Chapter 7
Summary, Conclusions and Policy Implications

This study has analysed regional dimensions of economic growth in Indian federation within the neoclassical growth paradigm. The empirical results and conclusions, and policy implications of this study are given as follows.

Absolute convergence in per capita income

Absolute convergence in per capita real income at 1980-81 constant prices is observed across 14 major states during the sub-period 1960-70 at the rate of 4.48 per cent per annum. Although there has been a tendency of convergence in primary and tertiary sectors, it is the convergence in secondary sector at the rate of 2.23 per cent per year, which has contributed to the absolute convergence in per capita real income during 1960s. These results corroborate the findings of Cashin and Sahay (1996) and Bajpai and Sachs (1999); contradict the reasons for the convergence process in the period 1960-70.

Absolute divergence is found across 14 major states in 1990-97 at the rate of around 1 per cent per year. This result is also similar to the findings of Rao et al., (1999) and Dasgupta et al., (2000). This divergence tendency is contributed by the unconditional divergence of secondary and tertiary sectors at the rates of 3.91 and 2.84 per cent per year during 1990s. However, absence of absolute convergence in primary sector contributes to the divergence process in per capita real income across the states during this period. It is interesting to note that the speed of absolute divergence is estimated at 2.51 per cent per year in the period 1970-97. But, neither the primary nor secondary or tertiary sector is significantly affecting the divergence process. Thus, except the period 1960-70, the divergence tendency in per capita real income has been observed in 14 major Indian states. This implies that the relatively better off states have grown faster than the worse off counterparts in Indian economy after 1970 onwards. Consequently, inequality in growth and levels of per capita real income across the states continues over time.
Sigma convergence in per capita real income

There is evidence in favour of σ-divergence along with β-divergence in 14 major states for different sub-periods during 1970 to 1997. All the measures of income disparities show the increasing tendency in per capita real income across the states after 1970. Nonetheless, after the implementation of market-based reforms since 1991, the rising income inequality of different states in India has been attributed to the differential growth performances of the states. The rate of increase in income gap among states has increased after the liberalisation era, as the better off states have grown faster than the worse off ones. Unequal and inadequate spread of social (education, health etc), physical (power, irrigation, road, railways etc), and economic (banking and others) infrastructure, and inequitable growth in these sectors have led to differential private investment decisions across the states. This may be a contributing factor for the dispersion in levels and growth of per capita real income during 1980s and 1990s. The spending in productive activities of State and Central Governments’ behaviour coupled with private investment decisions have created differential potential and capacity building of the states for capital accumulation over time.

The re-examination of unconditional (absolute) β-convergence across 14 major states in Indian federation offers the evidence for divergence tendency in per capita real income since 1970. But, the rates of absolute β-divergence are sensitive to selection of samples, different measurements of variables and estimations of models, consistency problems in the data, consideration of base periods and duration of time periods etc.

Absolute convergence in per capita consumption

The issue of absolute and sigma convergence are examined by taking three indicators of per capita consumption expenditure for rural and urban sectors (and total) across 14 major states from 1983 to 1999-00. The estimated β-convergence (divergence) in inflation and inequality adjusted per capita consumption expenditure (IIPCC) differ from the estimates of β-convergence (divergence) in per capita consumption (PCC) and inequality adjusted per capita consumption expenditure (IPCC) as well as in per capita real income (PCI). There is evidence for β-convergence in rural, and total IIPCC across the states at the rates of 4.71 per cent and 3 per cent per year, respectively, during pre-liberalisation era (i.e., 1983 to 1993-94).
Nevertheless, the rate of divergence in total IIPCC (3.37 %) is strongly observed in
the period 1993-94 to 1999-00. Therefore, during the reform era, even the per capita
real consumption expenditure (i.e., IIPCC) shows 0.16 per cent more divergence as
compared to per capita real income (3.21 %) per year across 14 major states. The
economic reforms pursued seem to have generated effect on factors leading to
agglomeration economics (Bhanumurthy and Mitra, 2003) in the relatively better of
states causing divergence in the growth of per capita real income as well as in the
growth of per capita real consumption expenditure during the reform period.
However, there is neither convergence nor divergence tendency in total IIPCC among
the states during the total period 1983 to 1999-00 due to offsetting tendency of per
capita real consumption expenditure in pre-liberalisation and post-liberalisation
period.

