Poster Sesson #1
Time: Monday, August 6, 2012 PM

Paper Prepared for the 32nd General Conference of
The International Association for Research in Income and Wealth

Boston, USA, August 5-11, 2012

Growth, Poverty and Inequality Paradox in India: A Panel Data Approach

Ratan Ghosal

For additional information please contact:

Name: Ratan Ghosal
Affiliation: University of Calcutta, Kolkata, India

Email Address: ratankumarghosal@rediffmail.com

This paper is posted on the following website: http://www.iariw.org

Growth, Poverty and Inequality Paradox in India—A Panel Data Approach.

Dr. Ratan Kumar Ghosal
Professor of Economics
Dept of Commerce
University of Calcutta, Kolkata, India.

Address for Communication: 178,B.K.Street; P.O: Uttarpara; Dist: Hooghly,Pin:712258, E-mail- ratankumarghosal@rediffmail.com,ratankumarghsl@gmail.com

Acknowledgement: The author records his indebtedness to his Research scholars Dr. Saikat Bhattacharya and Mr. Surajit Sengupta for their immense help in collecting required data for this paper. Usual disclaimer applies.

GROWTH, POVERTY AND INEQUALITY PARADOX IN INDIA ---A PANEL DATA APPROACH.

Dr. Ratan Kumar Ghosal
Professor of Economics, Department of Commerce,
University of Calcutta, Kolkata,
West Bengal, India.

Abstract

This paper is a modest attempt to examine the temporal and cross state behaviour of the growth ,poverty and inequality and also to examine the relations between them and to see whether the temporal behaviour of the incidence of poverty is compatible with the policy evolution followed since independence Further we re-examine whether the conventional hypothesis that growth is a necessary but not sufficient condition for the reduction of poverty across the states hold. Finally, we try to find out the proximate explanatory factors for the cross-state and temporal variations in the incidence of poverty in terms panel regression analysis. We find that our economy has indeed achieved a high growth trajectory such that it has been conspicuous during the post reform period with a remarkable structural transformation on an unconventional path which has been accompanied by a tremendous increase in service sector driven growth path. Almost all the states have experienced increase in the growth rates of their real per capita NSDP in varying degrees over the period and the post reform period marks a phase of achievement of very high growth rates for almost all the states. The nature of the growth experienced by the states is found to be divergent .We do not find any uniform relation between temporal behaviour of the growth rates and the Gini inequality across the states

Interestingly almost all the states have experienced declining trend in the incidence of poverty in varying degrees during the pre reform period and also over the period from 1993-94 to 2009-10 i.e. during the post reform period. We also find that the relative positions of the states regarding their ability to reduce poverty varies remarkably at the inter temporal level over the period of our study. The time profiles of growth rates, Gini inequalities and the rates of fall in the incidence of poverty do not reveal any definite desired relations. Further we find a paradoxical relation between growth performance and regional concentration of poverty. Moreover our panel regression results confirm that the cross state temporal variations in the social sector expenditure and growth rate of per capita NSDP and the growth rate of per capita NSDP from service sector are the crucial explanatory factors for the cross state temporal variations in the incidence of poverty. So we can plausibly conclude that our panel results are highly compatible with the policy evolutions towards poverty reduction and also with nature of the structural transformation with tremendous increase in service sector –led growth Therefore for the further reduction in the magnitude of poverty of the people across the states, more emphasis should be placed not only on the increase in the growth rates but also on the tremendous increase in the social sector expenditures like health ,education etc across the states. However because of the high degree of regional concentration of poverty as compared to that of population in a few states some state specific special strategies for poverty alleviation seem to produce substantial favorable effect on the incidence of poverty.

JEL Classification No: O 41, O 47, O 57.
Key Words: **India, Economic Growth, Inequalities; poverty; Panel Data.**

Address for correspondence:

Dr. Ratan Kumar Ghosal,
178, B.K.street, P.O:Uttarpara, District: Hooghly
West Bengal, PIN-712258 (INDIA)
Phone: +91 33 2 663 5827
E-mail: ratankumarghosal@rediffmail.com
ratankumarghsl@gmail.com

Growth, Poverty and Inequality Paradox in India—A Panel Data Approach.

I. Introduction:

It is well recognised that the avowed objectives of our social planners immediately after independence of our economy were the ending of poverty, ignorance and the inequality of opportunities. Of course, there has been an evolution of policy strategies from time to time since independence towards this direction. But ironically even after the elapse of sixty four years after independence about one-third of our total population still suffer from abject poverty and a large section of poverty afflicted people is entangled by the poverty trap i.e. they suffer from chronic poverty. The incidence as well as intensity of poverty has also been reflected in its various dimensions viz, the social, regional, occupational, ethnical etc in both rural and urban areas of our economy albeit with some degree of variations.

Interestingly the Govt has made changes in the policy strategies towards the objective of alleviation of poverty depending on the dynamic behaviour of our macro economic scenario during the plan period. In fact up to the early 70s we actually followed the strategy of growth mediated development policies on the basis of the expectation of the operation of the" Trickle Down Hypothesis" such that the fruits of economic growth would automatically percolate amongst all sections of people irrespective of region, religion and castes etc. But astonishingly the proportion of people lying below the poverty line remained well above 50% up to mid 70s which was followed by a declining trend thereafter albeit with some degrees of fluctuation. Because of this pessimistic experience of the failure of trickle down hypothesis, our Govt has made a radical shift of her policy strategy towards the direct attack on poverty by pursuing various workfare and welfare programmes viz different employment generating programmes like IRDP, SJGSY (latter renamed as SGSY) and other social security programmes like NREG etc so that the benefits of this programmes could reach the target group. These policies were followed up to the end of 80s.Of course this has led to the deceleration of poverty not only at the national level but also at the inter-state level. In fact the incidence of poverty declined up to 39 % at the national level. Majority of the states also experienced declining trends in poverty in varying degrees. Later in the early 90s i.e. since 1991 we have introduced the policy of economic reforms. This on-going process of reforms in various spheres viz, trade, Investment and finance, have indeed led to gradual withdrawal of the public sector coupled with the increasing reliance on the market fundamentalism. Interestingly, since 90s the Govt has been pursuing the policy of growth cum public action –led development strategy with its major focus on the participatory development process vis-à-vis the inclusive growth which has later been carried forward to the 12^{th} five year plan(2012 to 2017) as its principal objective of faster sustainable inclusive growth. As a fall out of this policy evolution the incidence of poverty has

declined both at the national level (29.8% in 2009-10 as per Planning commission) and also at the inter-state level in varying degrees albeit at a lower magnitude. But unfortunately as per estimate of the Planning Commission about 354.6 million of our total population (278.2 million in rural areas and 76.5million in urban areas) still suffer from abject poverty in 2009-10.

On the other hand, one cannot of course deny the fact that Indian Economy since her independence has gradually been moving towards the achievements of faster rate of growth of GDP after surpassing the long term (1950 – 75) persistence of Hindu Growth rate. We have indeed moved to the trajectory of high growth path by experiencing a sharp increase in our national income (i.e. about 7%to9%during 2000to 2007) which has made our country recognised as one of the fastest growing countries in the globe. Of course most of the states have also experienced sharp increase in their SDP during the same period. But this growth has mainly been informal service sector –led growth which is basically predatory and job destroying (Rakshit, 2007, 2009; Bhaduri, 2008).The usual perception is that this elite cantered as well as service sector driven growth process has led to the increase in both absolute and relative inequality in the distribution of income which in turn has led to boost the growth vis –a-vis the persistence of the inequality and poverty. The persistence of the trajectory of high growth both at the national and inter-state level and the higher incidence of poverty as well as inequality is indeed puzzling. So how can one reconcile between the persistence of high growth rate of our national income and the staggering dimensions of chronic poverty even after the pursuance of growth mediated and public action –led development strategies since 80s.

In this paper we have in fact tried to resolve the problem of reconciliation between the achievement of high growth rate both at the national and the state level and the persistence of the higher magnitude of the poverty afflicted people as well as inequality across the states. We will also examine whether the trajectory of high growth with structural transformation has taken place at the expense of greater income inequality. So we will examine compatibility between the poverty and growth dynamics across the major states and see the impact of the evolution of the policy strategies from growth-led development to growth cum public action led development strategy on poverty in terms of panel regression .Since for the purpose of growth with redistribution the Govt has followed different workfare programmes ,to capture the impact of this we will take into consideration the aggregate social sector expenditure scaled by the SDP at the cross-state level. It is well known that the conventional hypothesis regarding the relation between growth and poverty is that growth is a necessary condition but not the sufficient condition for the reduction of poverty. We will examine this hypothesis also.

Brief Review of Literature

The literature on the analysis of poverty in India is indeed very rich. One can safely classify the literature into three broad categories. The first group is concerned with the estimation of the number of people lying below the poverty line. In this group two approaches are used viz (i) income based or consumption expenditure based method of estimation of head count ratio(Dandekar and Rath,1971 ; Jha,2000; Radhakrishna and Ray,2005; Sen,1996,2001; Suryanarayana,2000; Sundaram,2000;Sundaram and Tendulakar,2000;Subramanian,2005; etc) and (ii) calorie based estimation of head count measure of the consumption deprivation(Jones and Sen .2001; Meenakshi and Vswanathan,2003; etc).Apart from the estimation of researchers, the Planning Commission has also estimated the incidence of poverty in India. However there is no consensus regarding the true incidence of poverty in India both before and after the economic reforms albeit almost all the studies are based on NSSO data. In fact there is controversy regarding the poverty line to be used. But most of the studies view in favour of the declining trend in poverty. On the other hand there are few studies which have estimated poverty by using both NSSO and National Accounts Statistics data and also on the basis of the methodology of the Expert Group of the Planning commission (Datt, 1999). Further Himanshu (2007) has estimated poverty(head count ratio) for the year 2004-05 by using the data of the 61st round of NSSO which are comparable with 50th (1993-04) round and also with previous rounds both for the rural and urban areas .He finds that poverty has indeed declined between 1993-04 and 2004-05, but the substantial part of the decline has occurred between 1999-2005 and the annual rate of reduction of poverty since 1993-04 is rather slower than that in the previous decade. The fall in the relative price of food is claimed to be the major explanatory factor behind this decline. He has however expressed doubt regarding the substantial fall in poverty both in rural and urban areas.

