



# **A State Level Analysis of the Social Infrastructure: Public Private Partnership in Education and Health**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

Since 1991, several sectors have experimented with Public Private Partnership (PPP) for infrastructure development in India, particularly at the National level with mixed results. However, there have been relatively fewer instances of PPPs at the state and local levels. This is mainly due to bottlenecks to PPPs at the Institutional, Organisational and Project level in Indian states. In response, the Indian government has initiated several schemes to enable state governments to implement infrastructure projects via PPP. India has also not experiment and explored the opportunities of PPP in social infrastructure. Though India has increasingly recognised the need for PPP in infrastructure development and has implemented some successful infrastructure projects through the PPP mode in the core and urban infrastructure, it is yet to realise its potential on social infrastructure. India as one of the leading countries of the Asian economy should highly target on the social development along with the economic growth for a sustainable development. Education and health form the major part of social infrastructure where India has a huge gap and thus scope to experiment with PPP. Considering the fact of the poor education and health status in India, it is the right time to enhance these potential sectors to move on ladder of economic and social development. This calls for exploring many opportunities and PPP is one effective way of achieving better social delivery. On the backdrop of this, the paper tries to explore the opportunities for implementing PPP in social infrastructure by analysing the effects of public and private expenditure on Human Development Index (HDI) and exploring it through case studies.

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## 1. INTRODUCTION

The concept of Public Private Partnership has gained increasing importance in public policy debates in the last few years. The PPP works on a complex framework, and hence the notion of PPP has multiple dimensions to it and thereby is confronted with both criticism and avid praise. The recent arguments for and against PPP has provoked many policymakers and economists to look at PPPs from different perspectives. There have been quite a lot of successful PPP models that worked best across the world in many infrastructure projects but the same models implemented in different countries have proven to be wrong. This aspect of PPPs has opened room to look at what are the factors and challenges facing PPP. Many different aspects such as the size of the country, the natural resources, the nature of the government, industry structure, the demand of the consumers and finally the institutional set up has to be deeply understood before starting to implement a PPP framework. There are many other factors that could influence a PPP project but the above mentioned factors are considered to be crucial that have to be considered for certain to come up with successful PPP.

## 2. BACKGROUND

### 2.1 The Way to PPP

India has opened its hands to global interests through the new economic reform since 1991. Since then there has been increasing private players entering the field to provide quality and innovative goods and services to people. The landmark policy of Liberalisation-privatisation-Globalisation (LPG) has directly influenced consumer demands through innovation and not so purely free trade. This has touched many Indians through quality and updated services. The provision of public goods particularly the infrastructure was solely the responsible of government. However, since the late 1990s and the beginning of the 21<sup>st</sup> century many private players started to show interest in providing the infrastructural facilities that the country needs. There have been some initial hiccups for the private sector to realise their dreams of providing the infrastructure projects but then later there have been huge scope for them to enter which changed the monopoly status of market. Since

2003 there have been many PPP projects proposed and implemented in India out of which few are considered to be very successful. Most of these PPP projects are basically in the core and urban infrastructure. There have been very few PPP projects in the social sector in India. As a developing country there is increasing urgency to look at the social sector and provide it with state of the art social infrastructure. Considering that India is a growing population of 1.2 billion people it is really high time India seriously start to improve the welfare of her huge population. Looking at many social and development indicators like HDI, poverty, literacy, gender inequality and income inequality it is really astonishing and disheartening to see India lag behind in most of these indicators compared to its other counterparts. To harness the available resources and direct it to productive use by developing good infrastructure, both the public and private sector can do best through the PPP route amid the criticism surrounding the issue.

### 2.2 The Need for Social Infrastructure Spending

As every nation is in the phase of reaching higher economic growth it is equally important for each country to improve its infrastructure to achieve the desired economic growth rate. Infrastructure facilitates in doing business with much ease and a sophisticated infrastructure helps in minimising the cost of the business transaction. A consistent long term economic growth gradually improves the human welfare of the economy thus leading to economic development. Generally, Infrastructure is of three different types and they are categorised as follows:

- Core Infrastructure (Roads, highways, ports, airports and railways)
- Urban infrastructure (water supply, solid waste management, power, telecom etc)
- Social infrastructure (Education, skill development and healthcare sector)

Categorising infrastructure into the above groups is highly helpful in identifying the necessary infrastructure that the country needs. It helps the policymakers to identify in which category there is less than optimum projects and allocate the necessary resources towards the project. It is quite obvious to think that the developed

countries invest more on the first two categories and the developing countries invest on the third. It is true that many of the successful PPP models from the developed countries are in core and urban infrastructure but there are also notable PPP in social infrastructure. However, In case of India it is heavily concentrating on the first two categories alone. There are hardly few projects in social infrastructure. But as a developing nation it is equally important to invest in social infrastructure.

India is a country with large heterogeneous mix of population with more than half of its population below the age of 35 years. People under this age are highly productive and ambitious who form the bulk of the labor workforce. Hence in a dynamic market this could be the right time to start investing in education and healthcare to ensure that this section of the society gets the adequate skills and healthcare to attain maximum productivity. The changing lifestyle has put pressure on the health of the Indian population which again stresses the fact that healthcare should be one of the top most priority of the government. It is not only the young population that needs the state of the art healthcare but also the growing old population. As an emerging nation, India needs to consciously develop the habit to invest in these social sectors to tap the power of the vibrant population to move on the ladder of economic development.

### **2.3 India's Stand on Social Development Indicators**

Apart from the traditional basic needs the modern requirements that measures human welfare are basic education, health and economic opportunities that maximises his social utility. When considering the two primary social sectors India has shown a significant improvement in the areas of education but the status of health is so poor for a developing nation. Many aspects of education such as gender equality, reduction in dropout ratio and free primary education to all have been achieved in the last ten years. But various health related issues and indicators have been showing a poor trend. This is mainly attributed to the governance and institutional setup in India that struggles hard to direct or mobilise the fund or resources to these sectors. Even in the case of education when compared to global standards India lags behind many of the social indicators. India ranks 135 in HDI among the medium development countries. The literacy rate of India is 74.04

percent as per 2011 figure which is much below the world average of 84 percent. The Ginni coefficient, a measure of income distribution among households is 38.1 percent as per 2011 world bank data. The unemployment rate is 8.8 percent which is way below the global standard. The maternal mortality rate is 200 deaths/100000 live births and the fertility rate is 43.19/1000 births. According to UNICEF, one in three malnourished children is from India. The poverty rate has declined by 22 percent in the last eight years to 29.8 percent in 2010. With government facing budget deficits both at the centre and state level there have been arguments in lowering the subsidies as it is causing the fiscal deficit to rise. This has put pressures on the functioning of governance as they have started to encourage private players to provide the infrastructure. This has increased the scope for PPP in India in recent years.

### **2.4 Challenges Facing Public Private Partnership**

The Concept of PPP evolved in the late 19<sup>th</sup> century and was in stages of development in 20<sup>th</sup> century. In the last decade many governments across the world particularly the developing countries have increasingly started to adopt PPP mode in providing state of the art infrastructure facilities. India as an emerging economy has a huge scope and potential for PPP but there are challenges ahead in implementing the PPP projects in India. Some of the challenges that India faces regarding PPP are:

- Regulatory Environment
- Lack of Information
- Project Development
- Lack of Institutional Capacity
- Financial Availability

While most of these challenges are being worked upon by the Government of India, the limited availability of sources of funding remains as the biggest bottleneck for the success of the PPP model in India. Once these challenges are rightly identified and rectified, India can truly benefit from the concept of PPP and build a better infrastructure in the near future. The success of such PPP in the key social infrastructure provides a path for the government and private sector to work in harmony in future by mutual understanding to realise dream of access to education and healthcare services to all at affordable cost. To meet this end, the financial sector also needs to participate in providing

guidelines on financial aspects. There should be significant support from the financial sector to mobilise funds for implanting effective PPP model. The success of government's ambitious infrastructure program hinges on developing an adequate financial market.

### 3. LITERATURE REVIEW

Mehrotra [1] in his paper examined the need for Reforming Elementary Education and analysed a set of options. He examined the role of central government to achieve 5 years of schooling by 2007 and 8 years of schooling by 2010. In his paper he examines and identifies the varied options open for reforming the elementary education system in India from a large sample survey of Indian states. The feasible reform options that could increase the public spending, efficient work environment and incentives to demand for schooling and private sector were analysed. The paper found and concluded that even with these policy reforms on the floor, improving teacher accountability will remain as a key challenge to the achieve the goals.

Hammer et al. [2] in their paper examined the cause for Government failure in public health services. They developed an analytical framework to understand the status of healthcare in India. From a public sector accountability model they argue that a weak voice and low accountability is the key binding constraint to effective delivery of healthcare services and products. Various schemes such as National Rural Health Mission (NRHM) strengthen the voice by involving the local governments to manage and control the public health services. They found that while the efforts from such schemes could increase the voice; they fail to address the issue of incentives that determine the provider behaviour. It is only when the accountability is intact can they provide better healthcare to the rural poor who are still inaccessible to certain health services.

Luthra et al. [3] in their paper examines the role of Public Private Partnership in School Education in India. They analyse the factors concerning the role and functioning of PPP in education with special focus on India. The governments in developing countries have limited resources for it. The authors finally conclude their paper stating the issues and constraints in public private partnership in India and suggest ways for effective implementation of it to reap maximum benefits. PPP can be an important part of the

overall strategy to achieve quality at scale, but is not a permanent fix. They say that the PPP strategy must fit into and be in line with the overall school education strategy and priorities and also see that PPP is useful to the extent that it helps meet the larger goals. The authors suggest that the most fertile area for a PPP engagement in India is in the form of Model School scheme launched in November 2008. They point to similar PPP arrangement that was initiated in the Australian state of New South Wales in the form of the 'New Schools Project' that became a huge success. The authors see that the use of PPP structures in education projects in India is set to continue and expand in the coming years. They give future scope for further research in the field of Model School Scheme.

Kumar [4] in his paper argues for Promoting Public Private Partnership in Health Services and analyses a particular model called the Rogi Kalyan Saniti in MP's Badnagar tehsil. In this paper he understands the concept of PPP in health services has been increasingly adopted as an alternative option by the state governments. The author in his introduction gives an overall picture about the issues facing the health services with some statistics related to Primary Health Centers (PHCs) and Sub Health Centers (SHCs) and the corresponding doctor availability in certain states of India. The author notes that the Madhya Pradesh scheme of PPP is all the more unique in the sense that unlike in other states, where partnerships has been sought from market forces the RKS seeks direct involvement of the users and service providers in running the public hospitals. He subsequently explored further improvement in health services in the state on implementation of the scheme. In the subsequent analysis he points out to the statistics that improved by the RKS scheme in Badnagar. He also poses the obstacles that hinder the existence of this scheme associate with political turnover. Finally, the author concludes with stating that with the formation of RKS the Madhya Pradesh government has taken a lead in heralding institutional reform in the health sector. The RKS has made the government hospital more open to citizen's involvement in decision-making. He also notes that the functioning of the government hospital has become more transparent, accountable and sensitive to the needs of the patients. He concludes that the statewide reach and impact of this innovation could be assessed only after undertaking a detailed study with a much larger

sample of RKS operating at different level of hospitals and health centers.

healthcare infrastructure to better address the health issues of its people.