**Sigma convergence in per capita consumption**

The evidence in favour of σ-convergence in inflation and inequality adjusted
per capita consumption expenditure (IIPCC) (rural, and total) is compatible with β-
convergence during 1983 to 1993-94 (pre-liberalisation era). But, β-divergence and σ-
divergence are evident during 1993-94 to 1999-00 (reform era). Moreover, the
dynamics (or series) of cross-state dispersion generated is found to be rising from
1983 to 1999-00 depending on the parametric values of β and its initial variance.
Therefore, even if β and σ-convergence (divergence) show similar results, β-
convergence is a necessary but not a sufficient condition for sigma convergence,
which may be caused due to changes in the ranks of states' consumption patterns.

**Conditional convergence in growth rates**

In the single cross-section regression, using average growth rate of per capita
real income (measured at 1993-94 constant prices) from 1981 to 2000 as dependent
variable, the rate of conditional β-convergence is estimated at 6.9 per cent per year.
Both population growth rate and literacy rate (human capital) do not affect the
variations in the average growth rates. The initial levels of per capita real income and
per capita private investment explain around 61 per cent variations in the average
growth rates of per capita real income across 14 major states during the period.
Conditional β-convergence in the trend growth rate of per capita real income across 14 major states after controlling for private investment rate and effective depreciation rate is observed to be 3.34 per cent per annum. If total investment (public and private) rate is used instead of private investment rate, the rate of conditional β-convergence is only 2 per cent per year. Therefore, private investment causes the major differences in the trend growth rate of per capita real income across 14 major states. Once human capital is considered along with total investment rates and effective depreciation rate, then the rate of conditional β-convergence is observed to be 4.61 percent per annum. It requires around 15 years for a state to close the gap between the initial levels of per capita real income and its steady state value. This relatively slow speed of conditional β-convergence implies that not only the transitional growth paths affect the states during their transitional dynamics from an initial position to steady state positions but also the differences in the steady state across the states influence the variations in the trend growth rate of per capita real income.

The elasticity of growth of income per capita with respect to total investment rate, effective depreciation rate and human capital is estimated at 0.06, -0.03, and 0.042 per cent, respectively. These three variables explain around 66 per cent variations in the trend growth rate of per capita real income across 14 major states during the period 1981-2000.

The physical and human capital share parameter, \( \alpha = 0.66 \) and \( \lambda = 0.46 \) are high in the state income. Since average total investment rate captures broad view of investment activities across the states and human capital is positively associated with this investment rate, it is expected that share of human capital in the state income would be higher. The addition of both physical and human capital share is however, either close to or more than 100 per cent, leaving nothing for labour share in the state income. What is surprising in the labour abundant and capital scare economies like Indian states is that these estimates are inconsistent with the model under consideration due to the features of either constant returns to scale or increasing returns to scale.

The alternative specifications of variables within the conditional convergence regression in a cross-sectional analysis shows that the effects of investment rate, effective depreciation rate, and human capital are robust. Thus, once the differences in determinants of the steady states are controlled for, there is inverse relationship
between the initial levels of per capita real income and their average growth rates indicating the evidence for conditional convergence in per capita real income across the 14 major states like other studies in Indian context (Cashin and Sahay, 1996; Nagaraj et al., 1997; Sachs and Bajpai, 2002, Trivedi, 2002 among others). This implies that there has been evidence of conditional convergence across Indian states but the rate of conditional convergence differs due to differences in the measurements of variables.

**Intergovernmental transfers and convergence in India**

In order to examine the distributional impact of intergovernmental transfers on the levels and growth of income across 14 major states, the volume of explicit (tax devolution and grants) and implicit intergovernmental transfers (indivisible due to states’ borrowing from the Central Government and banking system) were computed for 14 major states of India from 1976-77 to 2000-01. Description of these data shows that the Low Income States (LIS) have received relatively more explicit as well as implicit transfers as compared to High Income States (HIS) and Middle Income States (MIS) over the years.