The second group concentrates on the methodological issues relating to the measurement of poverty. It has raised the controversies on true trend in poverty especiallybetween1993-94 and 2000 (Bhalla,2005;Datt,1999;Datt and Ravallion,1998 ;Datt,Kozel and Ravallion,2005; Jha,2000;Sen,2000; Sundaram,2000; Sen,2005;Saith,2005; Tendulkar and Jain,1995 ; etc.)The researchers in this group have made revised estimates of poverty and some opined that the rate of decline in the poverty especially in the 90s is rather lower than what is claimed on the basis of the NSSO estimates. However Meenakshi et al have found the incidence of poverty to rise substantially when calorie based measure is adopted and the same to decline when the income based measure is adopted. On the other hand Jones and Sen have found a large divergence between calorie based measure of poverty and official poverty line.

The third group of economists raise the doubt on data and the notion of poverty used so far. Therefore there has been a storm of controversy regarding (a) the comparability of various rounds of NSSO data (Bhalla,2005; Datt et el, 2005; Sen,2001; Sundaram,2000; etc) and (b) the notion of poverty as is conceptualised by the conventional poverty line discourse In fact there is doubt about whether the conventional notion of poverty line is at all meaningful while assessing the nature ,forms and extent of deprivation experienced by the people of our society(Bhalla,2005; Gaiha,2003; Saith,2005, Sen,2005; etc).In fact the most of the debates centres round the comparability of the data on the income poverty because of the differences in the recall period from round to round surveys of NSSO. However, Datt et al in their model based on panel estimates of poverty found substantial increase in poverty not only at the national level but at the cross-state level also.

Given these limitations the third group of literature has recently come onto the surface which concentrates on the incidence of chronic poverty i.e. a sub-category of chronically poor who experience poverty continuously for a long period(Gaiha,2003; Mehta and Shah,2003; Radhakrishna et al,2003; etc).Since the NSS per capita consumption data are available for the reference period of one month for the duration of one year, it is not possible to estimate the number of people who is chronically poor for long duration. So Radhakrishna et al have constructed a standard of living index for each household by using the NFHS data and then established correspondence between NSS poverty line and the standard of living index. Accordingly a poor household with a mal-nourished child on the basis of height for age index is considered as chronically poor. According to their estimates57% of the poor household in rural areas and 50% of poor household in urban areas are found to be chronically poor in 1999-2000. On the other hand Gaiha has used a panel data of 4118 household from NCAER survey during the period 1968-69 to 1970-71 for estimating chronic poverty and found that 47% of the poor on an income criterion were chronically poor in 1968.

So the brief review of the literature clearly indicates there is a storm of controversy regarding the magnitude of the incidence of poverty, its rate of decline and methodologies of estimation. But there is as such no study (excepting that of Jha, et al 2000) on the estimation of the impact of the growth, social sector expenditure, literacy, inequality as well as the sectoral growth on the incidence of poverty across the states of India .So instead of entering into the controversy we have actually tried to find out the principal correlates of cross-state and cross-time variations in the magnitude of poverty in India. Under this backdrop our study concentrates on the detection of the proximate explanatory factors behind the persistence of poverty by using a panel data econometric technique. The rest of this paper is structured as follows. Section II presents the data and methodology; Section

III analyses the growth dynamics experienced by our economy and its states; Section IV concentrates on the analysis of poverty dynamics and its nature; Section V presents the results of the panel data analysis on poverty and finally section V gives the concluding observations.

II. Data and Methodology

We have examined the cross state and cross time behaviour of growth, poverty and inequality in India and tried to find out the proximate factors for the cross-state and cross time variations in the incidence of income poverty for the period from 1973-74 to 2009-10 by using panel data technique. Our study is exclusively based on the secondary data available from the various rounds of NSSO; Reports of Planning Commission ; Economic and Political weekly (EPW) Research Foundation Data base,2003,2008; Reserve Bank of India on-line data base; National Accounts Statistics: Census reports ;India Development Report,2008 and also from the existing literature. While analysing the incidence of poverty both at the national and at the cross-state level we have used the head -count ratio of poverty as is estimated by the planning commission. For the year 2009-10 we have also used the head count ratio of income poverty estimated by the Planning commission .However we have also estimated poverty for 2009-10 across the states on basis of official nutritional norms of calorie intake i.e 2400 Kcal per-capita per day in rural area and 2100 Kcal per-capita per day for urban area, the data on which are available form the 66^{th} Round report of National Sample Survey Organisation, Govt. of India (NSSO). For finding out the rural –urban combined figures of calorie based poverty we have taken the weighted average of rural and urban figures of poverty by using percentage of monthly per-capita expenditure on food in rural and urban areas as weights. Our calorie based estimates of poverty are found to be more or less compatible with the estimates of income based poverty done by the planning commission for the year 2009-10. It is worth noting that while estimating the panel regression we have used planning commission estimates of poverty for the entire period which is income based estimate. Since the policy evolution experienced by our economy clearly revel that there has been a radical shift of policies from growth mediated development strategy to growth cum public action led development strategy and further to market led development strategy coupled with public action led inclusive growth strategy, we have used the growth rates of real per-capita net state domestic product(GRPCNSDP), social sector expenditures(SSE) as percentage of SDP as explanatory factors to the cross state variations in the headcount ratio of poverty. We have computed five yearly annual averages of GRPCNDP at constant 1970-71 prices for the period under consideration from the EPW research foundation data base. The data on SSE are available from reports of Ministry of Human resource Development, GOI. Further since the inequality in the distribution of income or the consumption expenditure (INQ) which is a close proxy of income, affects adversely the incidence

of poverty we have treated it an explanatory factor of poverty. The data on Gini inequality coefficients for the states are available from various rounds of NSSO reports on Consumer expenditure. Now since the spread of education seems to have a close bearing on employment as well as income we have also considered it as an explanatory factor in terms of literacy variable (LIT) for explaining t the cross-time and cross state variations in the magnitude of poverty. The data on literacy are available decennially from the Census Reports. For the intermediate periods, however we have used the interpolated values of literacy. Moreover to have an insight about the impact of the sectoral growth on the incidence of poverty we have used the growth rate of per-capita net state domestic product originating from agriculture (GPCYA), industry (GPCYI) and also from service sector (GPCYS) as the possible explanatory factors of cross state and cross time variation. of poverty in a modified panel regression model. All these components are computed at constant 1971 prices from the data which are available from EPW research foundation**.** Since the data on dependent variable poverty are available at every five year interval we have computed five yearly annual compound growth rates of all the components of per-capita income variables. We have also computed the decennial annual compound growth rates of income variable at constant prices. We have found a close correspondence in respect of trend behaviour of both the decennial and five yearly annual growth rates.

To find out the proximate explanatory factors behind the dynamic behaviour of poverty at the cross-state and cross-time level we have used panel data econometric technique and used the software LIMDEP. Since the data on poverty are available quinquennially we have formed a five yearly panel for the period 1973-74 to 2009-10.We have considered 16 major states .The period chosen for the analysis is exclusively based on the availability of data. The models that we have used are as follows and we treat headcount poverty ratio of ith states and t period as the dependent variable and the social sector expenditure (SSE), the literacy rates (LIT), growth rates of per capita net state domestic product (GRPCNSDP),inequality(INQ), (GPCYA), (GPCYI), (GPCYS) of the 16 major states across time as independent variables. Our panel is a balanced panel. We have used different forms of panel regression model. We know that the panel data technique is used in three ways. The first technique simply pools all the time series and cross section data and then estimates the underlying model by OLS method. The second technique involves that the omitted variables may change the cross section and time series intercepts and so we add dummy variables to capture this changing intercepts. This gives the fixed effect model. Finally the third technique is the random effect model (error component model) which improves the efficiency of the first least squares estimation process by accounting for cross section and time series disturbances. This is nothing but

a pooled cross section and time series model where the error term may be correlated across time and individual units. The basic model that we have used is as follows:

$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$ ----------(i)

Where i = 1,, 2,…….,.N and t= 1,2,……,T

Here N=16 states; T = number of time-periods at 5 year interval from 1973-4 to 2009-10; ε_{it} => the error component or the disturbance term; α is the intercept or scalar and β is Kx1 and X_{it} is the it-th observations on K explanatory variables.

For fixed effect model we decompose the error term as: $\varepsilon_{it} = v_i + u_{it}$. Here v_i is the unit specific residual and u it is the usual residual with standard properties. So the model becomes

$Y_{it} = \alpha + \beta X_{it} + v_i + u_{it}$ ----------(2.)

Now if v_i's are assumed to be fixed parameter to be estimated then the model becomes the fixed effect model and if it is assumed to be random then the model becomes random effect model. The random effect model can be written as

$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$ ----------(3)

Here $\varepsilon_{it} = v_i + u_i + w_{it}$;

where v_i = cross section error component which is normally distributed

u_i = time series error component which is normally distributed

w_{it} = Combined error component which is normally distributed .

We also assume that the individual error components are uncorrelated with each other and are not auto correlated across both cross section and time series units. However if the v_i in model (2) are assumed to be random then the model becomes one way error component model.