### **3.1 Status of India in Achieving the Millennium Development Goals**

## **4. MOTIVATION AND OBJECTIVE OF THE STUDY**

#### **3.1.1 Millennium development goals**

The developing nations targeted a set of goals in 2000 UN Millennium Summit to be achieved by the year 2015 what came to be known as the Millennium Development Goals (MDGs). There are totally eight goals that have to be achieved and most of these goals are directly related to health. The MDGs for India are:

There are many studies that have already explored the public and private expenditure pattern in social sectors. There are also several papers on Public Private Partnership and most of these papers on PPP are theoretical that have primarily dealt with the nature and need for PPP in social sectors. The papers on expenditure also simply highlight the trend of expenditure in social sectors. Most of the papers on PPP are theoretical in nature and there aren't enough empirical papers that have explored the opportunities for PPP in social sector. Hence with the changing political and economic scenario of India there is a need to understand the relationship between expenditure and development. With the eleventh five year plan period having kept ambitious targets for education and health and eleventh finance commission having aimed at encouraging more PPP and allocating huge fund for PPP programs there is a need to understand the scope for implementing successful PPP in social sector.

1. Eradicate extreme poverty and hunger
2. Achieve Universal Primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Global partnership for development

India in the last 13 years has been progressing in few of the above indicators. It has shown a significant improvement in the 2<sup>nd</sup> and 8<sup>th</sup> goals but poor trend is seen in other goals. Of all, the first six goals are of primary interest to our study which truly reflects the social development. Since these goals are framed by the UNO as the MDGs it indicates the need for social development as it is of immense concern for a developing country.

There is a general understanding that the improvement of education and health primarily depends on the central government allocations to states. But states can also increase its financial resources through different routes. In more recent years and in particular from the latest budget and the 12<sup>th</sup> finance commission it is seen that the states are given more autonomy in fiscal discipline. Earlier studies on PPP have explored the challenges faced by PPP on a national level but however there are very few studies that have explored the scope for PPP in social sectors at the state level. However, in general the PPP in social sectors are basically implemented by the state governments. This comes to an understanding that the power and authority to implement PPP lies with the state. As many of the PPP projects require the support of and approval from states there is a need to understand the scope for PPP from the states perspective. There is a greater role of states and the power of the state government is only expected to increase and this paves way for more infrastructure projects getting green signal in the future. Hence this paper is an attempt to study the scope and opportunities for PPP in social infrastructure at the micro level. The study also hopes that a micro analysis would add on to

Education and healthcare are the most important type of social infrastructure. Every nation particularly the developing nations like India and china with huge population should pursue to develop their social infrastructure to utilise their human resources to their advantage. A country's development is incomplete if it concentrates only on its urban infrastructure leaving aside the development of social infrastructure. The education and healthcare sector in India has grown and transformed itself in many ways over the last decade and the benefits of this transition can be sustained only by systematically improving the management of these sectors and importantly by improving the infrastructure. The 12<sup>th</sup> five-year plan of India has ambitious objectives concerning education and the globalising Indian economy is constantly on the move to identify opportunities to improve its

the already existing literature on national level and gives a fresh perspective of PPP in social sector at state level that gives further scope for research.

The primary objective of the study is to find the impact of per capita public and per capita private expenditure of education and health on Human Development Index during the tenth (2002-2007) and eleventh five-year plan period (2007-2012). To see this first, the study begins by analysing or looking at the trend of how the public expenditure has been moving with respect to government spending on education and health and how the private expenditure has been behaving with respect to the household spending on education and health. The study then further develops to see the relationship between expenditure and HDI. The main objective of the study is to see the influence of per capita public and private expenditure on HDI so as to understand the nature and scope for PPP in social sector. To understand this broader objective of the study, the paper is aimed at carrying out case study on states based on selected criteria. The need for the case study is to validate the results of the analysis and give some policy implications in order to implement successful PPP programs in social sector.

## 5. METHODOLOGY

The data collected for the study is a panel data comprising of HDI (Appendix A: Figs. 3-6), real per capita public expenditure (Appendix B: Figs. 7-10), and real per capita private expenditure (Appendix C: Figs. 11-14) with respect to the social services (education and health combined) of 16 states for the period 2002-2012. As the study is intended to analyse the impact of real per capita public and real per capita private expenditure on HDI at state level there was a need to look at standard panel data techniques. In general, the panel data analysis is comprised of pooled OLS, fixed effects and random effects. While the fixed and random effects are widely employed techniques of panel data analysis, this study has however employed simple linear regression so as to analyse for individual states.

As the study requires to see the influence of expenditure on HDI for sixteen major Indian states there was a need to understand the individual impact of real per capita public and private expenditure on respective state HDI. The standard panel data techniques of fixed and random effects do not allow us to see the

individual impact of the expenditure on HDI for each state. Therefore, this study has used simple linear regression to analyse the individual impact of real per capita public and private expenditure on HDI for sixteen states.

The basic analysis is to find the relationship between or impact of real per capita public and private expenditure and HDI. The dependent variable of the study is HDI and the explanatory variables used are real per capita public expenditure and real per capita private expenditure. The motive of the study is to find the individual impact of the real per capita public and real per capita private expenditure on HDI. As the expenditures are correlated and there might be casual relationship between the explanatory variables and dependent variable, the analysis was carried out in two steps. The regression equation for this is given by:

$$Y = \alpha + \beta X_1 \quad (1)$$

$$Y = \alpha + \beta X_2 \quad (2)$$

Where

Y is Human Development Index  
 X1 is the Real Per Capita Public Expenditure  
 X2 is the Real Per Capita Private Expenditure

The regression was based on real per capita public and private expenditure of social services i.e. education and health combined on HDI and so by the results we do not know the true impact of these expenditures on HDI. HDI is an indicator that captures education and health as its primary indicators. As the expenditures are on education and health together we do not really know that the change in HDI is because of the change in real per capita public or private expenditure on education or health. To know this the study has taken two proxy variables one for each education and health. Gross Enrolment Rate is the proxy for education and Infant Mortality Rate is the proxy for health. To see whether the change in HDI for a change in real per capita public and private expenditure is because of the real per capita public or real per capita private expenditure on education or health, the study follows the following regression:

$$Y_1 = \alpha + \beta_1 X_1 \quad (3)$$

$$Y_1 = \alpha + \beta_1 X_2 \quad (4)$$

$$Y_2 = \alpha + \beta_1 X_3 \quad (5)$$

$$Y2 = \alpha + \beta_1 X_4 \quad (6)$$

Where

Y1 is the Total Gross Enrolment Rate

Y2 is the Infant Mortality Rate

X1 is the Real Per Capita Public Education Expenditure

X2 is the Real Per Capita Private Education Expenditure

X3 is the Real Per Capita Public Health Expenditure

X4 is the Real Per Capita Private Health Expenditure

From the regression results the states are categorised into different quadrants based on the R square values of real per capita public expenditure and real per capita private expenditure on HDI. The study looks at the R square values instead of Beta coefficients because the study intends not to see the rate of change as explained by the Beta but interested to see how much the dependent variable HDI is explained by each of the independents variables. The R square also in a way tells us about the efficiency of expenditure in explaining the HDI. Thus the R square values are plotted so as to pick few states from each quadrant on selected criteria for case studies. The case studies are used to validate the results of the study and give a glimpse of overall scenario in selected few states to carry out PPP in social sector.

## 6. DATA AND DESCRIPTION OF VARIABLES

For a long time in literature, Human Development Index has been the most predominately used indicator in the area of development economics. It is been the single most widely accepted indicator to understand the nature of human development in a country and since 1990 it is being computed by the United Nations Development Programme on a regular basis. Since then various other agencies and researchers started taking interest to compute their own HDI based on the objective of their study. This paper has also computed its own HDI for sixteen states of India on a set of basic parameters, the details of which is presented below.

The major part of the analysis for the study is to find the relationship or impact of public and private expenditure of health and education

combined on HDI. HDI as an indicator primarily takes into factors like education, health and standard of living and thus in line with the objective of the study it is felt that it is important to see the impact of expenditure on HDI. Following from other research work, this paper has computed the HDI on the basis of the methodology followed in the India National Human Development Report. HDI is a simple average of the three dimension indices each of which measures the average achievement of country or a state with regard to a long and healthy life, good knowledge and a decent standard of living. The following table provides the variables used to compute each dimension and the corresponding weights assigned to each variable in constructing the HDI.

It is agreed although there are several other factors that could influence the HDI, this paper emphasise on the impact of public and private expenditure on HDI so as to understand the scope for Public Private Partnership in Social Infrastructure. Thus this paper is an attempt to particularly understand the effects of expenditure on HDI at the state level. The data collected is for sixteen selected major states excluding union territories, north eastern states and newly formed states during the study period. For this the data of actual public or government expenditure of states is collected during the tenth and eleventh five year plan period (2002-2012) at current prices from planning commission. As for the private expenditure the data of state wise household average monthly per capita expenditure is collected from various annual rounds of National Sample Survey Office (NSSO) reports for the period 2002 to 2012. Both the public and private expenditure collected is on social services in particular the expenditure on education and health. The public expenditure on education includes expenses on general education, technical education, arts and culture and sports and youth services by the state government and that of health covers expenses by the state government on medical and public health. The data of household consumption expenditure on education includes books, journals, stationary, tuition and other fees etc on monthly basis i.e. per 30 days and on health includes medical institutional and non institutional for per 30 days.

The data of public expenditure on education and health is annual and that of household consumption expenditure data, initially was monthly per capita expenditure. It was then multiplied by 12 to consider it as annual

**Table 1. Weights and dimensions for constructing HDI**

<b>Dimension/Indicators</b>	<b>Weights</b>
Dimension 1: A long and Healthy Life Infant Mortality Rate	One Third
Dimension 2: Knowledge Gross Enrolment Ratio of 1 <sup>st</sup> to 12 <sup>th</sup> standard	One Third
Dimension 3: A Decent Standard of Living Monthly Per Capita Household Consumption Expenditure	One Third

expenditure made by households on education and health. The data collected for the household expenditure was for both rural and urban. To see it as expenditure on education and health, we took a weighted average of rural and urban expenditure with respect to the household population. The household population data for each state was taken from the same NSSO reports. However, the population data from the NSSO reports are estimated number of sample household which tend to show an irregular trend. In general, we know that the population of India is growing exponentially over the last decade. To address this issue the population data of households for 2001 and 2011 was taken from census. Using CAGR we found the projected population or the annual growth rate of population between 2001 and 2012. This projected population of households was then multiplied with the weighted average expenditure of households on education and health to finally arrive at per capita household expenditure. Since the household expenditure data from the NSSO reports was in per capita terms there was a need to convert the public expenditure to per capita terms. For this the annual actual public expenditure was divided by the projected household population.

The expenditure data both public and private was in current prices. While the study is to see the effects of expenditure on HDI it was felt important to see the impact of real per capita expenditure on HDI. For this the nominal expenditure was adjusted for inflation and converted into real terms. This was done by deflating the nominal expenditure by the GDP deflator or inflation rate to 2002 prices. So in the final analysis we tried to understand the impact of real per capita public and private expenditure on HDI.

Apart from these basic explanatory variables some proxy variables for education and health is also used. The proxy variable for education is Gross Enrolment Ratio and for health we have taken Infant Mortality Rate (IMR) and life expectancy for the period 2002-2012. The GER

data collected was for primary, upper primary, secondary and higher secondary from the Ministry of Human Resources and Development (MHRD). The IMR data for each state was collected from the planning commission and life expectancy data was collected from National Family Health Survey and IndiaStat.

## 7. RESULTS AND DISCUSSION

Following are the key results and descriptive statistics of the regression analysis.

### 7.1 Interrelationship between Real Per Capita Government Expenditure and HDI

Tables 2 and 3 shows the model summary and details about the coefficients and its significance value of the regression of Real Per Capita Public Expenditure (RPCGE) on HDI for 16 selected major states of India. From the above table by looking at the R Square values it is seen that the real per capita public expenditure is well able to explain the dependent variable HDI. Also the Beta coefficient of real per capita public expenditure is positive and highly significant at 0.05% level of significance for all the states. This could be a turnover to the debate on the low level of government expenditure on social sector. The results also provide some positive policy implications on the social infrastructure. It is seen that in all the states under the study the public expenditure is well able to influence and have significant impact on HDI growth. This calls for huge government spending on health and education the two major pillars of the social infrastructure.

