossroads: Sustaining Growth and Reducing Poverty*, Washington, DC: International Monetary Fund, pp. 143–169.
- Barro, R. J. (1991): Economic Growth in a Cross Section of Countries, *Quarterly Journal of Economics*, 106, 407–43.
- Barro, R. J. and Sala-i-Martin, X. (2004). *Economic Growth*, MIT Press, Cambridge, Massachusetts, PP. 492–509.
- Bhagat, B. R. (2010). “Internal Migration in India: Are the Underprivileged Migrating More?”, *Asia-Pacific Population Journal*, 25(1), 31–49.
- Bhagat, B. R. (2016). “*Nature of Migration and Its Contribution to India’s Urbanisation*”, in Deepak K. Mishra (eds), *Internal Migration in Contemporary India* (pp.26–46), New Delhi: Sage Publication.
- Bunea, D. (2011). “Cross-country Internal Migration and Convergence in Romania.” *Annales Universitatis Apulensis Series Oeconomica* 13: 508–21.
- Cardenas, M. and Ponton, A. (1995). “Growth and Convergence in Colombia: 1950–1990. *Journal of Development Economics*, 47, 5–37.
- Chakravarthy, M. (2016). “*Ranking India’s States on Consumption*”, Livemint, accessed on 08.08.2018 from <https://www.livemint.com/Opinion/FdDmDCv1gkiddtHQH6fYnDN/Ranking-Indias-states-on-consumption.html>.
- Chikte, R. P. (2011). “Income Convergence and Regional Growth in India: Before and After the Economic Liberalization” *South Asia Economic Journal*, 12(2), 239–269.
- Davis, Kingsley (1951). “*The Population of India and Pakistan*. Princeton” New Jersey: Princeton University Press.
- Ghosh, M. (2008): “Economic Reforms, Growth and Regional Divergence in India”, *Margin-The Journal of Applied Economic Research*, 2(3), 265–285.
- Gunji, H. and Nikaido, Y. (2010). “Convergence across Indian States: A re-evaluation”, *Journal of International Economic Studies*, 24, 133–153.
- Hewings, D. J and Ferhan, G. (2004). “Regional Convergence and the Economic Performance of Peripheral Areas in Turkey”, *Review of Urban and Regional Development Studies*, 16(2), 113–132.
- Kirdar, M. G. and Saracoğlu, D. S. (2008). “Migration and Regional Convergence: An Empirical Investigation for Turkey”, *Regional Science*, 87(4), 545–566.
- Kone et al. (2010). “How India’s Internal Borders inhibit Migration”, <https://www.ideasforindia.in/topics/urbanisation/how-india-s-internal-borders-inhibit-migration.html>
- Kubis, A. and Schneider, L. (2015). Regional Migration, Growth and Convergence- A Spatial Dynamic Model of Germany, *Regional Studies*. <http://dx.doi.org/10.1080/00343404.2015.1059932>.
- Nagaraj, R., Varoudakis, A. and Veganzones, M. A. (2000). “Long-Run Growth Trends and Convergence across Indian States”, *Journal of International Development*, 12, 45–70.
- Ostbye, S. and Westerlund, O. (2006). “Is migration important for regional convergence? Comparative evidence for Norwegian and Swedish counties, 1980–2000”, *Working Paper Series in Economics and Management*, 07/06, University of Tromsø.



- Ozen, C., Nijkamp, P. and Poot, J. (2010). "The Effect of Migration on Income Growth and Convergence: Meta Analytic Evidence", *Paper in Regional Science*, 89, 537-561, <http://dx.doi.org/10.1111/j.1435-5957.2010.00313.x>.
- Parida, J. K., Mohanty, K. S., and Raman, R. K. (2015). "Remittances, Household Expenditure and Investment in Rural India: Evidence from NSS data", *Indian Economic Review*, 50(1), 79-104.
- Parwez, S. (2016a). A Comparative Study of Gujarat and Kerala Developmental Experiences. *International Journal of Rural Management*, 12(2), 104-124.
- Parwez, S. (2016b). Labour and labour welfare in special economic zones in India with special reference to Gujarat. *South Asian Survey*, 23(2), 135-157.
- Parwez, S. (2018). 'Enterprising SEZ enclaves and economic development in India' *Journal of International Business and Economy*, 19(1), 1-33.
- Peeters, L. (2008). "Selective In-migration and Income Convergence and Divergence across Belgian Municipalities", *Regional Studies*, 42(7), 905-921.
- Percoco, M. and Fratesi, U. (2014). "Selective Migration, Regional Growth and Convergence: Evidence from Italy", *Journal of Regional Studies*, 48(10), 1650-1668.
- Polese, M. (1981). Regional Disparity, Migration and Economic Adjustment: A Reappraisal. *Canadian Public Policy*, 7, 519-525.
- Rao, M. G., Shand, R. T. and Kalirajan, K. P. (1999). "Convergence of Incomes across Indian States: A Divergent View", *Economic and Political Weekly*, 34(13), 769-778.
- Rosenzweig, M. and Munishi, K. (2009). "Why is Mobility in India so low? Social Insurance, Inequality, and Growth", National Bureau of Economics Research, Working Paper 14850, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.531.1171&rep=rep1&type=pdf>.
- Roy, N. and Debnath, A. (2011). "Impact of Migration on Economic Development: A Study of some Selected State", *IPEDR Journal*, 5, 198-202.
- Sharma, A. and Chandrasekhar, S. (2015). "Urbanisation and Spatial Patterns of Internal Migration in India", <http://www.igidr.ac.in/pdf/publication/WP-2014-016.pdf>
- Singh, N. and Srinivasan, T. N. (2002). "Indian Federalism, Economic Reform and Globalization", Paper prepared for CREDPR project on Globalisation and Comparative Federalism.
- Srivastava, R. (2012). "Internal Migration in India: An Overview of Its Features, Trends and Policy Changes", Workshop paper 2, Indian Council of Social Science Research, New Delhi.
- Srivastava, R. and Sasikumar, S. K. (2003). "An Overview of Migration in India, its Impacts and Key Issues", Paper presented in Regional Conference on Migration, Development and Pro-Poor Policy Choice in Asia, Dhaka, Bangladesh, 22-24 June.
- United Nations (2002). "International Migration Report 2002." Department of Economic and Affairs, Population Division, New York: United Nations.
- Wolszczak-Derlacz, J. (2009). "Does Migration Lead to Economic Convergence in an Enlarged European Market?", *Bank i Kredyt*, 40(4), 73-90.
- Zachariah, C. K. and Rajan, I. S. (2016). "Kerala Migration Study 2014", *Economic and Political Weekly*, 51(6), 66-71.