For making the convergence test of economic growth across the states we have used the conventional regression method (i.e. we regress the log difference of per-capita NSDP between 2004-05 and 1973-74 on the PCNSDP of 1973-74) and also the CV.

III. **Growth Performance**

Since the level of income and its growth, other factors apart are the crucial determining factor for the levels of living as well as the incidence of poverty of people we, in this section highlight the growth performance of our economy both at the aggregative level and also at the cross state level. One cannot of course deny the fact that Indian Economy since her independence has gradually been moving towards the achievements of faster rate of growth of GDP after surpassing the long term (1950 – 75) persistence of Hindu Growth rate. In fact, it has been found that our economy

continued to achieve the trajectory of high growth path between 1975 and 1990, which eventually culminated by the crisis of 1991 caused by high fiscal deficit vis-à-vis the current account deficit. Obviously the fall out of the crisis was the switching of the economy from plan to market. Of course during the post reform period and especially during the first five years of new millennium the growth rate of GDP has reached such a conspicuous level (i.e. 8% - 9% per annum) that India has been recognized as one of the fastest growing economies in the world .Interestingly during the period of half a century the economy has also experienced remarkable structural transformation in respect of her composition of GDP. Parallely it has also been found that in course of structural transformation of our economy the service sector has been enjoying a comparative advantage in playing a leading role towards the achievements of remarkable growth rate such that the service sector driven growth has been christened as 'service sector revolution' in our economy (Rakshit, 2007, 2009, Bhaduri, 2008). Figure 1 below gives an overview of the dynamic behaviour of the level of GDP and its sectoral composition. It reveals more or less an increasing trend over the period between 1950 – 51 and 2008 – 09.

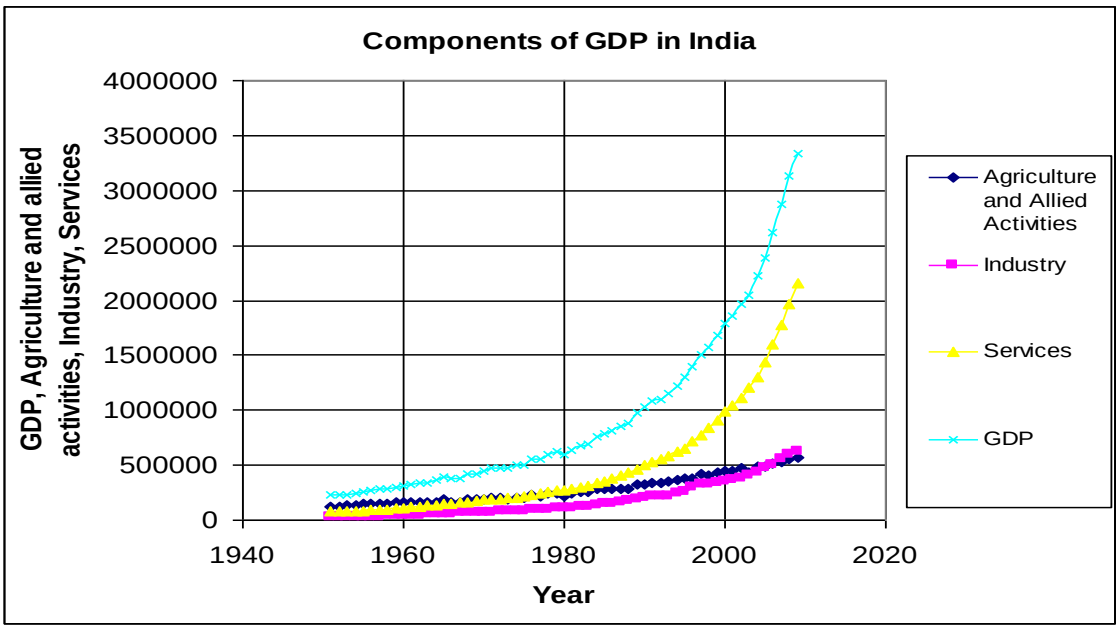

Figure-1.

The sectoral growth also has a close bearing on the incidence of poverty. For instance the higher agricultural growth is likely to produce cushion against the rural poverty. Similarly the industrial and service sector growth may also help reducing the incidence of poverty .So we have computed the decadal growth rates of the three sectors at constant(1993-94) prices which are presented in table-1 below

Table: 1 Growth Rate of GDP and its components in India

Period	GDP	Agricultural and Allied Activities	Industry	Services
1951-1961	3.901	3.029	6.138	4.478
1961-1971	3.724	2.313	5.396	4.879
1951-1971	7.77	5.411	11.865	9.575
1971-1981	3.088	1.495	4.34	4.165
1981-1991	5.375	3.395	6.716	6.327
1951-1991	5.327	3.257	6.946	6.615
1991-2000	5.127	2.766	5.023	6.463
2001-2009	6.002	2.426	5.188	7.495
1991-2009	11.913	5.233	11.157	15.079
1951-2009	4.768	2.654	5.771	5.928

Source: Author's own computation from RBI data.

We have a mixed picture on the decadal annual growth rates of GDP and the three major sectors. While the annual growth rate of GDP hovers between 3.9% and 6.0%, that of agricultural sector lies between 1.5% and 3.03% per annum over the period of our study. Conversely the decadal annual growth rates of industry hovers between 3.34% and 6.95% and that of service sector lies between 4.123% and 7.5% over the six decades. But if we analyze growth rates of GDP and its major sectors during the pre and post reform period, then we find a tremendous increase in the growth rates during the post reform period (1991 –2009) as compared with that in the pre reform period (1951 – 1991). The annual growth rate of GDP at factor cost was 5.33% followed by agricultural growth rate of 3.26% and the industry and service sector growth rates of 6.95% and 6.62% respectively. But during the post reform period the service sector has experienced a sharp increase in its annual growth rates to 15.08%, followed by industry (11.16%) and agriculture 5.23% respectively. However, one cannot deny the fact that the reform process has given a boost to the economy, the outcome of which has been reflected in terms of the break through in service sector growth during the post reform period.

Now since in our panel data exercise we have considered 16 major states as our observation s for the analysis of the cross state variations in the incidence of income poverty we have also computed the growth rates of NSDP (at factor cost) and its sectoral compositions across the states for each decade and also for the pre and post reforms period, the estimates of which are

given in the appendix tables 1 – 4. The decadal annual growth rates NSDP reveal a mixed picture over the period and it also reveals a tremendous inter-state variability measured in terms of the time profile of the values of coefficient of variation. Similarly the growth performance between the pre and post reform period also reveals a sharp contrasting scenario across the states. The appendix table 1 clearly reveals that the states excepting Bihar, UP, MP, AP, and Rajasthan have achieved an increasing trend in their rates of growth of NSDP during the five decades since 1961.In fact the above states have registered lower rates of growth of their NSDP during the first decade of economic reform. It seems these states could not initially adjust to reap the benefit of the market. Further the withdrawal of the public sector from development process as an implication of the IMF-World bank dictated policy of economic reform seems partly to be the explanation of the fall in growth rates of NSDP of the states.

Another striking feature of the growth rates of NSDP as is discernable from the Appendix table- 1 is that during the post reform period almost all the states have registered very high growth rates in varying degrees as compared to the growth rates achieved during the pre-reform period and also to the overall period of our study. So, it is plausible to conclude that the reform process has given a tremendous boost to the growth performance of all the states such that the states have been able to reap the benefits of the market in varying degrees. It is no less note worthy that the cross state variability in the growth rates of the states as is revealed by the time profile of the C.Vs which were very high during the sixties and the seventies and have gradually reduced overtime. Surprisingly the in the post reform period this has witnessed sharp reduction in the cross state volatility in the growth rate of NSDP also. So, one can say that the reform process might have helped reducing the inter-state disparity in economic growth also.

As far as the growth rates of the major three sectors are concerned the Appendix Table -2 gives a mixed picture on the growth experienced by the states in their agriculture and allied sector. No definite conclusion on the performance of decadal as well as pre and post reform agricultural growth can be drawn. In fact, the states with high degree of application of new seed fertilizer technology during sixties have achieved higher growth rates in agriculture, but the states with delayed application of new technology have achieved higher growth rates during 1970s and 1980s. However, there has been sluggishness in the growth rates of agriculture in almost in all the states during the 1990s coupled with a bit improvement in the first decades of the new millennium. So, one can plausibly conclude that liberalization of agricultural sector after the formation of WTO has not produced favorable impact on the growth of agriculture across the states of India. The time profile of C.V also reveals that the cross – state variability in the growth rates of agriculture was very high during the pre-reform period and it has fallen during post reform period albeit it is still

very high. On the other hand as far as the industrial sector is concerned the Appendix Table 3 clearly brings out the fact that all the states have achieved growth of NSDP originating from industry in varying degrees with some states like AP, HP, Gujarat, Karnataka etc. achieving high growth rates and some achieving moderate growth rates and very few states like WB Orissa, achieving lower growth rates. We also find that the first decades of reform has registered sluggishness in the growth rates of industrial production across all the states excepting Assam Gujarat and to some extent WB. However, it is worth noting that our economy has experienced industrial stagnation during 1965-1979. The estimates of industrial growth rates during pre and post reform period also reveal (see appendix table 3) that some states have performed better during the post reform period and some have performed better during the entire pre-reform period. It seems to be the outcome of the variability in the access to market economy on the part of the states. The time profile of C.V of the growth rates of NSDP originating from the industrial sector reveal a very striking feature that the cross-state variability in the growth rates of the industrial; sector have been increased remarkably during the post reform period.

On the other hand as far as the cross-state growth of service sector in concerned Appendix Table- 4 clearly brings out the fact that almost all the states have experienced tremendous increase in the growth of service sector in varying degrees. Surprisingly the post reform period has witnessed a tremendous break through in the growth rates of the service sector in almost all the states as compared to their growth performance of service sector during the pre-reform period.