### 7.2 Interrelationship between Real Per Capita Household Expenditure and HDI

Tables 4 and 5 shows the model summary and details about the coefficients and its significance value of the regression of Real Per Capita



Private Expenditure (RPCHE) on HDI for 16 selected major states of India. From the above table by looking at the R Square values it is seen that the real per capita private expenditure is very well able to explain the dependent variable HDI. Also the Beta coefficient of real per capita private expenditure is positive and highly significant at 0.05% level of significance for all the states. These results are well supported by

the fact that the rising share of household's income leading to higher out of pocket expenditure on education and health. The rising income of households in most of the states has led to huge expenditures on education and health. It is also evident that the share of household expenditure on these services has seen significant rise in the last decade.

**Table 2. Model summary of regression of RPCGE on HDI**

Model Summary					
States	Model	R	R Square <sup>b</sup>	Adjusted R Square	Std. Error of the Estimate
Andhra Pradesh	1	.968 <sup>a</sup>	.938	.931	.136867
Assam	1	.901 <sup>a</sup>	.812	.791	.187721
Bihar	1	.958 <sup>a</sup>	.917	.908	.117611
Gujarat	1	.960 <sup>a</sup>	.922	.913	.157374
Haryana	1	.946 <sup>a</sup>	.894	.882	.186481
Himachal Pradesh	1	.928 <sup>a</sup>	.861	.846	.255982
Karnataka	1	.979 <sup>a</sup>	.959	.955	.117350
Kerala	1	.968 <sup>a</sup>	.937	.930	.204591
Madhya Pradesh	1	.990 <sup>a</sup>	.981	.979	.067304
Maharashtra	1	.966 <sup>a</sup>	.934	.926	.174630
Odhisha	1	.978 <sup>a</sup>	.957	.952	.088250
Punjab	1	.910 <sup>a</sup>	.827	.808	.255408
Rajasthan	1	.979 <sup>a</sup>	.958	.953	.102303
Tamil Nadu	1	.944 <sup>a</sup>	.892	.880	.230024
Uttar Pradesh	1	.946 <sup>a</sup>	.894	.882	.146331
West Bengal	1	.938 <sup>a</sup>	.881	.867	.196708

**Table 3. Regression results of RPCGE on HDI**

States	Model	Standardised Coefficients	T	Sig.	95.0% Confidence Interval for B		
					Beta	Lower Bound	Upper Bound
Andhra Pradesh	1	RPCGE	.968	11.646	.000	.001	.001
Assam	1	RPCGE	.901	6.229	.004	.000	.001
Bihar	1	RPCGE	.958	9.999	.012	.001	.001
Gujarat	1	RPCGE	.960	10.311	.000	.000	.001
Haryana	1	RPCGE	.946	8.718	.000	.000	.000
Himachal Pradesh	1	RPCGE	.928	7.476	.000	.000	.000
Karnataka	1	RPCGE	.979	14.526	.000	.000	.000
Kerala	1	RPCGE	.968	11.549	.000	.002	.003
Madhya Pradesh	1	RPCGE	.990	21.472	.000	.000	.001
Maharashtra	1	RPCGE	.966	11.260	.000	.001	.002
Odhisha	1	RPCGE	.978	14.111	.008	.001	.001
Punjab	1	RPCGE	.910	6.571	.016	.001	.001
Rajasthan	1	RPCGE	.979	14.328	.000	.001	.001
Tamil Nadu	1	RPCGE	.944	8.602	.000	.001	.001
Uttar Pradesh	1	RPCGE	.946	8.719	.001	.000	.001
West Bengal	1	RPCGE	.938	8.151	.018	.001	.001

**Table 4. Model summary of regression of RPCHE on HDI**

States	Model	Model Summary			
		R	R Square <sup>b</sup>	Adjusted R Square	Std. Error of the Estimate
Andhra Pradesh	1	.987 <sup>a</sup>	.975	.972	.086716
Assam	1	.958 <sup>a</sup>	.918	.909	.123734
Bihar	1	.969 <sup>a</sup>	.940	.933	.100544
Gujarat	1	.976 <sup>a</sup>	.953	.947	.122541
Haryana	1	.975 <sup>a</sup>	.950	.945	.127674
Himachal Pradesh	1	.993 <sup>a</sup>	.986	.984	.081696
Karnataka	1	.972 <sup>a</sup>	.944	.938	.137085
Kerala	1	.974 <sup>a</sup>	.949	.943	.184458
Madhya Pradesh	1	.969 <sup>a</sup>	.939	.932	.120309
Maharashtra	1	.964 <sup>a</sup>	.929	.921	.180906
Odhisha	1	.957 <sup>a</sup>	.916	.907	.122987
Punjab	1	.966 <sup>a</sup>	.932	.925	.159962
Rajasthan	1	.986 <sup>a</sup>	.973	.970	.082089
Tamil Nadu	1	.990 <sup>a</sup>	.980	.978	.098261
Uttar Pradesh	1	.870 <sup>a</sup>	.757	.730	.221718
West Bengal	1	.955 <sup>a</sup>	.913	.903	.168146

**Table 5. Regression results of RPCHE on HDI Coefficients<sup>a,b</sup>**

States	Model	Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B		
					Beta	Lower Bound	Upper Bound
Andhra Pradesh	1	RPCHE	.987	18.743	.000	.001	.001
Assam	1	RPCHE	.958	10.051	.000	.001	.001
Bihar	1	RPCHE	.969	11.838	.000	.001	.001
Gujarat	1	RPCHE	.976	13.461	.000	.001	.001
Haryana	1	RPCHE	.975	13.127	.000	.000	.001
Himachal Pradesh	1	RPCHE	.993	25.062	.000	.001	.001
Karnataka	1	RPCHE	.972	12.337	.000	.000	.001
Kerala	1	RPCHE	.974	12.890	.000	.000	.001
Madhya Pradesh	1	RPCHE	.969	11.752	.000	.000	.001
Maharashtra	1	RPCHE	.964	10.841	.000	.000	.001
Odhisha	1	RPCHE	.957	9.908	.000	.001	.001
Punjab	1	RPCHE	.966	11.136	.000	.000	.000
Rajasthan	1	RPCHE	.986	17.995	.000	.000	.001
Tamil Nadu	1	RPCHE	.990	21.115	.000	.001	.001
Uttar Pradesh	1	RPCHE	.870	5.295	.000	.000	.001
West Bengal	1	RPCHE	.955	9.708	.000	.001	.001

**7.3 Interrelationship between Real Per Capita Government Health Expenditure and IMR**

Tables 6 and 7 provides the model summary and the regression results of the Real Per Capita Public Expenditure on Health (RPCGHE) on IMR. From the Table 6 it is seen that in most of the states the real per capita public expenditure on health is not significantly explaining the variability in the IMR. In other words, the model is not well explained. Though the R Square values

are not explaining the effect of real per capita public expenditure on health, the individual beta coefficient gives better picture. From the Table 7 we can see the rate of change in the IMR for a unit increase in real per capita public expenditure on health. In majority of the states the signs are in accordance and it is also highly significant at 0.05 % level of significance. However, there are exceptions to states like Bihar, Himachal Pradesh, Haryana, Kerala and Uttar Pradesh which is not significant.

#### 7.4 Interrelationship between Real Per Capita Household Health Expenditure and IMR

Tables 8 and 9 provides the model summary and the regression results of the Real Per Capita Private Expenditure on Health (RPCHEE) on IMR. From the Table 8 it is seen that in most of the states the real per capita private expenditure on health is not significantly explaining the variability in the IMR. In other words, the model is not well explained. Though the R Square values are not explaining the effect of real per capita private expenditure on health, the individual beta coefficient gives better picture. From the Table 9 we can see the rate of change in the IMR for a unit increase in real per capita private expenditure on health. In majority of the states the signs are in accordance and it is not highly significant except Tamil Nadu.

From the above tables and results one can conclude that the increase in the HDI regarding the health component is significantly impacted by the real per capita public expenditure on health than the real per capita private expenditure on health. However, even the real per capita public expenditure is not significantly reducing the IMR in few states.

#### 7.5 Interrelationship between Real Per Capita Government Education Expenditure and Total Gross Enrollment Rate

Tables 10 and 11 provides the model summary and the regression results of the Real Per Capita public Expenditure on Education (RPCGHE) on

Total Gross Enrolment Rate (TGER). From the Table 10 it is seen that in most of the states the real per capita public expenditure on education is significantly explaining the variability in the Total Gross Enrolment Rate. In other words, the model is well explained. The individual beta coefficient gives better a picture too. From the Table 11 we can see the rate of change in the total gross enrolment rate for a unit increase in real per capita public expenditure on education. In majority of the states the signs are in accordance and it is highly significant except Assam and Tamil Nadu.

#### 7.6 Interrelationship between Real Per Capita Household Education Expenditure and Total Gross Enrollment Rate

Tables 12 and 13 provides the model summary and the regression results of the Real Per Capita Private Expenditure on education (RPCGHE) on Total Gross Enrolment Rate (TGER). From the Table 12 it is seen that in most of the states the real per capita private expenditure on education is not significantly explaining the variability in the TGER. In other words, the model is not well explained. Though the R Square values are not explaining the effect of real per capita private expenditure on education, the individual beta coefficient gives better a picture. From the Table 13 we can see the rate of change in the total gross enrolment rate for a unit increase in real per capita private expenditure on education. In majority of the states the signs are in accordance and it is not highly significant except for Tamil Nadu, Rajasthan and Karnataka.

**Table 6. Model summary of regression of RPCGHE on IMR**

Model summary					
States	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Andhra Pradesh	1	.941 <sup>a</sup>	.885	.871	2.211
Assam	1	.910 <sup>a</sup>	.828	.807	2.092
Bihar	1	.017 <sup>a</sup>	.286	-.125	6.469
Gujarat	1	.967 <sup>a</sup>	.934	.926	1.551
Haryana	1	.448 <sup>a</sup>	.200	.100	5.628
Himachal Pradesh	1	.602 <sup>a</sup>	.362	.282	5.434
Karnataka	1	.859 <sup>a</sup>	.738	.705	3.427
Kerala	1	.069 <sup>a</sup>	.005	-.120	1.513
Madhya Pradesh	1	.495 <sup>a</sup>	.245	.150	7.726
Maharashtra	1	.796 <sup>a</sup>	.634	.588	3.819
Odisha	1	.355 <sup>a</sup>	.126	.016	9.266
Punjab	1	.363 <sup>a</sup>	.131	.023	6.363
Rajasthan	1	.897 <sup>a</sup>	.805	.781	3.804
Tamil Nadu	1	.921 <sup>a</sup>	.848	.829	3.198
Uttar Pradesh	1	.227 <sup>a</sup>	.051	-.067	7.280
West Bengal	1	.748 <sup>a</sup>	.560	.505	4.121

a. Predictors: (Constant), RPCHEE

**Table 7. Regression results of RPCGHE on IMR**

States	Model	Standardised Coefficients Beta	T	Sig.	95.0% Confidence Interval for B	
					Lower Bound	Upper Bound
Andhra Pradesh	(Constant)		38.183	.000	62.140	70.128
	RPCGHE	-.941	-7.847	.000	-.060	-.033
Assam	(Constant)		63.215	.000	67.129	72.212
	RPCGHE	-.910	-6.206	.000	-.034	-.016
Bihar	(Constant)		7.697	.000	39.064	72.486
	RPCGHE	.017	.047	.964	-.199	.207
Gujarat	(Constant)		60.822	.000	58.140	62.722
	RPCGHE	-.967	-10.683	.000	-.025	-.016
Haryana	(Constant)		19.019	.000	51.554	65.780
	RPCGHE	-.448	-1.416	.195	-.028	.007
Himachal Pradesh	(Constant)		7.788	.000	26.567	48.919
	RPCGHE	.602	2.131	.066	-.001	.021
Karnataka	(Constant)		21.496	.000	51.444	63.808
	RPCGHE	-.859	-4.742	.001	-.055	-.019
Kerala	(Constant)		10.945	.000	9.950	15.261
	RPCGHE	-.069	-.196	.849	-.022	.019
Madhya Pradesh	(Constant)		9.043	.000	65.350	110.085
	RPCGHE	-.495	-1.610	.146	-.278	.049
Maharashtra	(Constant)		12.308	.000	39.360	57.510
	RPCGHE	-.796	-3.720	.006	-.132	-.031
Odisha	(Constant)		7.686	.000	58.053	107.820
	RPCGHE	-.355	-1.072	.315	-.358	.131
Punjab	(Constant)		15.647	.000	37.574	50.563
	RPCGHE	-.363	-1.100	.303	-.086	.030
Rajasthan	(Constant)		28.302	.000	73.033	85.990
	RPCGHE	-.897	-5.755	.000	-.135	-.058
Tamil Nadu	(Constant)		20.964	.000	42.602	53.132
	RPCGHE	-.921	-6.676	.000	-.081	-.039
Uttar Pradesh	(Constant)		15.082	.000	60.681	82.586
	RPCGHE	-.227	-.658	.529	-.047	.026
West Bengal	(Constant)		11.522	.000	41.247	61.887
	RPCGHE	-.748	-3.192	.013	-.177	-.029