Despite the redistribution of resources among 14 major states due to progressive nature of explicit intergovernmental transfers, progressivity of total transfers is reduced due to significant regressive nature of implicit transfers from 1985-86 to 1994-95. Greater amount of intergovernmental transfers to LIS in comparison with the HIS and MIS does not enable the poor states to grow more rapidly in per capita real state disposable income. In fact, MIS are the larger beneficiaries of intergovernmental transfers due to existing mechanisms of transfer system in Indian federation as seen through their higher per capita growth rates throughout the period 1976-2000.

**Absolute convergence in per capita real disposable income**

The analysis of absolute β-convergence in per capita real disposable income within the neoclassical growth paradigm shows that neither convergence nor divergence in various measures of income in per capita terms (i.e., per capita real income and state disposable income) at 1993-94 prices across the states in the period 1976-77 to 2000-01 except the sub-period 1980-1990. During 1980-90, β-divergence is evident in per capita (NSDP + Implicit Transfers) due to the greater size and impact of implicit transfers for HIS. Nevertheless, the negative absolute convergence
coefficients indicate the tendency of divergence in these measures of income during all the sub-periods except 1976-1985. If the disaggregate components of intergovernmental transfers are added to NSDP, the magnitudes of $\beta$-divergence coefficients of per capita real state disposable income (SDIs) tend to slightly reduced almost in all the sub-periods. This indicates the inadequate flow of transfers to poor states to catch up the standards of living of better off states in terms of per capita real disposable income.

**Sigma convergence in per capita real disposable income**

The evidence for sigma divergence in per capita real income (PCI) and various per capita disposable incomes constructed due to different components of intergovernmental transfers show the increasing inequality in all the sub-periods. Even if the size of explicit intergovernmental transfers are estimated to be more for LIS, it is the MIS that grow at a higher rate in per capita total transfers, revenue receipts and total expenditure as well as in per capita real income throughout the period 1976-2000. In spite of this, the insignificant nature of $\beta$-convergence/divergence coefficients throughout the periods indicates the absence of convergence or divergence in per capita real disposable income across the states.

**Conditional convergence after controlling intergovernmental transfers**

The speeds of conditional $\beta$-convergence after controlling total investment (that captures intergovernmental transfers) along with other control variables are 5 % for 1976-2000 and 5.97 % for 1985-2000. Without accounting for intergovernmental transfers (i.e., private investment), the speeds of conditional $\beta$-convergence are 5.6 % and 7.35 % during the same sub-periods. Thus, the speed of conditional $\beta$-convergence with intergovernmental transfers is lower than that of without intergovernmental transfers. Since conditional convergence is consistent with sigma divergence, this indicates that the extent of differences in growth rates of per capita real income across Indian states has been reduced after accounting for total intergovernmental transfers. Further, the relatively higher rate of conditional convergence for 1985-2000 shows more income inequality across 14 major states in comparison to the sub-period 1976-2000.

Using low-income states (LIS) dummy variable in the presence of investment rate and population growth rate increases the variations in growth rates from 80 to 84
per cent across the states during mid-1980s (i.e., 1985-2000) due to state-specific effects. This implies that the better off states have reaped the benefits of growth process due to their availability of socio-economic infrastructure as against the LIS. Thus, despite the LIS states have received considerable amounts of intergovernmental transfers in comparison with better off states, the higher growth rate of both private investment as well as intergovernmental transfers due to faulty mechanism of intergovernmental transfers in Indian context, has resulted in the conditional convergence and sigma divergence during the period 1976-2000. This diverging tendency has further, increased during 1985-2000. Therefore, the process of liberalisation begun in 1985 and gained momentum since 1991 has generated wide income disparities across 14 major states.