It is further no less noteworthy that the cross state variability in the growth rates of service sector as is evident from the time profile of C.V has declined remarkably during the post reform period. So it is plausible to conclude that the reform process in India has not only helped bring about the service sector revolution that we have experienced but also reducing inter-state disparity in the growth rates of service sector tremendously. So one can expect that the higher growth rates of the service sector and the declining trend in inter-state disparity would have produced a favourable impact on the incidence of poverty at the cross state level. However in our panel exercise we have used the per capita cross state five yearly annual average growth rates of the three sectors as possible explanatory factors instead of using the aggregate sectoral growth rates.

The temporal behaviour of the growth rates of per capita NSDP at constant prices across the 16 major states is discernable from the table -2 below.

Table-2: Five yearly Annual Compound Growth Rates of Per-Capita NSDP (at 1970-71 prices)

	1971-75	1975-80	1980-85	1985-90	1990-95	1995-2000	2000-05	2005-10
Andhra Pradesh	1.79(4)	0.49(15)	-0.90(16)	7.43(2)	3.28(8)	2.09(12)	5.26(3)	7.50(7)
Assam	-0.33(9)	0.53(14)	2.47(6)	4.20(7)	0.13(14)	5.04(3)	2.34(13)	3.86(16)
Bihar	-0.57(10)	1.36(10)	2.38(9)	1.84(14)	-3.97(16)	3.10(8)	1.29(16)	8.32(4)
Gujarat	10.52(1)	5.60(1)	2.43(8)	-3.15(16)	7.54(1)	1.63(15)	9.74(1)	8.89(3)
Haryana	-2.27(13)	4.75(2)	1.23(11)	5.93(3)	1.23(13)	3.30(6)	4.75(6)	7.85(5.5)
Himachal Pradesh	2.221(3)	-0.05(16)	0.18(14)	5.92(4)	1.50(11)	4.36(5)	4.83(4)	4.56(15)
Karnataka	-0.04(7)	1.19(12)	2.96(4)	17.57(1)	5.07(3)	6.59(1)	2.93(11)	7.01(9)
Kerala	0.08(6)	0.72(13)	0.16(15)	3.78(10)	4.38(6)	3.28(7)	5.30(2)	7.85(5.5)
Madhya Pradesh	-0.76(11)	2.19(7)	2.70(5)	4.11(8)	1.37(12)	1.64(14)	3.30((10)	5.03(13)
Maharashtra	2.223(2)	1.90(8)	1.38(10)	5.56(6)	4.96(4)	2.60(11)	4.41(7)	9.85(1)
Orissa	-3.76(15)	2.55(6)	0.31(13)	0.84(15)	3.37(7)	1.17(16)	3.58(9)	6.75(10)
Punjab	1.15(5)	3.21(3)	4.11(2)	3.48(11)	2.54(9)	2.78(9)	2.21(14)	5.47(12)
Rajasthan	-6.46(16)	1.27(11)	4.05(3)	5.87(5)	1.98(10)	2.69(10)	4.11(8)	7.23(8)
Tamil Nadu	-3.60(14)	2.62(4)	5.88(1)	4.08(9)	5.75(2)	4.54(4)	1.82(15)	9.21(2)
Uttar Pradesh	-2.12(12)	2.56(5)	2.46(7)	3.22(12)	-0.18(15)	1.65(13)	2.72(12)	4.61(14)
West Bengal	-0.14(8)	1.61(9)	0.87(12)	2.04(13)	4.92(5)	5.25(2)	4.77(5)	6.29(11)

Source : Authors Computation from EPW Reasearch Foundation data base and RBI Database.
Figures in Brackets represent ranks.

It is discernable from the table that almost all the states have experienced increase in the growth rates of their real per capita NSDP in varying degrees with the evidences of quinquinnial ups and down over the period of our study. In fact no states have experienced smooth continuous increasing trend in their growth rates of per capita NSDP. If we look at growth performance of the pre-reform period then we find that the states like AP, Rjasthan, Tamil Nadu, Haryana, Punjab, Karnataka, have been able to enjoy higher growth rates especially during the two phases in the 80's. The only state Gujarat experienced negative growth rate during 1985-90. During the post reform period however almost all the states have experienced steady increase in the growth rates in varying degrees with some states experiencing tremendous increase in the growth rates of their per capita NSDP especially during 2000-05 and 2005-10. Interestingly the phase 2005-10 marks a phase of very high growth rates for some states like Maharastra (9.85%), TamilNadu (9.21%),Bihar(8.32), Gujrat (8.89%) A.P (7.550, Harayana (7.85%),Orissa (6.75), Kerala(7.85) , Rajasthan (7.23%) and West Bengal(6.29%) . It is also worth noting that a large number of states have experienced

sluggishness in their growth rates in the early phase after reforms i.e.1990-95 albeit they have been able to recover later. Obviously one should expect positive impact of this higher growth rates on the incidence of poverty. Further the relative positions (ranks)of the states in respect of the achievement of the growth of per capita NSDP has changed sporadically over the period . Another interesting feature of the cross state performance of growth rates has been that we find a divergent nature of growth both for the period from 1971 to 2009-10 and the post reform period i.e. 1991-2010. The regression results (given in appendix table-5) with positive values of slope coefficients reveal the same directions.

Now if we look at the cross state temporal behaviour of the inequality in the distribution of monthly per capita consumption expenditure measured in terms of Gini coefficients which is also a good surrogate of the distribution of per capita income also and compare it with the cross state temporal behaviour of the growth rates of per capita NSDP then we find a paradoxical situation. The table -3 gives an over view of the cross state temporal trend in inequality which is measured in terms of Gini coefficient and expressed in percentage terms. We actually do not find any definite/unique relation between the temporal behaviour of growth and inequality across the states over the period of our study.

Table-3: Gini Inequality in Monthly Per-Capita consumption expenditure.

State	1974	1978	1984	1988	1994	2000	2005	2010
Andhra Pradesh	28.05	30.97	31.3	32.98	30.98	29.8	34.32	32.33
Assam	24.69	24.76	21.2	26.2	24.56	24.5	27.22	28
Bihar	25.53	27.93	27.8	25.76	25.8	24.1	28.26	27.45
Gujarat	23.94	29.97	28.4	26.78	27.06	28.6	29.52	28.69
Haryana	29.94	29.97	30.6	29	29.6	26.9	35.5	32.72
Himachal Pradesh	25.41	27.93	29	27.94	39.08	27.1	32	33.04
Karnataka	28.47	32.97	33.2	31.42	29.94	31.3	32.68	27.76
Kerala	33.82	36.73	33.6	34.02	32.62	30.4	39.92	45.48
Madhya Pradesh	28.06	35.41	30.7	31.68	32.16	29.3	34.54	32.28
Maharashtra	29.29	41.17	34.1	32.64	33.7	35.3	35.16	32.93
Orissa	29.75	30.96	28.4	28.54	28.26	27.8	32.64	31.5
Punjab	27.94	33.86	30.3	29.34	28.1	27.1	35.98	32.87
Rajasthan	28.47	38.28	35	32.74	28.18	24.6	32.36	29.64
Tamil Nadu	28.88	32.48	37.1	34.12	33.36	36.6	34.54	29.47
Uttar Pradesh	26.35	31.45	30.2	30.5	30.88	28.2	33.74	30.65
West Bengal	30.94	30.45	32.8	29.32	30.5	29.8	33.94	29.94

Source : Computed from various reports of NSSO

All the states excepting Himachal Pradesh have experienced a tremendous increase in the inequality in the distribution of income during 1994 -2005 in varying degrees in the post reform

period with some states like Kerala , Maharastra , A.P, Punjab , W.B, U.P, T.N having the highest figures of Gini inequality. However during the period between 2005 and 2010 all the states excepting Kerala have experienced a falling trend in the inequality. Kearla has experienced tremendous increase in inequality even in this phase, the value of Gini inequality being 45.48%. The values of Gini inequalty coefficients in almost all the states are however found to remain high over the entire period. If we compare the growth performance of the states with their experience with the degree of inequalities then it is surprising to note that there some states like Gujrat, T.N, Kerala, Maharastra, A.P, Orissa,which have achieved high growth rates during the post reform period (i.e. from 1995-2010) coupled with the higher degrees of inequality. On the contrary there are some states like Karnataka, W.B etc which have achieved higher growth rates with a declining tendency of the degree of inequality. Now if we compare the phase wise analysis of growth and inequality the we see that almost all the states have experienced tremendous increase in their growth rates during 2005-10 ,but the degree of inequality in the distribution of income in all the states excepting Kerala and H.P has fallen in the same period. There are also states with lower growth rates accompanied by higher inequality. So the relation between the growth rates and inequality is indeed paradoxical. It is really doubtful whether growth causes inequality or the reverse. This paradoxical relation between the temporal behaviour of growth and inequality across the states also becomes critical if take into consideration of the temporal behaviour of the incidence of income poverty along with this.

IV. **Analysis of the trend in poverty and its nature.**

Now as far as the incidence of poverty is concerned it is well recognised that because of the growth mediated strategy of development and later the inclusion of the direct public intervention programmes of the Govt the magnitude of the incidence of poverty has declined not only at the national level but also at the rural and urban areas across the states in varying degrees. However the dynamics behaviour of the extent of poverty clearly reveals that the rate of decline was almost negligible up to1970 because of the failure of the trickle down hypothesis so that about 51% of our total population lived below the official poverty line in the mid70s.Later since mid 70s the extent of poverty started declining at a faster space both at the national level and cross-state level such that between 1977-78 and 1987-88 national level poverty declined to 39% and there after by 2009-10 it has reached the figure of 29.8%.It is worth mentioning that while analysing the temporal behaviour of the incidence of income poverty across the states we have used the planning commission estimates of poverty .Now since the Planning commission has changed the methodology of estimation of poverty for 2004-05 and 2009-10 by switching over from Lakdawala methodology

to the Tendulkar methodology which covers broader perspective for measuring poverty, we have also used the same estimates for the periods 2004-05 and 2009-10 respectively. Obviously because of the change of methodology causing an upward shift in state specific poverty lines we find rather a mild increasing trend in the incidence of poverty across the states between 1999-2000 and 2004-05. This seems to have produced little impact on our panel regression analysis.