**Table 8. Model summary of regression of RPCGHE on IMR**

States	Model	Model Summary			
		R	R Square	Adjusted R Square	Std. Error of the Estimate
Andhra Pradesh	1	.606 <sup>a</sup>	.367	.288	5.188
Assam	1	.564 <sup>a</sup>	.318	.232	4.167
Bihar	1	.127 <sup>a</sup>	.016	-.107	6.417
Gujarat	1	.120 <sup>a</sup>	.014	-.109	6.015
Haryana	1	.179 <sup>a</sup>	.032	-.089	6.192
Himachal Pradesh	1	.498 <sup>a</sup>	.248	.154	5.902
Karnataka	1	.279 <sup>a</sup>	.078	-.038	6.425
Kerala	1	.265 <sup>a</sup>	.070	-.046	1.462
Madhya Pradesh	1	.183 <sup>a</sup>	.033	-.087	8.742
Maharashtra	1	.159 <sup>a</sup>	.025	-.097	6.230
Odisha	1	.323 <sup>a</sup>	.104	-.008	9.379
Punjab	1	.101 <sup>a</sup>	.010	-.113	6.792
Rajasthan	1	.457 <sup>a</sup>	.209	.110	7.671
Tamil Nadu	1	.674 <sup>a</sup>	.454	.386	6.056
Uttar Pradesh	1	.068 <sup>a</sup>	.005	-.120	7.457
West Bengal	1	.108 <sup>a</sup>	.012	-.112	6.177

a. Predictors: (Constant), RPCGHE

**Table 9. Regression results of RPCHE on IMR**

States	Model	Standardised Coefficients Beta	t	Sig.	95.0% Confidence Interval for B	
					Lower Bound	Upper Bound
Andhra Pradesh	1 (Constant)		8.027	.000	51.988	93.900
	RPCHE	-.606	-2.153	.063	-.047	.002
Assam	1 (Constant)		9.447	.000	40.484	66.630
	RPCHE	.564	1.930	.090	-.005	.062
Bihar	1 (Constant)		4.024	.004	26.309	96.917
	RPCHE	-.127	-.363	.726	-.113	.082
Gujarat	1 (Constant)		4.142	.003	20.994	73.729
	RPCHE	.120	.340	.742	-.031	.042
Haryana	1 (Constant)		4.453	.002	30.000	94.453
	RPCHE	-.179	-.515	.620	-.033	.021
Himachal Pradesh	1 (Constant)		4.464	.002	35.869	112.537
	RPCHE	-.498	-1.623	.143	-.063	.011
Karnataka	1 (Constant)		6.675	.000	34.163	70.225
	RPCHE	-.279	-.820	.436	-.028	.013
Kerala	1 (Constant)		4.385	.002	5.007	16.113
	RPCHE	.265	.779	.459	-.002	.005
Madhya Pradesh	1 (Constant)		6.177	.000	49.618	108.731
	RPCHE	-.183	-.525	.614	-.048	.030
Maharashtra	1 (Constant)		4.841	.001	19.873	56.023
	RPCHE	-.159	-.454	.662	-.019	.013
Odisha	1 (Constant)		3.458	.009	18.764	93.908
	RPCHE	.323	.965	.363	-.044	.106
Punjab	1 (Constant)		3.275	.011	11.410	65.710
	RPCHE	.101	.289	.780	-.016	.021
Rajasthan	1 (Constant)		5.642	.000	51.457	122.602
	RPCHE	-.457	-1.453	.184	-.069	.016
Tamil Nadu	1 (Constant)		5.782	.000	36.640	85.261
	RPCHE	-.674	-2.580	.033	-.055	-.003
Uttar Pradesh	1 (Constant)		12.799	.000	55.734	80.230
	RPCHE	.068	.193	.852	-.011	.013
West Bengal	1 (Constant)		4.189	.003	15.896	54.837
	RPCHE	.108	.308	.766	-.023	.030

**Table 10. Model summary of regression of RPCGEE on TGER**

Model Summary					
States	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Andhra Pradesh	1	.339 <sup>a</sup>	.815	.005	8.3780505E4
Assam	1	.757 <sup>a</sup>	.572	.519	3.4957847E4
Bihar	1	.900 <sup>a</sup>	.809	.786	2.2559077E5
Gujarat	1	.598 <sup>a</sup>	.658	.278	8.4130895E4
Haryana	1	.911 <sup>a</sup>	.829	.808	2.8985927E4
Himachal Pradesh	1	.583 <sup>a</sup>	.340	.257	3.4848074E3
Karnataka	1	.864 <sup>a</sup>	.746	.714	4.2243643E4
Kerala	1	.725 <sup>a</sup>	.526	.467	1.6421822E4
Madhya Pradesh	1	.811 <sup>a</sup>	.657	.614	2.1451187E5
Maharashtra	1	.150 <sup>a</sup>	.423	-.100	1.0904700E5
Odisha	1	.298 <sup>a</sup>	.089	-.025	5.6402156E4
Punjab	1	.978 <sup>a</sup>	.957	.952	1.7356981E4
Rajasthan	1	.904 <sup>a</sup>	.817	.794	6.9795325E4
Tamil Nadu	1	.663 <sup>a</sup>	.440	.370	7.2075786E4
Uttar Pradesh	1	.750 <sup>a</sup>	.563	.508	6.4439815E5
West Bengal	1	.804 <sup>a</sup>	.646	.602	8.5787951E4

**Table 11. Regression results of RPCGEE on TGER**

States	Model	Standardised Coefficients Beta	t	Sig.	95.0% Confidence Interval for B	
					Lower Bound	Upper Bound
Andhra Pradesh	1 (Constant)		31.858	.000	1858849.461	2148948.134
	RPCGEE	.339	1.020	.037	-188.288	487.213
Assam	1 (Constant)		33.180	.000	724961.510	833256.322
	RPCGEE	-.757	-3.272	.511	-269.000	-46.594
Bihar	1 (Constant)		10.594	.000	1107942.363	1724488.732
	RPCGEE	.900	5.828	.000	941.752	2174.796
Gujarat	1 (Constant)		17.491	.000	1164676.684	1518412.361
	RPCGEE	.598	2.111	.068	-26.194	593.884
Haryana	1 (Constant)		32.438	.000	530290.466	611455.618
	RPCGEE	.911	6.233	.000	52.959	115.151
Himachal Pradesh	1 (Constant)		81.793	.000	217841.993	230481.721
	RPCGEE	.583	2.029	.077	-.446	6.967
Karnataka	1 (Constant)		31.206	.000	1243364.831	1441789.478
	RPCGEE	.864	4.849	.001	119.327	335.698
Kerala	1 (Constant)		50.686	.000	840668.139	920807.256
	RPCGEE	.725	2.980	.018	54.473	427.477
Madhya Pradesh	1 (Constant)		8.227	.000	1238301.881	2202820.681
	RPCGEE	.811	3.915	.004	413.849	1599.744
Maharashtra	1 (Constant)		39.149	.000	3032032.588	3411583.979
	RPCGEE	.150	.429	.049	-585.884	853.805
Odisha	1 (Constant)		21.077	.000	856202.891	1066566.439
	RPCGEE	.298	.882	.403	-153.312	343.305
Punjab	1 (Constant)		50.278	.000	470655.436	515904.065
	RPCGEE	.978	13.396	.000	188.445	266.815
Rajasthan	1 (Constant)		26.747	.000	1548520.607	1840725.526
	RPCGEE	.904	5.972	.000	497.299	1122.902
Tamil Nadu	1 (Constant)		45.302	.000	1932511.284	2139804.949
	RPCGEE	-.663	2.508	.087	-666.446	-27.914
Uttar Pradesh	1 (Constant)		8.962	.000	3374409.391	5712531.931
	RPCGEE	.750	3.208	.012	1045.587	6391.105
West Bengal	1 (Constant)		37.418	.000	1793900.169	2029533.749
	RPCGEE	.804	3.825	.005	216.563	874.306

**Table 12. Model summary of regression of RPCHEE on TGER**

States	Model	Model Summary			
		R	R Square	Adjusted R Square	Std. Error of the Estimate
Andhra Pradesh	1	.542 <sup>a</sup>	.293	.205	7.4874913E4
Assam	1	.288 <sup>a</sup>	.083	-.032	5.1197984E4
Bihar	1	.286 <sup>a</sup>	.082	-.033	4.9509779E5
Gujarat	1	.809 <sup>a</sup>	.655	.612	6.1665591E4
Haryana	1	.659 <sup>a</sup>	.434	.363	5.2772662E4
Himachal Pradesh	1	.373 <sup>a</sup>	.139	.031	3.9793090E3
Karnataka	1	.706 <sup>a</sup>	.499	.436	5.9343003E4
Kerala	1	.287 <sup>a</sup>	.082	-.032	2.2850434E4
Madhya Pradesh	1	.473 <sup>a</sup>	.224	.127	3.2279330E5
Maharashtra	1	.255 <sup>a</sup>	.065	-.052	1.0663600E5
Odisha	1	.018 <sup>a</sup>	.000	-.125	5.9072763E4
Punjab	1	.152 <sup>a</sup>	.023	-.099	8.3046504E4
Rajasthan	1	.676 <sup>a</sup>	.458	.390	1.2008927E5
Tamil Nadu	1	.854 <sup>a</sup>	.729	.696	5.0107716E4
Uttar Pradesh	1	.096 <sup>a</sup>	.009	-.115	9.6989527E5
West Bengal	1	.414 <sup>a</sup>	.171	.068	1.3133505E5

a. Predictors: (Constant), RPCHEE

**Table 13. Regression results of RPCHEE on TGER**

States	Model	Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B	
					Beta	Lower Bound
Andhra Pradesh	1 (Constant)		25.082	.000	1751469.460	2106135.843
Assam	1 (Constant)	.542	1.822	.106	-91.940	784.297
Bihar	1 (Constant)	.288	12.300	.000	542215.570	792448.496
Gujarat	1 (Constant)	.288	.849	.420	-399.731	865.986
Haryana	1 (Constant)	.288	3.758	.006	1026900.634	4289027.835
Himachal Pradesh	1 (Constant)	-.286	-.845	.423	-15097.452	7000.709
Karnataka	1 (Constant)	.286	13.498	.000	966452.926	1364717.671
Kerala	1 (Constant)	.809	3.897	.005	420.363	1638.895
Madhya Pradesh	1 (Constant)	.659	3.463	.009	130043.267	648386.636
Maharashtra	1 (Constant)	.659	2.477	.038	25.755	720.459
Odisha	1 (Constant)	.659	32.336	.000	220538.339	254409.146
Punjab	1 (Constant)	-.373	-1.136	.289	-54.839	18.635
Rajasthan	1 (Constant)	.373	32.811	.000	1329368.151	1530354.721
Tamil Nadu	1 (Constant)	.706	2.823	.022	49.278	488.595
Uttar Pradesh	1 (Constant)	.706	26.654	.000	876964.169	1043078.912
West Bengal	1 (Constant)	-.287	-.847	.422	-219.990	101.825
	1 (Constant)	.473	7.398	.000	1441512.337	2747204.269
	1 (Constant)	.473	1.518	.168	-575.132	2789.899
	1 (Constant)	.473	29.097	.000	3071387.643	3600122.990
	1 (Constant)	-.255	-.747	.476	-728.735	372.026
	1 (Constant)	.152	15.408	.000	851659.496	1151457.783
	1 (Constant)	.152	-.050	.961	-845.330	809.168
	1 (Constant)	.152	3.563	.007	189732.116	885762.625
	1 (Constant)	.676	.434	.676	-399.532	584.676
	1 (Constant)	.676	13.214	.000	1423817.468	2025844.138
	1 (Constant)	.676	2.598	.032	96.149	1614.389
	1 (Constant)	.676	41.812	.000	2048721.751	2287892.419
	1 (Constant)	-.854	-4.644	.002	-730.730	-245.790
	1 (Constant)	-.096	13.651	.000	5087902.165	7156205.409
	1 (Constant)	-.096	-.273	.792	-1902.538	1499.614
	1 (Constant)	-.414	17.195	.000	1935929.035	2535612.043
	1 (Constant)	-.414	-1.286	.234	-1599.021	453.972