Accounting for unobserved state-specific effects within the fixed effects panel growth model have shown higher rates of conditional β-convergence with and without intergovernmental transfers. The faster rates of conditional convergence, 17.5 and 11.5 with and without the effects of intergovernmental transfers indicate that the unobserved state-specific effects do affect the differences in the steady state levels of per capita real income across 14 major states. With existing better levels of initial technology and other socio-economic environment in relatively better off (especially MIS other than HIS) states, the private investment and intergovernmental transfers received by MIS and HIS are more productive than the LIS causing higher output or income growth in those states. Although the income elasticity with respect to capital (0.34) appears to be reasonable in the present context, these high rates of conditional convergence indicate that the Indian states are close to their steady states. Therefore, the large differences in observed levels of per capita real income across the 14 major states have arisen from differences in the steady state levels, rather than from differences in the position of states along their similar transitional growth paths. Further, since conditional β-convergence is consistent with sigma divergence, the high rate of conditional β-convergence implies that inequalities of income and growth in Indian states are driven by wide differences in the steady states. Similar diverging trend is evident in case of three different categories of HIS, MIS and LIS. However, intergovernmental transfers have positively influenced the levels of per capita real income for LIS.
The empirical results and conclusions of this study leads to the following policy implications.

Indian states differ with respect to steady states. Consequently, there are significant differences in the findings of absolute, sigma and conditional convergence. The absolute divergence, sigma divergence and conditional convergence are consistent with each other implying the inequalities in the levels of per capita real income and growth across 14 major states after 1970s. Moreover, these convergence results indicate the rising inequality not only in per capita real income but also in per capita real consumption during 1990s (i.e., liberalisation era) across the Indian states. The main sources of inequality in per capita real income in the Indian states have arisen from the secondary and tertiary sectors in comparison with the primary sector as indicated by absolute divergence. Therefore, improvement and augmentation of secondary and tertiary sectors should be targeted with due respect to primary sector in poor states so as to achieve balanced growth in per capita real income across Indian states and hence, convergence in standards of living.

Conditional convergence shows that differences in per capita private investment (rate), population growth rate and human capital do influence the growth and levels of per capita real income across the states. Higher physical and human capital and lower population growth cause higher levels and growth of income for better off states while reverse is true for poor states. This suggests that the inter-state growth patterns in Indian economy are not only determined by state’s distance from its own steady state but also the factors that determine the differences in the steady state. As a consequence, factor accumulation continues to play a key role to economic growth and explains the major differences in growth rate of per capita real income across 14 major states. A poor state can invest more on secondary and tertiary sectors to generate more employment opportunities by giving due attention to the primary sector for balanced and sustainable growth. Appropriate policies are required to increase the levels of private as well as public investments in both physical and human capital by creating appropriate economic environment and facilitating different kinds of infrastructure in poor states in order to achieve balanced growth and equity. It is also essential to control population growth rate by giving proper incentives to private agents to control over the fertility rate and other characteristics of population
since it affects the levels and growth of income negatively because of the thin spread of physical capital over the large population.

In addition, public policy may consider factor like initial level of technology. Even with similar saving and population growth rates across the states, a state can improve its long-run position of economic growth by bringing improvements in the components of initial level of technology. Further, improvements in initial level of technology have the positive effects on saving and population growth leading to an indirect increase in the steady state levels of income.

Notwithstanding the role of federal transfers, the levels and growth of per capita real income of better off (HIS and MIS) states have increased more than the LIS due to the higher growth rates of per capita private investment and per capita total intergovernmental transfers during the period 1977-2000. Therefore, intergovernmental transfers received by MIS and HIS are more productive in the better off states due to high levels of per capita private and public investment made in different socio-economic infrastructure that increase the capacity building of those economies. In turn, this increases the per capita real income over time. In reverse way, LIS might not get enough benefits from the intergovernmental transfers due to lack of appropriate infrastructure even if they have received more per capita federal transfers in absolute values. The design of intergovernmental transfers system in Indian federation is redistributive in the sense that low-income states have received greater amount of federal fiscal transfers as compared to better off states in absolute terms especially explicit transfers. But, the higher growth in these transfers for better off states especially middle income states, and hence, increasing the growth of income will lead to further regional disparities in income levels across the states. The higher growth rate of per capita total intergovernmental transfers in case of MIS raises queries for review of design of fiscal transfers mechanism for effective redistribution in the context of Indian federation.

Further, policies to accelerate convergence processes in consumption/income in rural and urban sectors across the states may need a thorough understanding of factors mobility and factor-price equalisation across the border of the states giving due attention to the differences in structural characteristics of states in India.