The time profile of the incidence of poverty across the states which are given in table -4 clearly reveals that almost all the excepting Bihar experienced a declining trend in the incidence of poverty during 1973-74 to 1983 -84 in varying degrees. Similarly the period from 1983-84 to 1993-94 also records a declining trend in the incidence of poverty for almost all the states excepting Harayana and H.P. Interestingly it discernable from the table -4 that almost all the states have experienced declining trend in the incidence of poverty in varying degrees over the period from 1993-94 to 2009-10 i.e. during the post reform period. It is worth mentioning that since there is a switch over of methodology of estimation of poverty between 1999-2000 and 2004 - 05, we find relatively higher figures of head count poverty for almost all the states. However if we compare the figures of poverty estimated by using Lakdawala methodology for the same periods then we find almost all the states excepting M.P, Maharastra , Punjab, Rajasthan, and Orissa have experienced falling trend in poverty(Ghosal,2010) It also interesting to note that in all the states excepting Assam the incidence poverty has fallen between 2004-05 and 2009-10., estimates for both years are based on Tendulkar methodology. It is also interesting to note that our calorie based estimate of poverty for 2009-10 reveals same declining trend in the poverty with a relatively lesser degree of incidence of poverty across the states as compared to the Tendulkar based estimates for the same period. Now to judge the relative positions of states in respect of their ability towards the reduction of poverty we have ranked all the states such that the state having the lowest incidence of poverty has got rank one and so on. It is obvious from table-4 that no state has been able to retain constant rank. We find that the relative positions of the states in respect of their ability of reduction of poverty varies remarkably at the inter temporal level over the period of our study.

Table -4: Trend in Poverty (Head Count Ratio) Across the States.

States	1973-74	1977-78	1983-84	1987-88	1993-94	1999-00	2004-05*	2004-05***	2009-10**	2009-10***
A.P	48.86 (6)	28.91 (4)	28 (4)	25.86 (4)	22.19 (2)	21.3 (7)	15.8	29.6(6)	19.07	21.1(6)
Assam	51.21 (7)	40.47 (9)	40.47 (9)	36.21 (8)	40.86 (12)	36.09 (13)	19.7	34.4(11.5)	19.42	37.9(15)
Bihar	61.91 (14)	62.22 (15)	62.22 (15)	52.13 (15)	54.96 (16)	41.5 (15)	41.4	54.4(15)	23.5	53.5(16)
Guj	48.15 (5)	32.79 (5)	32.79 (5)	31.54 (5)	24.21 (3)	16.2 (5)	16.8	31.6(8)	27.11	23(7)
Haray	35.36 (3)	21.37 (3)	21.37 (3)	16.64 (3)	25.05 (4)	11.1 (2)	14.0	24.6(4)	22.44	20.1(5)
H.P	26.39 (1)	16.4 (2)	16.4 (3)	15.45 (2)	28.44 (7)	11.7 (3)	10.0	22.9(3)	22.98	9.5(1)
Karnat	54.47 (9)	38.24 (7)	38.24 (7)	37.53 (9)	33.16 (8)	25.6 (9)	25	33.3(10)	22.16	23.6(8)
Kerala	59.79 (12)	40.42 (8)	40.42 (8)	31.79 (6)	25.43 (5)	15.7 (4)	15	19.6(1)	23.68	12(2)
M.P	61.78 (13)	49.78 (12)	49.78 (12)	43.07 (12)	42.52 (14)	37.65 (14)	38.3	48.6(14)	27.17	36.7(12)
Maha	53.24 (8)	43.44 (10)	43.44 (10)	40.41 (10)	36.86 (11)	28.65 (11)	30.7	30.2(7)	22.18	24.5(9)
Orissa	66.18 (16)	65.29 (16)	65.29 (16)	55.58 (16)	48.56 (15)	44.35 (16)	46.4	57.2(16)	17.6	37(9)
Punjab	28.15 (2)	16.18 (1)	16.18 (1)	13.2 (1)	11.77 (1)	6.15 (1)	8.4	20.9(2)	17.6	15.9(3)
Rajas	46.14 (4)	34.46 (6)	34.46 (6)	35.15 (7)	27.41 (6)	21.2 (6)	22.1	34.4(11.5)	17.5	24.8(10)
T.N	54.98 (10)	51.66 (13)	51.66 (13)	43.39 (13)	35.03 (9)	22.15 (8)	22.5	29.4(5)	22.23	17.1(4)
U.P	57.07 (11)	47.07 (11)	47.07 (11)	41.46 (11)	40.85 (12)	32.05 (12)	32.8	40.9(13)	23.55	37.7(14)
W.B	63.43 (15)	54.85 (14)	54.85 (14)	44.72 (14)	35.66 (10)	28.3 (10)	24.7	34.2(9)	28.11	26.7(11)
C.V.	24.195	28.699	37.027	35.542	32.706	43.306		43.31		43.82807

*Source: Planning Commission 2002. Figs in brackets are Ranks. * Planning commission's estimates based on Lakdawala Methodology ** Author's Estimate based on Calorie consumption (2100 Kcal for Urban and 2400 K cal for Rural). *** Planning commission's estimates based on Tendulkar Methodology.*

Now to judge the compatibility between the temporal behaviour of quiquennial average growth rates, the degree of inequality and the relative change in the incidence of poverty across the states we have computed the percentage point changes in the incidence of poverty across the states and time, the estimates of which are give in the table -4A**.** It is evident from the table that during the periods between (i)1973-74 and 1983-84 ; (ii)1983-84 and 1993-94 and also between 1993-94 and 1999-00 all the states have experienced negative percentage point changes in the incidence of poverty in varying degrees. . The phase wise analysis of the percentage point changes in the extent of poverty across the states reveals that over the period between 1973-74 and 1983-84 all the states excepting Bihar have experienced faster fall in the magnitude of poverty in varying degrees while

in next phase (1983-84 to 1993-94) most of the states excepting Harayana ,H.P and Assam have shown relatively smaller rate of decline in the extent of poverty with high degree of variability (see table 4 and 4A).But in the third phase (1993-94to 1999-2000) all the states are found to have experienced much faster fall in the extent of poverty. Further, during the 4^{th} phase (i.e. between 1999-2000 and 2004-05) we find relatively smaller rates of decline in the magnitude of poverty in some of the states if the comparison is made between poverty figures based on Lakdawala method (not shown in the Table-4a).. However in such case a few states like Harayana, Maharastra, Orissa, Rajasthan are found to have experienced the increase in the extent of poverty in varying degrees. But if we consider the percentage point changes in the poverty across the states by comparing the poverty ratios for 2004-05 which is based on Tedulkar method with the poverty estimates of 1999-00 based on Lakdawala method as is shown in table 4A then we find that all the states excepting Assam have experienced increase in poverty in varying degrees. Interestingly ,in the 5^{th} phase (i.e. 2004-05 to 2009-10) we find that all the states excepting Assam have experienced fall in the rate of poverty in different magnitude with H.P,T.N, Gujrat, Orissa, Kerala showing much faster rates of fall in poverty. On the whole the table -4 confirms that the extent of poverty has declined in almost all the states in varying degrees since 1993-94.This is also confirmed by the study made by Himanshu (2007). However our analysis contradicts the major conclusion of Himanshu that poverty has reduced substantially between 1999-2000 and 2004-05, albeit he has drawn the conclusion by computing annual rates of changes in poverty. We also find the fall in the extent of poverty over the same period excepting for the states Rajasthan, Maharastra, Orissa, Harayana and Punjab but with a relatively smaller magnitude in some of the states.

Table -4A: Temporal behaviour of the rate of change in Poverty since 1973-74.

States	Percent point change in poverty in 1983-84 over 1973-74	Percent point change in poverty in 1993-94 over 1983-84	Percent point change in poverty in 1999-2000 over 1993-94	Percent point change in poverty in 2004-2005* over 1999-2000	Percent point change in poverty in 2009-2010* over 2004-2005*
Andhra Pradesh	-40.83	-23.24	-4.01	36.96	-28.72
Assam	-20.97	0.96	-11.67	-4.68	10.17
Bihar	0.50	-11.67	-24.49	31.08	-1.47
Gujarat	-31.90	-26.17	-33.08	95.06	-37.39
Haryana	-39.56	17.22	-55.68	121.62	-18.29
H.P.	-37.86	73.41	-58.86	95.73	-58.52
Karnataka	-29.80	-13.28	-22.80	30.87	-29.13
Kerala	-32.40	-37.09	-38.26	24.84	-38.77
M.P.	-19.42	-14.58	-11.45	29.08	-24.49
Maharashtra	-18.41	-15.15	-22.27	5.41	-18.87
Orissa	-1.34	-25.62	-8.67	28.97	-54.59
Punjab	-42.52	-27.26	-47.75	239.83	-23.92
Rajasthan	-25.31	-20.46	-22.66	62.26	-27.91
T.N.	-6.04	-32.19	-36.77	32.73	-41.83
U.P.	-17.52	-13.21	-21.54	27.61	-7.82
W.B.	-13.53	-34.99	-20.64	20.84	-21.93

*Source: Author's Computation. * Figures of poverty are estimated by Tendulkar Methodology*

Interestingly it also follows from **table-4 &4A** that there has been high degree of variations in the incidence of poverty and its rates of decline both across states and time. The time profile of the C.V reveals a tremendous increasing trend in cross state variations in the incidence of poverty from 24.19% in 1973-4 to43.31% in 2004-05 and further to 43.83% in 2009-10 albeit with a bit fluctuation between 1987 and 1994. This clearly indicates a divergent trend .However it is discernable from the table-3 that the time profile of the values of Gini inequality of each states does not reveal any uniform trend. On the whole we find that (i) almost all the states have experienced increase in their growth rates coupled with some states experiencing increase in the degree of inequality and some experiencing falling inequality especially in the post reform period; (ii) all states experienced fall in the incidence of poverty with some achieving much faster fall and some very smaller rate of fall in the same .Further some states have experienced increasing inequality with lower growth rate and falling incidence of poverty.

