

The Theory of Public Private Partnership:

A case study of selected 21 States in India

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Abstract

A positive correlation in long-run contract no consensus and encompasses in rent-seeking behaviors to directly of a public sector entity and private sector entity for a specified time period on commercial terms and in which private and public partnership on economic activity and growth rate of GDP. Growth rate of Gross Domestic Product (GDP) is determined in increase in marginal propensity to public private partnership. When the rule and on average to increase Public Private Partnership (PPPs) investment as National State Domestic Product (NSDP) per capita (nominal) income increase, but not as much as the investment increase in NSDP per capita (nominal) income. It is increase leads to output and employment increase both public and private sector and vice versa. The investigation of the presenting paper is following objectives are: firstly, is to examine the public and private partnership on GDP. Secondly to comparative State wise investment on public and private partnership and lastly, to examine the effects of public and private partnership on growth of GDP, the scope of the study is investment and NSDP per capita (nominal) income in 21 selected States in India. The collection of secondary data which is related to CSO in NSDP per capita (nominal) 2018-19 year State wise public private partnership investment as on 2017-18, I use multiple regression analysis to estimate effects of investment of public private participation on GDP.

Assumptions

- Other things remaining the same
- 2*1*2 model; Government and private sectors, one nation, two variables i.e., Net State Domestic per capita income in Rs crore and development projects cost in Rs crore
- Positive correlation between Government and private partnership
- Marginal propensity to Government expenditure is always positive, greater than zero and less than one $0 < mpg < 1$
- Marginal propensity to private expenditure is positive and less than 1
- Economic projects determines on cannons of taxation
- Economic projects on the basis of Cost-Benefit Analysis
- Government and private partnership ratio 75:25 respectively
- There is no market failure under public private partnership.
- Externalities are given
- State of technology more importance

- There is economics profit are given
- Output is determine by returns to scale
- Public and private goods ratio is 75:25
- The cost of projects are based on Wiseman-Peacock Hypothesis

Objectives

- 1.To examine the public and private partnership on GDP
- 2.To significance of investment of public and private partnership on selected States and
- 3.To examine the effects of public and private partnership on growth of GDP

Methodology

The scope of the study is covered State investment and NSDP per capita (nominal) income in 21 selected States in India. The collection of secondary data which is related to CSO in NSDP per capita (nominal) 2017-18 year States wise public private partnership investment as on 31st July, 2011.

Selection of Data

The list of Indian states and union territories by NSDP per capita Net state domestic product (NSDP) is the counterpart to a country's Net domestic product (NDP), which equals the gross domestic product (GDP) minus depreciation on a country's capital goods. The following table gives selected 21 States the latest available nominal NSDP per capita figures for the States and Union Territories of India at current prices in Indian rupees.

www.infrastructureindia.gov.in is a repository of information on infrastructure projects being implemented in India by various Government Departments and private sector companies. This database has been developed by PPP cell, infrastructure Division, Department of Economic Affairs, Ministry of Finance, Government of India.

This Report provides information on infrastructure projects implemented by the Government on PPP basis across pre-defined set of parameters and following Coverage criteria:

Government Infrastructure Projects (PPP) that were either under 'pre-construction Stage', 'Under Construction' or Operation and Maintains Stage' as on April 1, 2011 or 'Awarded' thereafter and with Project Cost > INR 5 crore.

Private Sector Projects that were under 'Pre-construction Stage', or 'Under Construction' as on April 1, 2012 or 'Awarded' thereafter and with Project Cost > INR 50 crore.

Table 1 State wise net State domestic product per capita (nominal) income in crore Rs and public private partnership project Cost (actual) in crore Rs. As on April 1, 2011.

Table 1.1 state wise NSDP per capita incomes in 2018-19 and sub-sector public private partnership project cost (actual) in 2011