It is seen from the above tables that much of the increase in the HDI is explained by the real per capita public and private expenditure on education. It is also to be noted that the public spending on education contributed to increase in the total gross enrolment and its contribution to the HDI is more significant than the private spending. This is also in line with other studies and the fact that India has been able to achieve its Millennium Development Goal (MDGs) concerning education, the goals of achieving universal primary education. However, it requires efficient spending and mobilisation of resources to achieve the health goals. This calls for adoption of PPP.

**8. COMPARING THE REAL PUBLIC AND PRIVATE EXPENDITURE EFFECT ON HDI**

Fig. 1 shows R Square values of real per capita public expenditure on HDI measured in x axis

and the real per capita private expenditure on HDI measured on the Y axis for the 16 major states. The graph depicts the R square values which explain the variability in HDI that is explained by both the real per capita public and private expenditure. It also in a way explains the efficiency of both the expenditure in affecting or influencing the HDI. From the figure it is seen that both the real per capita public and private expenditure is highly influencing the HDI except for Uttar Pradesh and Assam. This graph serves as a guide to choose the states for case study. The criterion for choosing is explained in detail below.

**9. STATUS OF PRIVATE EXPENDITURE**

Fig. 2 shows the ratio of private expenditure to the total expenditure for the period 2002 measured on X axis and 2012 measured on Y axis. This graph shows how the share of private

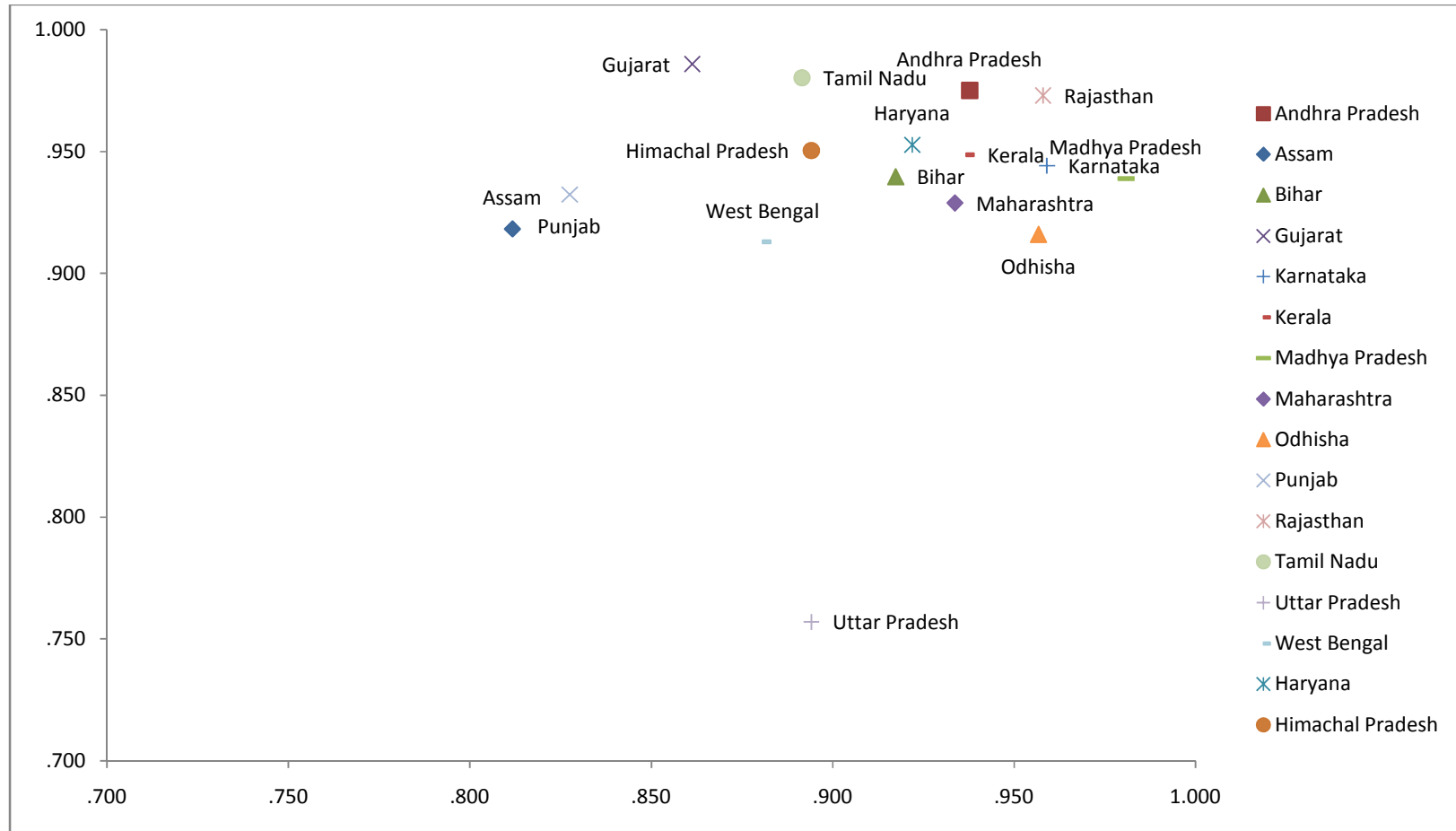


Fig. 1. R square values of per capita public and per capita private expenditure



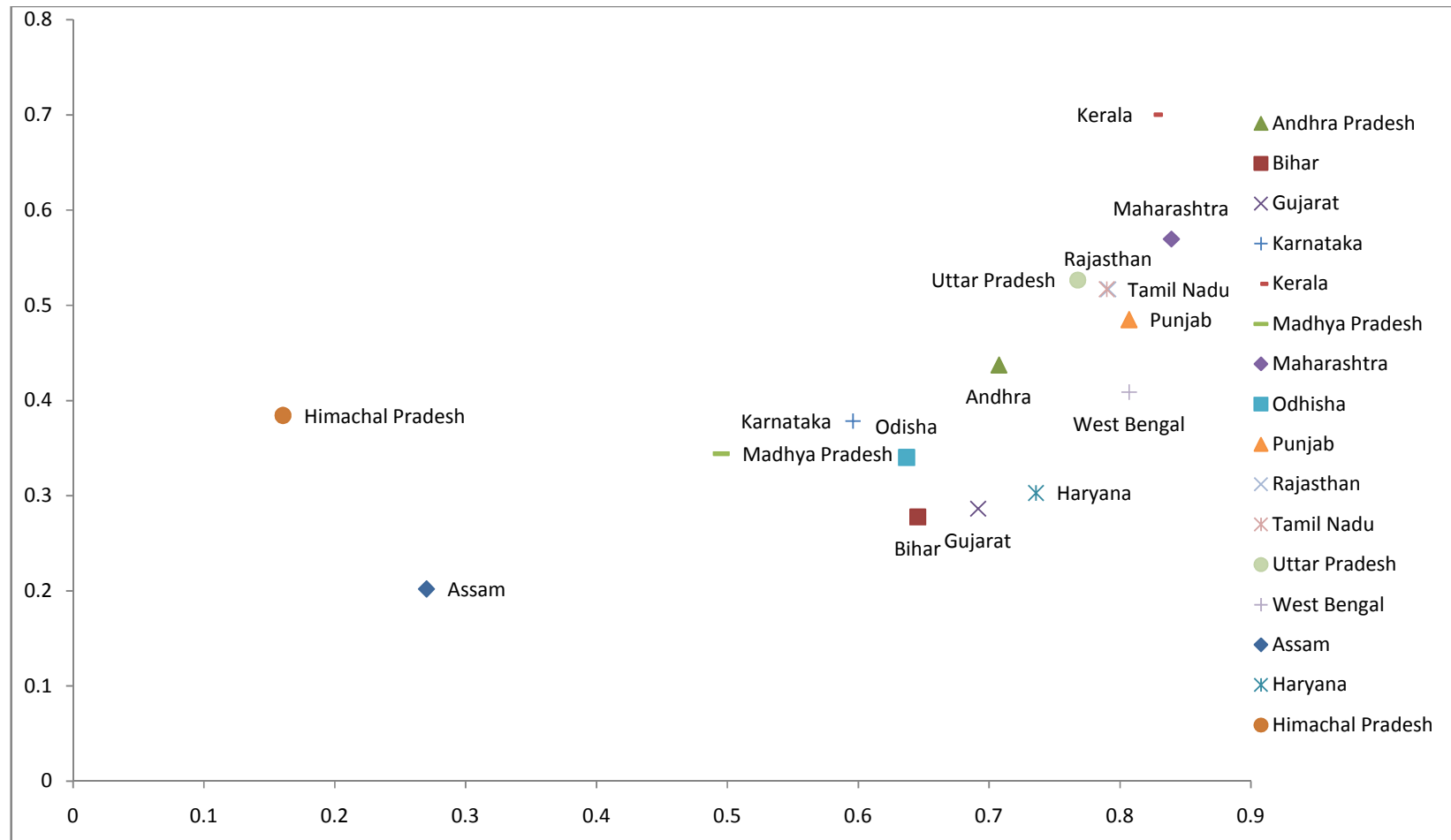


Fig. 2. Ratio of private expenditure to total expenditure during 2002 and 2012

expenditure to the total expenditure has moved for the 16 states from the initial time period to the ending time period of the study. The above figure also serves as a tool to choose the states for case study.

Following the regression analysis, the states had been categorised in different quadrants based on the R square values of the public and private expenditure on HDI. From the Fig. 1, it is seen that in most of the states except few both the public and private expenditure seem to be efficiently and significantly affecting the HDI growth. Following are some case studies on selected states where either the public or private expenditure is relatively higher than the other in affecting the HDI. The states are also chosen on the basis of share of private to total expenditure in the initial and ending time period of the study. The states are chosen by following the criteria where for a particular state either the real per capita public expenditure is relatively higher and it has moved on to private spending and the real per capita private expenditure is relatively higher and the state had moved to public spending. The choice of states for case study is restricted to three states namely Tamil Nadu, Gujarat and Uttar Pradesh.