Now if we look at the regional concentration of poverty and population across the states, the overview of which is given in table -5 then we find an interesting picture It follows that in the states like Bihar, UP, the shares in the total poverty stricken people of India are much higher than

their share in total population in 1999-2000 and 2009-10. For instance, while the share of UP in total population were 17% and 16.49% in 2001 and 2011 respectively, the relative share in total poverty stricken people of India were 20.36% and 20.80% respectively in the same period. Surprisingly, it is evident that while the share of UP in total population has fallen between 2001 and 2011 the same in poverty has increased between the same period. It is further interesting to note that while the shares of the state Bihar in total population of the country have fallen from 10.69% in 2001 to 8.58% in 2011, its share in poverty has fallen marginally from 16.36% to 15.32% during the same period. The same trend is also found to persist for the states Maharashtra, West Bengal. However, the share in total poverty afflicted people in Orrisa (4.32%) has been found to be much higher than her share in total population (3.46%) in 2011. The same picture is also found to persist in Orissa in 1999-2000 . If we club the shares of the states like Bihar, MP, Maharashtra, Orrisa, UP, West Bengal and Tamil Nadu in total poverty stricken people and in total population in India then it is really surprising to note that while these states together account for only 53.96% of total population of India, their share in total poverty afflicted people of the country reads the figure of 62.24% in 2009-10. It is also evident that in all these seven states the shares of poverty stricken people were much larger (71.65%) than their share in total population (56.40%) in 2001. Now if we compare the growth performance of these states with their relative share in poverty then we really find a contrasting picture of high growth with higher concentration of poverty. So, once again we find a paradoxical relation between growth performance and regional concentration of poverty.

Table-5: Regional Concentration of Poverty and Population in 2009-10

States	No of persons below poverty line(in lakh)	Percentage of poverty afflicted people	Percent share in total population in 2011.
A.P.	176.6	4.98	6.99
Assam	116.4	3.28(3.63)	2.58(2.59)
Bihar	543.5	15.32(16.36)	8.58(10.69)
Gujarat	136.2	3.84	4.99
Haryana	50	1.41	2.09
H.P.	6.4	0.18	0.57
Karnataka	142.3	4.01	5.05
Kerala	39.6	1.12	2.76
M.P.	261.8	7.38(11.47)	5.99(7.91)
Maha	270.8	7.64(8.76)	9.29(9.41)
Orrisa	153.2	4.32(6.5)	3.47(3.57)
Punjab	43.5	1.23	2.29
Rajasthan	167	4.71	5.67
Tamil Nadu	121.8	3.43	5.96
U.P.	737.9	20.80(20.36)	16.49(17)
W.B.	240.3	6.76(8.2)	7.55(7.81)
ALL INDIA	3546.8	100	100

Source: Authors computation from the data on poverty and census data on population. Figures in parentheses are for 1999-00 (for poverty) and 2001 (for population).

IV. **Analysis of Panel Regression Results.**

Now to resolve the paradoxical relation between growth, poverty and inequality and also to find out the proximate explanatory factors responsible for the cross state and cross time variations in the incidence of poverty we undertake panel regression by using five yearly Panel data following the linear model as specified in section II. We use the software *LINDEP*. Since our economy has experienced a policy evolution from growth mediated development strategy to growth cum public action (workfare program) led development strategy even during the post reform period, to capture the impact of these policy variables on cross state and cross time incidence of poverty we have used SSE, GRPCNSDP, as proximate explanatory factors in our panel. Further since we find a paradoxical relation between growth and inequality, we have also incorporated INQ as a possible explanatory factor. Moreover, since the spread of education has a close bearing on the incidence of poverty, we have used literacy as a possible explanatory factor. Now, since we find that our growth trajectory reveals a radical structural transformation through service sector revolution, to capture the effect of this we have used a modified panel function by incorporating GPCYA, GPCYI, GPCYS as other possible explanatory factors for cross state and cross time variations of the incidence of poverty. The following forms of model specifications for panel regression are used:

$$POV = f\,(Constant, SSE, GRPCNSDP, INQ) \qquad \text{(I)}$$

$$POV = \varphi\,(Constant, SSE, INQ, GPCYA, GPCYI, GPCYS) \qquad \text{(II)}$$

Now, since in the pooled regression method the assumptions of constancy of intercepts and slope parameters across unit and time are unreasonable one has to allow the intercept term to vary over time and across units by using the fixed effect model (FEM). Since both the number of states (N) and the number of time periods (T) are small which are not drawn randomly in our case and further since it follows from the results that residual sum of squares fall substantially in FEM over pooled model the use the fixed effect model is likely to be desirable. However since in our analysis the N is much larger than T and the assumptions of error component model hold ,the estimators of random effect model (REM) are likely to be more efficient than FEM estimators(Taylor,1980). Moreover since both the Lagrange multiplier (LM) test and Hausman test for FEM vs (REM) rejects the validity of FEM we use the REM without combined error component (for both I and II

model specifications above) following the equation (2) in section II. The results of of the panel regression for the model –I are given in the table below.

It is evident from the result (see table –I) that the coefficients of the variables SSE and GRPCNSDP are highly significant as is indicated by their (P-Values) along with their expected signs. So on the basis of the result we can draw the following conclusions. First in relative term 1% increase in social sector expenditure will lower poverty by 1.29 points. Secondly we can say that 1% increase in per capita NSDP will bring down the poverty by 1.53 points. Finally the effect of inequality on the incidence is insignificant. So the cross state temporal variations in the SSE and GRPCNSDP seem to be the crucial explanatory factors for the cross state temporal variations in the incidence of poverty.

Table: I Result of Panel regression REM of model- I

Vraiable	Coefficient	P Values
SSE	-1.293781485	0.0001
GRPCNSDP	-1.533621668	0.0000
INQ	-0.1897726546	0.5324
Constant	10.011073	0.0000
R Squared	0.15553	
Var(u)	0.894241	
Var (v)	0.155603	
Sum of squares	0.257582	
LM test=	119.85	0.0000
Hausman test =	2.76	0.43

Now since our economy has experienced structural transformation with tremendously increasing trend in the service sector- led growth, we use the sectoral break up of the per capita growth of NSDP so as to capture the effect of temporal and cross state changes in the growth rates of per capita NSDP originating from the major three sectors on the cross state as well as temporal variations in the poverty. In such case also the Hausman test favours the use of REM. The results of panel regression under REM model following equation -2 and model specification-2 are given in table-2 below.

Table: II Result of Panel regression REM of model -II

Vraiable	Coefficient	P Values
SSE	-1.221556585	0.0002
INQ	-0.3083839646	0.3107
GPCYA	-0.4678071012	0.8361
GPCYI	0.9542299452	0.6380
GPCYS	-1.231985593	0.0000
constant	60.40680391	0.0000
R Squared	0.1196	
Var (u)	0.909979	
Var(v) =	0.202577	
Sum of squares	0.268529	
LM test=	115.78	0.0000
Hausman test =	7.35	0.19567

It is evident from the result table –2 that the coefficients of the variables SSE and GPCYS are highly significant (as is indicated by their(P-Values) along with their expected signs. So on the basis of the result we can draw the following conclusions. First in relative term 1% increase in social sector expenditure will lower poverty by 1.22 points. Secondly we can say that 1% increase in per capita NSDP from service sector will bring down the poverty by 1.23 points. Finally the effects of inequality, GPCYA, GPCYI on the incidence of poverty are found to be insignificant in this model specification. So the cross state temporal variations in the SSE and GPCYS seem to have produced a substantial favorable impact on the cross state temporal variations in the reduction of the incidence of poverty. Therefore we can plausibly say that our panel results are highly compatible with the policy evolutions towards poverty reduction and also with nature of the structural transformation with tremendous increase in service sector –led growth which has also produced favorable impact on the reduction of poverty across states and over time. Therefore it is also plausible to conclude that for the further reduction in the magnitude of poverty of the people across the states more emphasis should be placed not only on the increase in the growth rates but also on the tremendous increase in the social sector expenditures like health ,education etc across the states. However because of the high degree of regional concentration of poverty as compared to that of population in a few states some region specific special strategies for poverty alleviation seem to produce substantial favorable effect on the incidence of poverty.

It is however interesting to note that in both of these panel results the variances (var (u)) assume very large values which clearly indicate that larger variations in the state specific factors (state

specific workfare programmes)and the omitted variables seem to be responsible for the lower values of R squared in the REM. Now since we have not selected the states and periods randomly and further since the N and T are small the FEM could have been appropriate such that results of the FEM which are given in the APPENDIX-6(Table I&II) also indicate that the same explanatory factors like SSE, GRPCNSDP in the first specification and SSE and GPCYS in the second specification are highly significant with higher values of adjusted R squared (viz; 0.63 and 0.68). Further in terms of goodness of fit (with the values of Adj. R Squared 0.63 and 0.68) and the model test i.e. the F value and its probability, the regression results are found to be robust. It is interesting to note that in another study covering the period from 1983-84 to 2004-05 we have used the poverty estimates of planning commission based on uniform methodology for panel regression(FEM) and found that the variables INQ,SSE,GRPCNSDP,LIT and industrial growth (INDGR) together explain 86% of the cross state variations in the incidence of poverty over time such that all these explanatory factors excepting the variable INDGR have been found to be highly significant with their respective desired signs (Table -3, Appendix -6)(Ghosal,2011).

V. Concluding Observations

The main objectives of this paper were : (i) to examine the temporal and cross state behaviour of the growth ,poverty and inequality and also to examine the relations between them and see whether the temporal behaviour of the incidence of poverty is compatible with the policy evolution followed since independence (ii) to re-examine whether the conventional hypothesis that growth is a necessary but not sufficient condition for the reduction of poverty across the states hold; and finally to find out the proximate explanatory factors for the cross-state and temporal variations in the incidence of poverty in terms panel regression analysis. The following conclusions emerge from our study.

First at the aggregative level our economy has indeed achieved a high growth trajectory such that it has been conspicuous during the post reform period with a remarkable structural transformation on unconventional path which has been accompanied by a tremendous increase in service sector driven growth path. Second, all the states have experienced increase in the growth rates of their real per capita NSDP in varying degrees over the period and the post reform period marks a phase of achievement of very high growth rates for almost all the states. Further the relative positions (ranks) of the states in respect of the achievement of the growth of per capita NSDP have changed sporadically over the period. The nature of the growth experienced by the states is found to be divergent over the period between 1973-74 and 2009-10 and also between 1991 and 1009-10.

Second we do not find any uniform relation between temporal behaviour of the growth rates and the Gini inequality across the states. However the values of Gini inequalty coefficients in most of the states are found to remain high over the entire period. In fact the relation between temporal behaviour of growth rates and the Gini inequality across states are found to be paradoxical.
Third, the time profile of the incidence of poverty across the states clearly reveals that almost all the states excepting Bihar experienced a declining trend in the incidence of poverty during 1973-74 to 1983 -84 in varying degrees. Similarly the period from 1983-84 to 1993-94 also records a declining trend in the incidence of poverty for almost all the states excepting Harayana and H.P. Interestingly almost all the states have experienced declining trend in the incidence of poverty in varying degrees over the period from 1993-94 to 2009-10 i.e. during the post reform period. We also find that the relative positions of the states in respect of their ability of reduction of poverty varies remarkably at the inter temporal level over the period of our study. Fourth, the time profiles of growth rates, Gini inequalities and the rates of fall in the incidence of poverty do not reveal any definite desired relations . Further we find a paradoxical relation between growth performance and regional concentration of poverty. Fifth our panel regression results confirm that the cross state temporal variations in the SSE and GRPCNSDP and the GPCYS are the crucial explanatory factors for the cross state temporal variations in the incidence of poverty. Finally we can plausibly say that our panel results are highly compatible with the policy evolutions towards poverty reduction and also with nature of the structural transformation with tremendous increase in service sector –led growth which has also produced favorable impact on the reduction of poverty across states and over time. Therefore it is also plausible to conclude that for the further reduction in the magnitude of poverty of the people across the states, more emphasis should be placed not only on the increase in the growth rates but also on the tremendous increase in the social sector expenditures like health ,education etc across the states. However because of the high degree of regional concentration of poverty as compared to that of population in a few states some state specific special strategies for poverty alleviation seem to produce substantial favorable effect on the incidence of poverty.

References:

Bhaduri, Amit (2008): "Predatory Growth": Lecture delivered at the Dept. of Economics, University of Calcutta, Kolkata, March 28.

Bhalla, S.S. (2005): "Recounting the Poor" in Angus Deaton and Valerie Kozel (ed), The Great Indian Poverty Debate, Macmillan India Ltd, New Delhi.

Datt, Gaurav (1999): "Has Poverty Declined Since Economic Reforms", Economic And Political Weekly (EPW), 34(10).

_____ and Martin Ravallion(1998): "Farm Productivity and Rural Poverty in India" Journal of Development Studies, v-34, pp-62-85.

_____and Kozel and M Ravallion (2005): "A Model Based Assessment of India's Progress in Reducing Poverty in the 90's" in Angus Deaton and Valerie Kozel (ed), The Great Indian Poverty Debate, Macmillan India Ltd, New Delhi.

Gaiha, R.(1989): "On the Estimate of Rural Poverty in India-An Assessment", Asian Survey, 29(7).

Ghosal, Ratan.K(2005): "Globalisation And the Nation State**"** in Occasional Papers, vol-14 March, 2006, Rabindra Bharati University, Kolkata. Also in Open Eyes, vol. 2, no.1&2, June-Dec .

.----------(2005): **"**Globalisation and Inequality**",** Indian Economic Journal, vol. 53, no 2, pp 71-86.

----------(2007)**:"**Augmented Solow Model of Growth and Its Empirical Relevance", Journal of Quantitative Economics, vol.5, no. 1, pp.85-100 January .

----------**(**2009):"Cross-Country Differentials in Economic Growth and Inequality in South Asia: A Panel Data approach", Indian Economic Journal, Vol. 57, No 1, pp 132-157, April –June**.**

----------(2010):"Inter-state Disparity in Growth, Poverty and Inequality in India—A Panel Data Approach" Asian Economic Review, vol. 52, No. 2 August .

----------(2011): "Growth, Inclusiveness and Reforms---Some Issues and Challenges" Paper presented at the National Conference of Indian Economic association held at Pune, India during December 27-29,2011.

Ghosal, Ratan.K. and Chattopadhyay, A. (2005): "Cross-State Differentials in Rural Poverty in India" in K, Nageswara Rao (ed) "Poverty in India", Deep & Deep Publication Ltd, New Delhi.

Himanshu (2007): "Recent Trend in Poverty and Inequality: Some Preliminary Results", EPW, Feb. 10, 2007.

Jha, R. (2000); "Growth, Inequality and Poverty in India-Spatial and Temporal Characteristics", EPW 36(3).

Jha,R., Biswal,B.,Biswal,D.Urvashi(2000): "An Empirical analysis on the Impact of Public expenditure on education and Health on poverty in Indian states", Working Paper,IGIDR,General Vaidya Marg, Goregaon(East),Mumbai 400065,India.

Jones, R.P. and K Sen, (2001): "On India's Poverty Puzzles and Statistics of Poverty", EPW, 36(3).

Mehta, K.A. and Amita Shah (2003): "Chronic Poverty in India, Causes and Policies", World Development, 31(3).

Meenakshi,J.V and B Vishwanathan(2003):"Calorie Deprivation in Rural India,1983-99/2000",EPW 38(4).

Radhakrishna, R. and S Ray (2005): "Poverty in India-Dimensions and Character" in Kirit Parikh and Radhakrishna (ed), "India Development Report", 2004-05, IGRD, OUP, New Delhi.

Rakshit,Mihir (2007): "Services- led Growth: Indian Experience" Money and Finance,February.

----------(2009): Macroeconomics of Post Reform India,Oxford University Press,New Delhi.

Sen, Pronab (2005): "Of Calories and Things", EPW, 40 (.43).

Saith, A. (2005): "Poverty Line Versus the Poor, Methods Versus Meaning", EPW, 40(43).

Sen, A. (1996): "Economic Reforms, Employment and Poverty: Trends and Options", EPW, 37(3).

_____(2000): "Estimates Of Consumer Expenditure and its Distribution: Statistical Priorities after NSS 55th Round",EPW,35(51).

Sengupta, Arjun, K Kannan and G Raveendran (2008) "India's Common People: Who Are They,How many Are They and How Do They Live? EPW,March ,49-63

Subramanian, S. (2005): "Fractions Versus Whole Numbers on Head Count Comparison of Poverty Across Variable Populations", EPW,40(43

Sundaram, K. (2001): "Employment and Poverty in 90's: Further Results from NSS 55th Round Employment-Unemployment Survey", EPW, 36(32).

_____ and S Tendulkar (2003): "Poverty Has declined in the 90's-A Resolution of Comparability Problems in NSS Consumer Expenditure Data", EPW, 38(4).

Suryanarayana, M.H. (2000): "How Real in the Secular Decline in Rural Poverty?" EPW, 35, (25).

Taylor,W.E (1980) :" Small Sample Consideration in Estimation from Panel data", Journal Of Econometrics Vol. 13, pp.203-23.