## 10. EVIDENCE OF PUBLIC PRIVATE PARTNERSHIP TRANSFORMATION

### 10.1 Case Study

**Tamil Nadu:** Tamil Nadu a state in the southern most part of India has always emphasised on good social infrastructure. The state boasts itself in launching and successfully implementing some notable social welfare schemes like mid day meal and Integrated Child Development Scheme (ICDS), the success story of which has later been implemented by other states as well. A state known for freebies and public welfare schemes has come a long way in emerging as one of the top states in terms of human development and in particular in the category of best performing states in the ranking of various social indicators like education and health. However, in the recent years due to sour political turmoil, the state has witnessed high critics in its social sector spending. But this study primarily focuses on the performance of the state in human development during the tenth and eleventh five year plan period.

The state government increased the share of social services in eleventh five year plan to 43

percent as against 34 percent in 10th Plan giving high priority to social sector. Tamil Nadu fares relatively well in terms of key education indicators. It ranks first in terms of gross enrolment ratio at middle schools, third in terms of education development index for primary and overall and female literacy, fifth in terms of composite index for elementary education, and sixth in terms of gross enrolment at primary level. The literacy in Tamil Nadu was 87.5 percent at the end of the 11th Plan, which was however slightly lower than the targeted rate of 90 percent in 2012. However, the gender gap in literacy reduced to 10 percent level at the end of the plan period. Drop-out rate at primary level was 1.02 and at upper primary is 1.88. The state was able to meet the target of zero level at the elementary level. The major challenge before secondary education is that of meeting the surge in demand due to success of SSA. The new scheme called "Scheme for Universalisation of Access to Secondary Education (SUCCESS)" launched has helped in meeting the increasing demand.

Tamil Nadu compares well with the average performance of the country in terms of health indicators like crude birth rate, crude death rate, total fertility rate and infant mortality rate, child (0-3 years) malnutrition, and life expectancy. The state expenditure on health and family welfare as percent of GSDP declined continuously up to end of 10th Plan and then it started increasing. But it was still lower than its level at the beginning of 9th Plan. However, expenditure on social security welfare and nutrition in Tamil Nadu relative to GSDP has been continuously increasing from the beginning of 10th Plan period. Although the state was well on-track in reducing birth rate by end of 11th Plan, it did not meet its targets relating to death rate, infant mortality rate and maternal mortality rate. Less than the target level of IMR and malnourishment is of serious concern and remained as a great challenge facing the government over the study period. The target rate of child (0-3) malnutrition is 16.6 percent. But the state's child malnutrition is likely to be 30. The index of deficiency values for literacy, life expectancy, per capita income, enrolment, etc. indicate that while Government has been successful in spreading education, better health services across districts, wide differences still remain in economic activities reflected by the per capita income relative to the state average. Malnutrition among children and women is the major area of concern. The government had taken various initiatives to

eradicate severe malnutrition and reducing IMR the results of which is slowly seen in now.

Following are some of the flagship programs in which Tamil Nadu had performed well and have shown significant progress during the study period.

**1. Integrated Child Development Scheme:**

During 2002-03 to 2009-10, the state received a cumulative amount of Rs. 1,136 Crore under ICDS and Rs. 294 Crore under supplementary nutrition. During the same period, the state utilised 98 percent of funds received under ICDS. The actual expenditure on supplementary nutrition has exceeded significantly the fund received from the centre, suggesting special attention given by the State Government to the nutritional needs of the children and pregnant and lactating women.

**2. Mid Day Meal Scheme:**

Financial allocation to Tamil Nadu under this scheme by the centre was Rs. 144 Crore in 2007-08 and increased to Rs. 402 Crore in 2009-10. At the same time, the expenditure increased from Rs. 144 Crore to Rs. 400 Crore. Thus, the fund utilisation ratio is almost 100 percent. The intervention of nutritious meal has reduced dropout rate at primary level to 1.02 percent and at upper primary to 1.88 percent in 2009.

**3. Sarva Siksha Abhiyan:**

During 2001-02 to 2009-10, the centre released Rs. 2,506 Crore and the state released Rs. 1,140 Crore under this scheme. Enrolment of girls improved both at primary and upper primary and the gender gap in education reduced. There has been dramatic improvement in the completion rates, fall in repetition rates and dropout rates in the state.

Apart from the above centrally sponsored schemes the state had also implemented various social security schemes like Varumun Kappom Thittam and Kalaignar Kapitu Thittam in the areas of health and Teacher Education Scheme in the areas of education.

**Gujarat:** Gujarat the westernmost state of India under the leadership of Modi during the study period had rapidly grown and has achieved balanced growth. Many states are looking up to the Gujarat growth model despite some criticism surrounding it. Though the state has achieved

rapid growth it has been a poor performer in the areas of education and health. Many experts in the field believe that nowhere in the picture the state seem to take some concrete steps in bringing the poor into its economic development. Seeing the performance of Gujarat over the last decade in the development process it is seen that all the fuss and talk are only about its leapfrog development only in terms of economic growth. However, it is seen as a laggard when closely compared to other states in terms of social development. The fast growth of Gujarat during the study period has not translated into meaningful development. Balanced growth of Gujarat can be sustained only when there is inclusive growth. Economic growth should be translated into development and this is where Gujarat needs to take big steps and measures to improve its social sector. There is increased emphasis and suggestion to focus on education and health. Healthcare is identified as one of the prominent drawbacks faced by the state during the study period. Education in the state needs improvement with increased competition among the universities. While primarily it is argued that the primary and secondary education needs to be taken care of the government the higher education should be explored by the private players.

A planning commission study suggests that the poor performance of Gujarat in social sector has more to do with the governance. The study ranked 21 major states in the social development indicators. Gujarat ranks 16<sup>th</sup> in health and 14<sup>th</sup> in education. According to the paper the only sector in which Gujarat performed well was in infrastructure and that supports its swift growth story. Though Gujarat's has performed well in the HDI ranking between 2002-12, it is below the national average as per the updated India Human Development Report 2011 prepared by the Institute of Applied Manpower Research (IAMR). As for as the improvement in the education index, Gujarat's performance during the study period was particularly bad. According to another report published by Ministry of Human Resources and Development (MHRD) Gujarat shows a dismal picture in the enrolment which was one of the greatest challenge for the state in achieving the Universal Primary Education. Poor enrolment, high drop out of girls in the upper primary level remained as on the major roadblocks during the study period.

Not only has the education and health status of Gujarat that is in doldrums in its process of

economic growth but the state also shows poor progress in poverty reduction. Though this study basically focuses on the effect of expenditure on education and health on HDI there is a need to look at the poverty and income aspects as well. HDI is an indicator that captures income as one of its key factors other than education and health. In that case Gujarat fared relatively low in reducing poverty and inequality during the study period. A close look at the expenditure pattern of Gujarat during the study period would suggest many a things in improving the HDI.

The average monthly consumption expenditure in the rural areas was equal to the national average between 1993 and 2005. During 2005-10, the rural monthly consumption expenditure grew at 2.05 percent per annum, which is much lower than what was achieved by other competing states like Tamil Nadu and Maharashtra but marginally more than the national growth in consumption expenditure of 1.97 percent per annum. In the urban areas, the growth in average monthly consumption expenditure in the state of Gujarat was marginally less than the national average between 2005-10. The advantage that the state had between 1993-05 was lost during 2005-10. Overall, average monthly consumption expenditure in Gujarat during 2005-10, barely equaled the national average. Reduction in poverty in rural Gujarat between 2005-10 was reasonable, 2.5 percent per annum compared to average of 1.7 but the head count ratio in 2009-10 was 26.63 which was higher than many comparable states. Aggregate inequality has increased in Gujarat during 1993-05, as well as between 2005-10, although the increase was marginal in the last five years of eleventh five year plan period. The reason for this slowing down of increase in inequality is because of the decline in inequalities in the rural areas. In other comparable states inequality had fallen at a much faster rate during the years 2005-10.

Gujarat's health status clearly highlights the missing link between economic growth and its impact on human well being. There have been poor gains in reducing Gender Gap in IMR. There has been an increase in disparity ratio during 1990-95 to 2000-2004. Disparity ratio of 1.82 in 2005-06 is highest across all the states. It is disturbing to note that in 2005-2006 under nutrition in Gujarat was higher than the national average. The social gap for Gujarat in immunisation was better than the national average in both the time periods. However,

social gap in ante natal care had increased between 2000 and 2006. These outcomes have to be seen in relation to the priority of the government towards health. However, the share of expenditure in the state is less than the national average. There is a very high reliance on the private sector in Gujarat both in rural and urban areas. This gets reflected in the fact that there is a decline in use of government health service across all the income groups, barring the lowest income group in rural areas. In urban areas we see a similar declining trend in use of government services but the decline has been quite significant in lowest income group. Unequal health achievement across social groups reflects the existing health inequity in the state. Government's role in delivery of health services have been questionable and this trend calls for attention as poor in large number in rural areas still depends on government health services.

Apart from the centrally sponsored flagship programs such as Sarva Shiksha Abhiyan, Mid Day Meal Scheme, Integrated Child Development Scheme and National Rural Health Mission the state had also introduced its own schemes such as Vidya Deep and Vidya Lakshmi Bond in the areas of education to primarily support the needs of poor people in imparting education and improve the enrolment of girls in primary education. Though it had helped in achieving the broader goals of the scheme it later faced financial crunch and was subsequently dismissed during 2009. There were very few effective state schemes for health and they readily went unnoticed because of its lack in formulating feasible goals and administrative inefficiencies.

**Uttar Pradesh:** Uttar Pradesh is at the heart of India with interesting traditional and social background. These very basic differences in traditional social inequalities inevitably affect the distribution of economic assets. Deep inequalities across gender and social groups have a crucial bearing in the human development of the state. During the study period, Uttar Pradesh showed significant improvement in literacy, and recorded a distinctly higher rate of improvement for girls. However, poor infrastructure, quality of teaching and poor achievement levels is a major concern in Uttar Pradesh. Public financial resources were also considerably below the levels required for adequate public provisioning of schools. Gradually, the education system financing in UP is moving from State control to a privately

managed and privately funded system under State regulation, although the role of the State still remains massive. This has interesting bearing on our results.

Social Security Programs introduced in the state during the tenth and eleventh five year plan as means of achieving the plan targets had a crucial role in the delivery of social services and thus poverty reduction to a certain extent. Economic growth has led to a reduction in poverty in UP, but the state still accounts for almost 18 percent of India's poor at the end of the study period. Non-material measures of human development too suggest that poverty is indeed widespread in Uttar Pradesh and more prevalent than in many parts of India. Overall inequality, as measured by the Gini index in monthly per capita expenditures across households, in UP was 0.282 in 2002-03, down to 0.154 in 2009. The low Gini indicates that UP has an egalitarian welfare distribution. Overall welfare inequality in UP is low and has decreased during the study period, but substantial welfare inequity is seen across geography and caste groups.

According to a study, many of the social safety net programs implemented in UP during the study period had very low coverage rates which implies that the exclusion errors were very large. The beneficiaries are disproportionately from poor households. Non-poor households mostly benefitted from the program creating inclusion errors as well. There was considerable geographic variation in program coverage, implying heterogeneity in the effectiveness of service delivery in the state during the study period. Many of the programs had a very small impact on household welfare, even for poor households and this is evident from our results as the share of private expenditure on social services have been increasing during the period concerned.

Education attainment in the state during the period is quite low compared to other states although the literacy level had been increasing during the study period. The percentage of male/female population is considerably poorer than the national average. Much greater attention is needed to develop educational capability of deprived groups. There is clear evidence of considerable dynamism in the elementary education sector in UP during the study period. With the implementation of Uttar Pradesh Basic Education Project – I, Uttar Pradesh Basic Education Project – II and District Primary

Education Programme – III, primary schooling facilities have been provided in almost all eligible habitations as per State norm during the study period.