Appendix Table: 1

Annual Compound Growth rate of NSDP (at factor cost) (%)

States	Period								
	1961-71	**1971-81**	**1981-91**	**1991-2001**	**2001-2008**	**1961-91**	**1971-91**	**1991-2008**	**1961-2008**
Andhra Pradesh	2.92	3.13	7.06	3.80	7.65	4.35	5.08	5.37	4.72
Assam	3.07	3.36	4.78	5.89	2.22	3.73	4.07	4.36	3.96
Bihar	1.94	2.74	4.26	2.39	8.18	2.98	3.50	4.74	3.61
Gujrat	4.53	10.26	0.99	5.80	9.25	5.19	5.53	7.20	5.92
Hariyana	5.94	4.53	6.58	4.75	8.71	5.68	5.55	6.36	5.93
Himachal Pradesh	5.81	3.04	5.60	5.14	6.92	4.81	4.31	5.87	5.19
Karnatak	4.22	3.12	13.69	7.62	6.67	6.91	8.27	7.23	7.02
Kerala	3.98	2.28	3.73	5.07	8.27	3.32	3.00	6.38	4.42
Madhya Pradesh	1.70	3.34	6.01	3.65	5.36	3.67	4.66	4.35	3.91
Maharashtra	2.92	4.40	6.26	5.64	7.75	4.51	5.32	6.50	5.23
Orrisa	-1.72	1.88	2.48	3.94	6.46	0.86	2.18	4.97	2.33
Punjab	5.13	4.60	5.73	4.64	4.94	5.15	5.17	4.76	5.01
Rajastan	4.96	0.90	7.85	4.61	6.66	4.53	4.32	5.45	4.86
Tamilnadu	2.51	1.72	6.31	6.11	5.65	3.49	3.99	5.92	4.36
Uttaar Pradesh	2.51	2.95	5.30	2.75	7.18	3.58	4.12	4.55	3.93
West Bengal	2.19	3.13	3.82	7.01	6.97	3.04	3.47	6.99	4.45
C.V	***58.03***	***59.89***	***48.96***	***28.93***	***25.03***	***33.23***	***30.26***	***17.76***	***23.30***

Appendix Table: 2

Annual Compound Growth rate of Agriculture and Allied Activities (at factor cost) (%)									
States	**Period**								
	1961-71	**1971-81**	**1981-91**	**1991-01**	**2001-08**	**1961-91**	**1971-91**	**1991-08**	**1961-08**
Andhra Pradesh	2.10	1.32	3.49	2.59	4.77	2.30	2.40	3.48	2.72
Assam	1.63	2.83	1.16	2.64	0.80	1.87	1.99	1.88	1.87
Bihar	0.94	1.14	2.45	-0.85	3.76	1.51	1.79	1.02	1.33
Gujrat	5.12	8.74	-2.48	0.69	15.57	3.69	2.98	6.57	4.72
Hariyana	5.33	3.17	5.20	1.33	3.43	4.56	4.18	2.19	3.70
Himachal Pradesh	5.70	2.19	2.81	-0.14	2.88	3.56	2.50	1.09	2.66
Karnatak	3.83	0.38	10.87	6.62	-3.92	4.94	5.49	2.15	3.92
Kerala	1.93	0.99	2.52	-0.90	2.07	1.81	1.75	0.31	1.27
Madhya Pradesh	1.06	1.05	5.09	-1.13	5.31	2.38	3.05	1.47	2.05
Maharashtra	-1.28	3.96	4.31	3.01	3.68	2.30	4.14	3.28	2.65
Orrisa	-3.06	1.28	-2.09	1.68	4.59	-1.31	-0.42	2.87	0.18
Punjab	4.70	4.23	5.36	3.17	2.52	4.76	4.79	2.90	4.09
Rajastan	6.09	-1.28	7.18	-1.45	6.60	3.93	2.86	1.79	3.15
Tamilnadu	0.13	-1.88	3.95	3.85	0.02	0.71	1.00	2.25	1.26
Uttaar Pradesh	1.61	1.94	2.78	1.66	2.62	2.11	2.36	2.05	2.09
West Bengal	1.62	4.39	0.39	5.85	3.85	2.12	2.37	5.02	3.16
C.V	***111.66***	***116.04***	***99.27***	***134.85***	***109.27***	***63.18***	***53.95***	***61.61***	***47.86***

Appendix Table: 3

Annual Compound Growth rate of Industry (at factor cost) (%)									
States	**Period**								
	1961-71	**1971-81**	**1981-91**	**1991-2001**	**2001-2008**	**1961-91**	**1971-91**	**1991-2008**	**1961-2008**
Andhra Pradesh	5.58	5.60	11.06	2.98	6.69	7.38	8.30	4.49	6.33
Assam	6.73	3.00	3.75	11.57	1.55	4.48	3.37	7.33	5.50
Bihar	6.25	3.81	4.13	-1.07	2.96	4.72	3.97	0.57	3.20
Gujrat	4.24	10.27	5.07	5.40	9.55	6.49	7.63	7.09	6.71
Hariyana	8.69	4.55	9.85	3.36	8.52	7.67	7.17	5.45	6.86
Himachal Pradesh	14.07	-3.01	17.44	8.37	11.38	9.12	6.73	9.60	9.29
Karnatak	5.62	10.41	11.86	4.93	7.77	9.26	11.13	6.09	8.10
Kerala	6.97	1.41	3.91	2.64	6.34	4.07	2.65	4.15	4.10
Madhya Pradesh	7.71	6.06	8.70	3.71	2.34	7.48	7.37	3.14	5.89
Maharashtra	5.65	5.17	5.63	2.60	6.06	5.48	5.40	4.01	4.95
Orrisa	2.85	1.44	8.24	3.94	4.91	4.14	4.78	4.34	4.21
Punjab	6.36	4.71	10.29	2.99	4.68	7.10	7.46	3.68	5.85
Rajastan	1.88	4.50	9.38	8.23	6.01	5.21	6.91	7.31	5.97
Tamilnadu	6.19	4.11	5.52	5.32	2.28	5.27	4.81	4.06	4.83
Uttaar Pradesh	5.50	5.93	8.19	0.57	6.24	6.53	7.05	2.86	5.19
West Bengal	1.61	0.99	4.59	5.83	3.46	2.38	2.77	4.85	3.27
C.V	***48.53***	***76.79***	***46.50***	***69.17***	***48.94***	***31.54***	***37.39***	***43.84***	***28.99***

Appendix Table: 4

Annual Compound Growth rate of Services (at factor cost) (%)

States	Period								
	1961-71	1971-81	1981-91	1991-2001	2001-2008	1961-91	1971-91	1991-2008	1961-2008
Andhra Pradesh	3.71	4.97	9.03	4.88	9.39	5.88	6.98	6.72	6.18
Assam	5.60	4.64	9.83	6.71	3.20	6.67	7.21	5.25	6.15
Bihar	2.26	5.08	6.58	5.85	11.03	4.63	5.83	7.96	5.82
Gujrat	4.01	11.93	1.26	8.44	6.64	5.64	6.47	7.69	6.38
Hariyana	5.95	7.21	6.82	8.86	11.42	6.66	7.01	9.91	7.82
Himachal Pradesh	4.61	5.34	6.28	7.41	7.23	5.41	5.81	7.33	6.10
Karnatak	4.48	3.86	17.69	9.27	10.56	8.50	10.56	9.80	8.97
Kerala	5.75	4.03	4.67	8.70	10.11	4.82	4.35	9.28	6.41
Madhya Pradesh	1.10	6.39	5.82	7.99	6.33	4.41	6.11	7.30	5.45
Maharashtra	4.87	4.12	7.73	8.06	9.29	5.56	5.91	8.56	6.64
Orrisa	1.07	3.51	7.01	5.64	7.86	3.84	5.25	6.55	4.81
Punjab	5.36	5.09	4.32	7.22	7.06	4.92	4.70	7.15	5.73
Rajastan	3.78	3.59	8.21	8.20	7.03	5.17	5.88	7.72	6.09
Tamilnadu	3.74	3.40	8.11	7.37	8.31	5.06	5.73	7.76	6.03
Uttaar Pradesh	3.63	3.75	7.54	4.54	10.14	4.96	5.63	6.81	5.62
West Bengal	3.12	2.91	6.43	8.05	9.11	4.14	4.65	8.49	5.69
C.V	***38.02***	***43.56***	***46.72***	***19.52***	***25.43***	***21.22***	***23.56***	***15.87***	***15.49***

Appendix: 5 Results of cross state Convergence Regression Analysis

Appendix Table -5.1 Results of cross state Convergence Regression Analysis

Vraiable	Coefficient	t Values
Constant	-1.746	-0.706
X2	0.465	1.205
Adj. R Squared	0.029	

Independent Variable ➔ *Y2*

Where *Y2=log(Y_ PCNSDP_10)-log (PCNSDP_71)*

X2=log(PCNSDP _71)

Appendix Table -5.2 Results of cross state Convergence Regression Analysis

Vraiable	Coefficient	t Values
Constant	0.514	0.307
X3	0.59	0.306
Adj. R Squared	0.047	

Independent Variable ➔ *Y3*

Where *Y3=log(Y_ PCNSDP_10)-log (PCNSDP_1980-81)*

X3=log(PCNSDP _1980-81)

Appendix Table -5.3 Results of cross state Convergence Regression Analysis

Vraiable	Coefficient	t Values
Constant	-0.737	-0.556
X4	0.170	0.149
Adj. R Squared	0.015	

Independent Variable ➔ *Y4*

Where *Y4=log(Y_ PCNSDP_10)-log (PCNSDP_1990-91)*

X4=log(PCNSDP _1990-91)

APPENDIX-6

Table:1 Result of Panel regression FEM of model I

Variables	Coefficient	P Values
SSE	-1.418215793	0.0000
GRPCNSDP	-1.48983952	0.0000
INQ	-0.138727649	0.6602

R Squared	0.6809	
Adj. R Squared	0.628	
Model Test: F[18,119] =	12.93	0.0000
Diagnostic: Log- L=	-458.8088	
LM test=	119.85	0.0000
Hausman test =	2.76	0.43

Table:2 Result of Panel regression FEM of model II

Variables	Coefficient	P Values
SSE	-1.3594	0.0001
INQ	-0.2526	0.4267
GPCYA	-0.2118	0.9258
GPCYI	0.1395	0.4953
GPCYS	-1.2444	0.0000

R Squared	0.6816	
Adj. R Squared	0.6221	
Model Test: F[20,107] =	11.45	0.0000
Diagnostic: Log- L=	-458.6833	
LM test=	115.78	0.0000
Hausman test =	7.35	0.1956

Table:3 Result of Panel regression FEM model

Variables	Coefficient	P Values
SSE	-.94995432	0.0000
INDGR	-.46378099	0.3405
GRPCNSDP	-2.6517603	0.0029
LIT	-.3765848	0.0000
INQ	.4354865	0.0736

R Squared	0.893227	
Adj. R Squared	0.85703	
Model Test: F[20,59] =	24.68	0.0000
Diagnostic: Log- L=	-232.0614	