Not only education but the health outcomes in UP are also so low. In UP, poor health is one of the leading reasons for volatility in household welfare, while households cope with volatility by selling off assets such as jewelry. Life expectancy at birth, a crucial summary indicator of the health status of the population and one of the key components of HDI was 57.2 years in Uttar Pradesh in 2001 almost five years less than the average and this has increased just to 60 years in 2012 at CAGR of 0.28 percent. The public health system in the State provides three tier medical services in the State. Though the public medical health care system in U.P. is massive and well spread, the delivery system leaves much to be desired. The main reasons, which are attributable to poor management at various levels of service delivery, are imbalanced mix of inputs; low quality of service provisioning in terms of inconvenient timing and poor sensitivity to patient needs to name a few.

Following are some of the flagship programs implemented in Uttar Pradesh during the study period and a brief glimpse of its performance in each of the programs.

- 1. School Grain Distribution Program:** This program was implemented in an effort to improve the children's nutritional status and to improve attendance in school. The program was in place unit mid-2004, when it was phased out in place of providing a cooked meal to children under the mid-day meal scheme. Under this Scheme, UP was one of the states reporting large uncertainties with respect to food grain arrivals, partly explained by the difficulties coordinating between the different departments and agencies and difficulties in recovering the transport subsidies.
- 2. School Scholarship Program:** This program was intended to boost enrolment, attendance and retention in school. When the program was initiated, the intended beneficiaries were all SC/ST children. But, since mid-2004, the program was broadened to include all OBCs. But it still remains as a progressive scheme and does reach a higher proportion of SC/ST children than other caste groups. The official program allocation of Rs. 300 per

child and the amount reported by households is consistent, but the transfer had only a small impact on household welfare.

- 3. Integrated Child Development Scheme:** It is largest community based outreach system in the world for women and children and is one of the largest nutrition program in UP. The Scheme is primarily carried out through anganwadi centers. These are more prevalent in richer areas relative to poorer areas of UP. ICDS coverage in UP during the concerned period was very low and failed to reach the children in the crucial age of 0-3. Although only a small percentage of households used the Anganwadi centers, the services offered were thought to be of value by households that used the centers.

Apart from the above flagship programs the state had also implemented its own social welfare scheme mostly in education in order to improve the enrolment of girls in upper primary school. The schemes that encouraged girl child are Mahmaya Gareeb Balika Aashirwad Yojana where the girl child in BPL family receives Rs. One Lakh on attaining 18 years, Mukhya Mantri Garib Arthik Madad Yojna where cash assistance of Rs. 400 were provided to female head of the families BPL and Savitra Bai Phuley Balika Shiksha Madad Yojna where a girl from BPL family received cash assistance of Rs 15000 and Bicycle while taking admission in Higher Secondary.

## 11. CONCLUSION

From the study it is evident that the states in India are showing great sign of improving their HDI. India as a welfare state has a much expanded role in ensuring its citizens basic services such as education and health services. Government of India is making efforts for these welfare functions. There is a potential for PPPs to contribute more and help meet the infrastructure gap in India in social sector. From the earlier studies and the present study the just stated objective is highly achievable when the states are given more autonomy over implementing and functioning of PPP. There is a massive scope for expansion of the use of PPP in nearly every sector and particularly in the areas of education and health sector and also in poverty reduction. PPP shows promising ways to use the empowerment generated by allowing people to make their own choices by

channeling funds to the people rather than to the providers.

The access to education needs to be considerably improved if India is to catch up with the burgeoning demands from various sectors. Public Private Partnerships have distinct advantages and can help to achieve desired education outcomes. It should not, however, be considered an end in itself but as a means to achieve desired education outcomes. There are many successful examples of PPPs in the education sector of a number of countries developed and developing. Examples of these include Relocating or building new schools, colleges, Building facilities for education institutions, Refurbishing existing assets or providing facilities management etc. In a study conducted on Public-Private interface in Primary Education in West Bengal, it was found that both private and public schools had their pros and cons. On one hand, the poor quality of education delivered in many of government primary schools forced some parents to opt for private schools which were perceived to deliver better quality on the other hand, the negative correlation of annual expenditure and quality of education in some private schools created a reverse trend among some private school parents. Aspects such as this should be considered for implementing better PPP projects in social sector.

Improvement in the health status of the population has been one of the major thrust areas for the social development programmes of the country. This was to be achieved through improving the access to and utilisation of health services with special focus on under-served and underprivileged segments of the population. Public Private Partnerships (PPP) in health sector are emerging across the country. While new initiatives like National Rural Health Mission are trying to find out the remedies to the existing situation, state governments are showing interest in PPP to tackle multiple ills afflicting the health sector. Public Private Partnerships are tried out in some parts of the country not only for mobilising funds but also to explore the possibilities of replicating the successful and best practices adopted by private sector into the public arena. India should establish enabling task forces at the central, state and local body levels for implementing public-private partnership schemes.

In an attempt to explore the new paradigms of governance as reflected in the PPP model of

Development in India in the backdrop of a high growth state, it is found that there have been various constraints and challenges facing in implementing the PPP in social infrastructure. Wherever PPPs are implemented in the social sectors like health and education old issues remain and newer concerns emerge. Thus PPP emerges as an inevitable mode of providing better social services. Of course there are doubts on the credibility and efficiency of PPPs. However, for a country like India, poised to be one of the leading economies of the 21st century, PPP is perhaps the best available option. The need is to use PPP extensively both for infrastructure development as well as for social development to transform India into a developed country. PPP is a tool for all-round development and the benefits depend on how such tools are utilised by the policy and decision-makers.

#### **ACKNOWLEDGEMENT**

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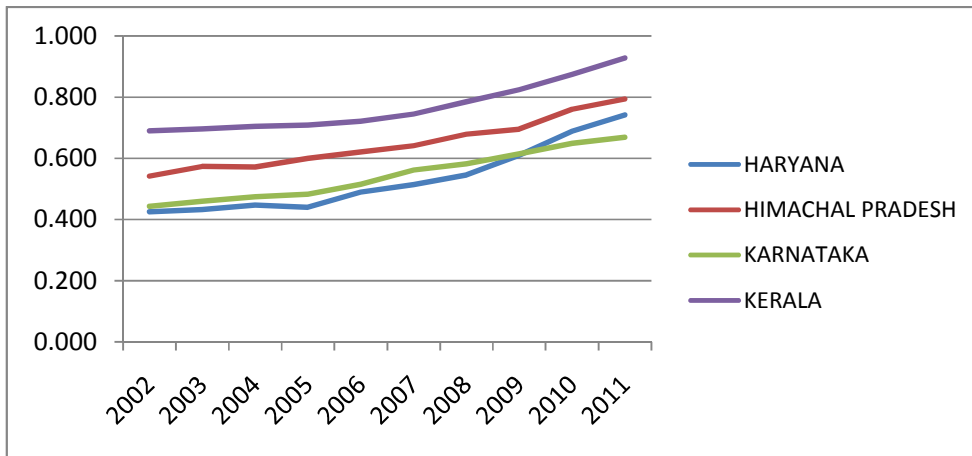
#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

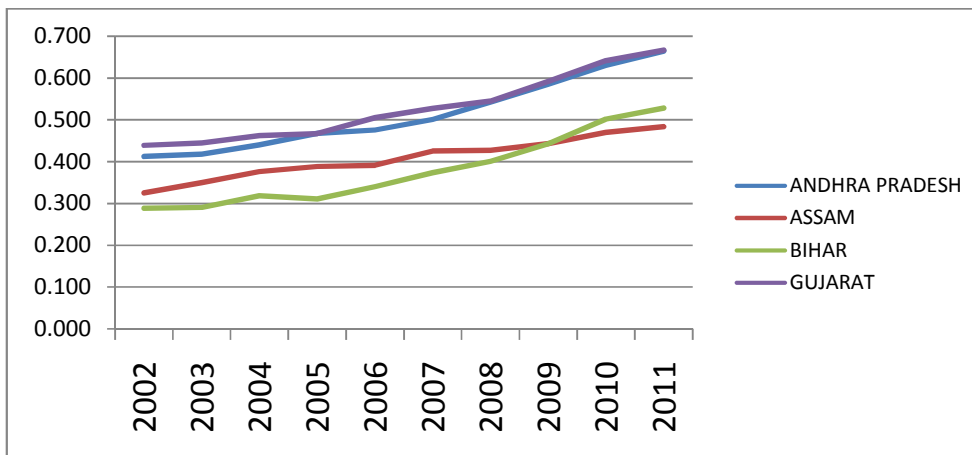
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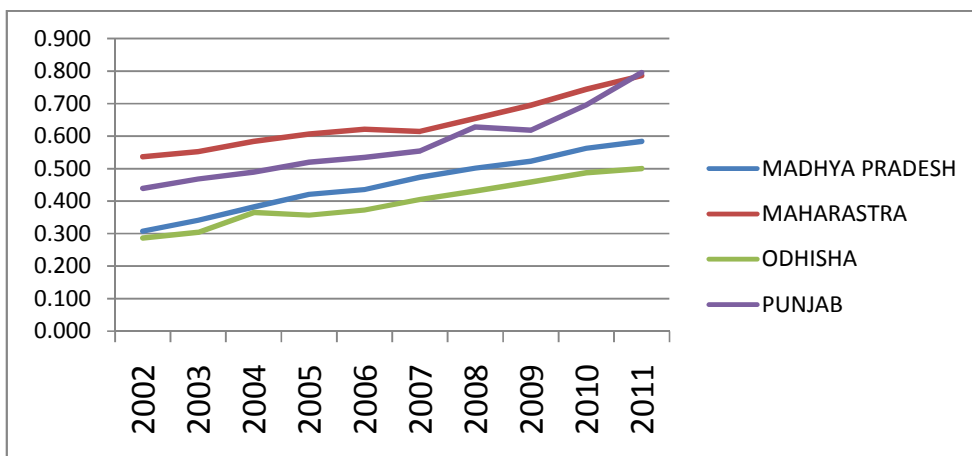
**APPENDIX - A**



**Fig. 3. States trend of HDI**



**Fig. 4. States trend of HDI**



**Fig. 5. States trend of HDI**



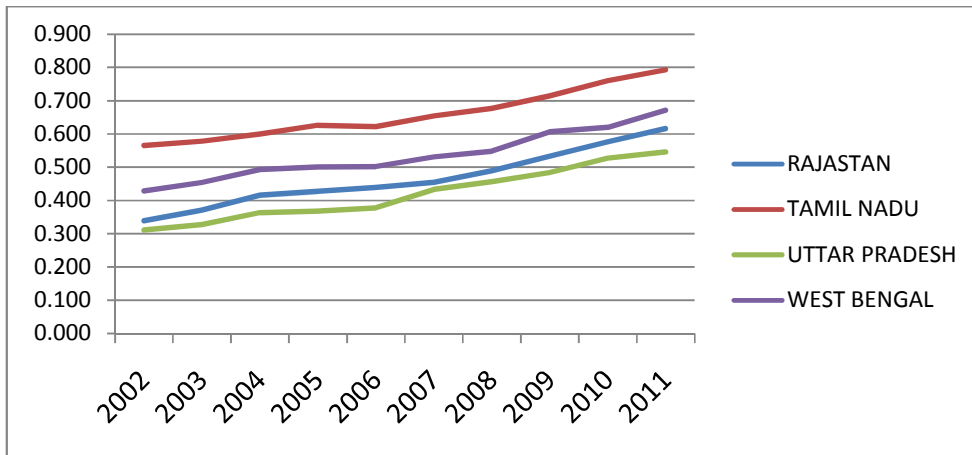


Fig. 6. States trend of HDI

APPENDIX - B

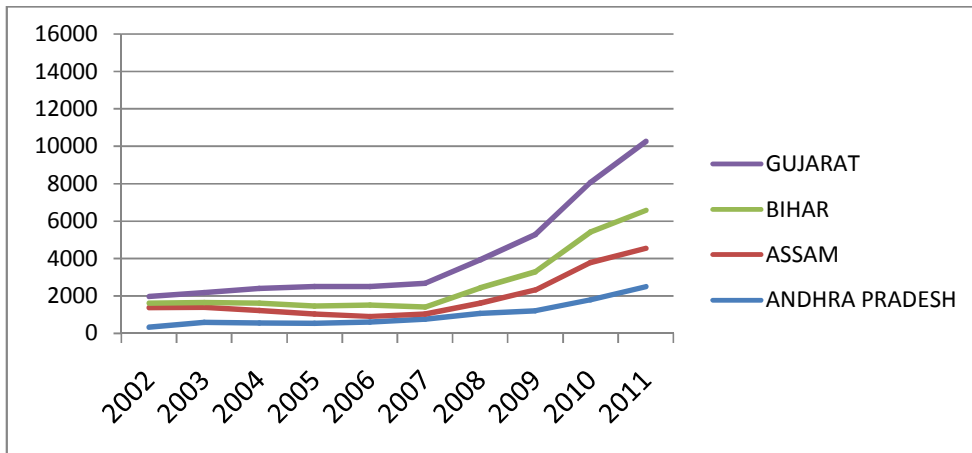


Fig. 7. States trend of real per capita public expenditure

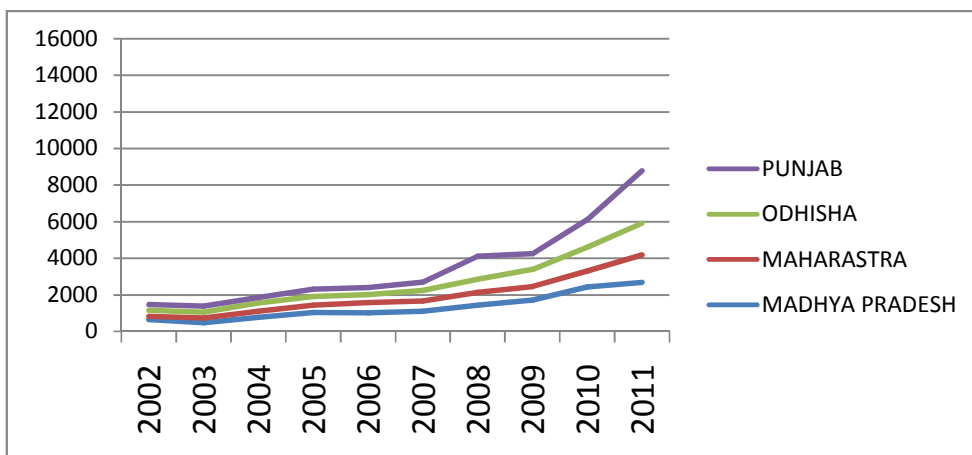


Fig. 8. States trend of real per capita public expenditure

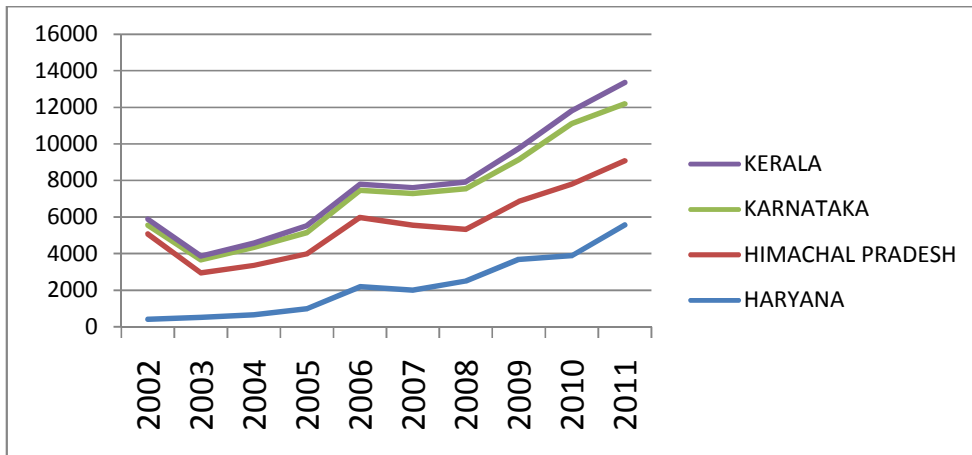


Fig. 9. States trend of real per capita public expenditure

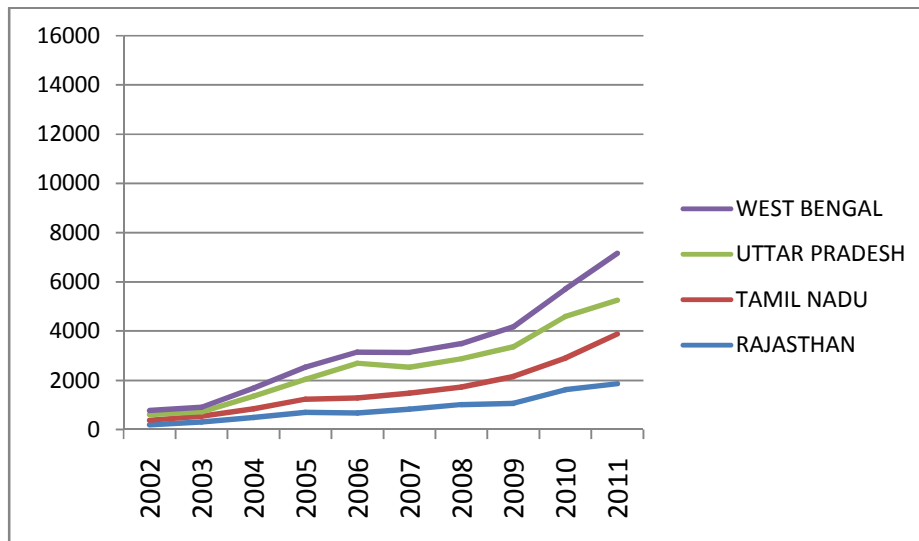
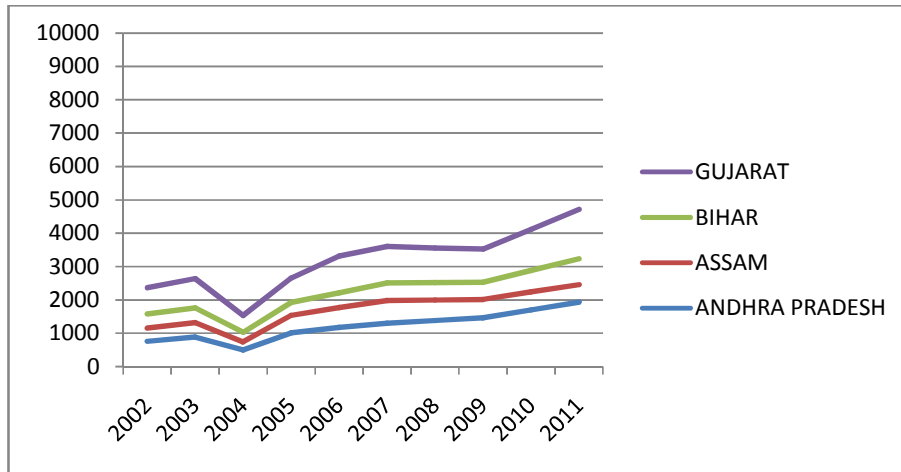
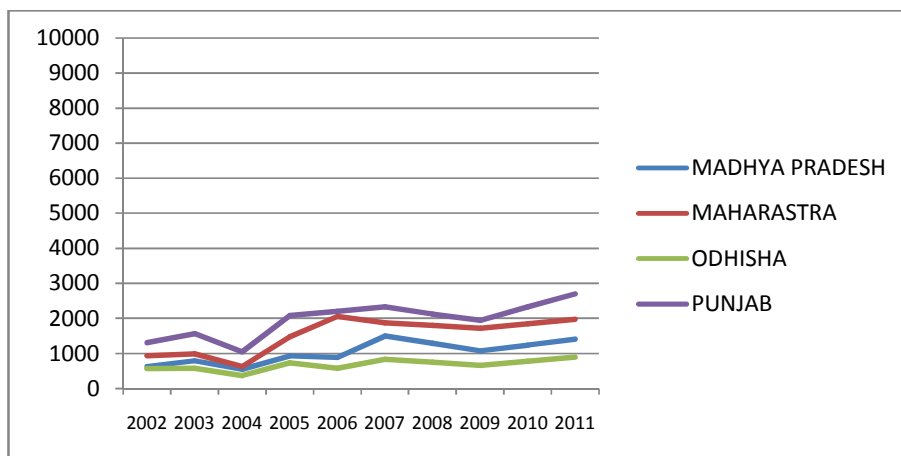


Fig. 10. States trend of real per capita public expenditure

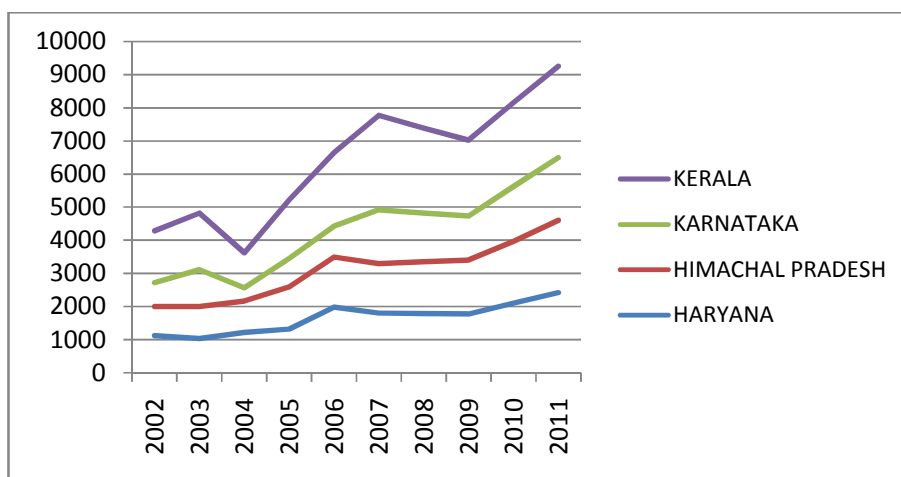
**APPENDIX - C**



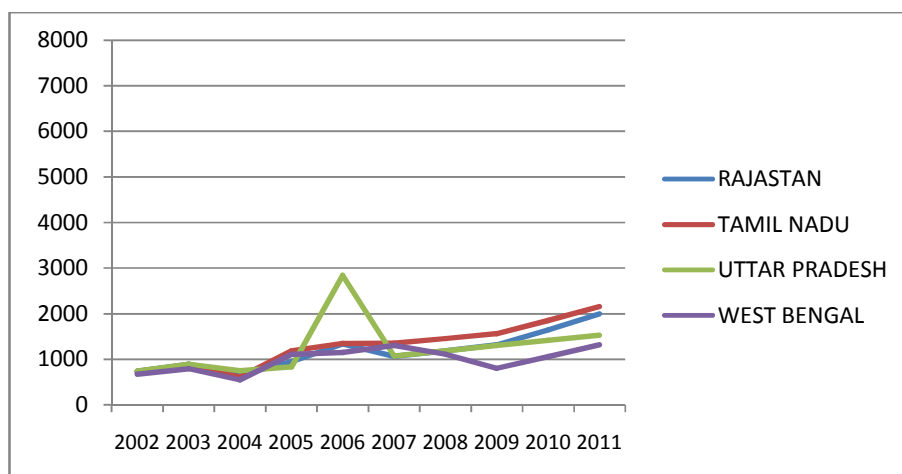
**Fig. 11. States trend of real per capita private expenditure**



**Fig. 12. States trend of real per capita private expenditure**



**Fig. 13. States trend of real per capita private expenditure**



**Fig. 14. States trend of real per capita private expenditure**

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