SL Num	States	NSDP per capita Y (nominal)Rs. Crore ₹2017-18	Sub-Sector Partnership	Public Private	Project Cost(Actual) X₹ in Rs Crore April 1, 2011
1	Goa	375,554	Airports		145.95
2	Delhi	329,093	Electricity Distribution		6021
3	Sikkim	297,765	Renewable energy (grid)		1188.57
4	Haryana	196,982	Electricity generation (grid)		6116.16
5	Telangana	181,034	Electricity transmission		345
6	Maharashtra	180,596	Roads and bridges		652.29
7	Uttarakhand	177,356	Renewable energy (grid)		1694
8	Karnataka	174,551	Roads and bridges		262.94
9	TamilNadu	166,934	Electricity generation (grid)		3514
10	Kerala	163,475	Solid waste management		50
11	Himachal Pradesh	160,719	Electricity transmission		1003
12	Gujarat	156,527	Operation and Maintenance Stage		3000
13	Punjab	142,958	Electricity generation (grid)		4573
14	Andhra Pradesh	142,054	Renewable energy (grid)		164
15	Rajasthan	100,551	Electricity generation (grid)		8323
16	West Bengal	95,562	Solid waste management		132.71
17	Chhattisgarh	92,035	Renewable energy (grid)		207
18	Madhya Pradesh	79,907	Roads and bridges		189.05
19	Meghalaya	73,291	Water supply pipeline		226.11
20	Jharkhand	62,816	Electricity Distribution		181.31
21	Uttar Pradesh	55,339	Electricity Distribution		1457
		3,405,099			39446.09
	Average	162147.5714	Average		1878.385238

Sources: www.NSDP.com NSDP PPP per capita is calculated from Implied PPP conversion rate from IMF.

- Government expenditure public private partnership subsector in elected States in India

Average level value is Rs. 1878.38 crores investment of public-private partnership in sub-sector is more than average level that are: Electricity Distribution (Goa), Electricity generation (grid)(Hariyana), Electricity generation (grid)(Tamil Nadu), Operation and Maintenance Stage(Gujarat), Electricity generation (grid)(Punjab), Electricity generation (grid)(Rajasthan), but remaining 17 States are below average level public private partnership sub sector project costs it is shows that,

Frame work of the study

I use two variable regression analyses to estimate effects of investment projects of public private partnership on NSDP percapita income

$$\widehat{NSDP}_i = \beta_1 + \beta_2 \text{ Project Cost (Actual)}_i + \hat{u}_i$$

$$NSDP_i = 162147.57 + 5.197987103X_i + \hat{u}_i$$

Above the table average Net State Domestic Product (NSDP) percapita income in 2017-18 it was Rs. 162147.57 crore. Greater than selected States are Goa, Delhi, Sikkim, Hariyana, Tealngana, Maharashtra, Uttarakhand, Karnataka and Kerala. These percapita (nominal) income increase with participation of Government and private partnership as a results selected States income is greater than the average level. But, Himachal Pradesh, Gujarat, Punjab, Rajasthan, Andra Pradesh, West Bengal, Chhattisgarh, Madhya Pradesh, Meghalaya, Jharkhand, Uttar Pradesh states are below average line, because this states are not importance of Government and private partnership of Sub sector public and private partnership Project Cost(Actual) in Rs Crore April 1, 2011 average.

Table 1.2 results of NSDP per capita (nominal) Rs. Crore ₹ and Sub-Sector Public Private Partnership

Results		$se(\beta_2) = \sqrt{\text{var}(\beta_2)}$	7.943993443
$\beta_1 = \bar{y} - \beta_2 \bar{X}$	162147.57	$r^2 = 1 - \frac{\sum \hat{u}_i^2}{\sum (Y_i - \bar{Y})^2}$	8.94
$\beta_2 = \frac{\sum xy}{\sum x_i^2}$	5.197987103	$\text{var}(\beta_1) = \frac{\sum x_i^2}{N \sum x_i^2}$	6.78345E+14
$\bar{X} = \frac{\sum X}{\sum N}$	1878.39	$r = \sqrt{r^2}$	2.989983278
$\bar{Y} = \frac{\sum Y}{\sum N}$	162,148	$se(\beta_1) = \sqrt{\text{var}(\beta_1)}$	26045066.7
$\hat{\sigma}_i = \sqrt{\hat{\sigma}^2}$	86787.35201	$\hat{\sigma}^2 = \frac{\sum \hat{u}_i^2}{N-2}$	7,532,044,468.31
$\text{var}(\beta_2) = \frac{\hat{\sigma}^2}{\sum x_i^2}$	63.11	t =	0.5912
t _{α/2} 19 df at 5% los	1.729		

Once again let us

Under the normality assumption the variable follows the t distribution with n-2 df(degree of freedom). If the value of true $\beta_2 = 5.197$, $\beta_2 = 0.5$, $se(\beta_2) = 7.9439$ t = ? We calculate t value is:

$$t = \frac{\hat{\beta}_2 - \beta_2}{\text{se}(\hat{\beta}_2)} = \frac{\text{Estimator} - \text{Parameter}}{\text{estimated standard error of estimator}} = \frac{5.197 - 0.5}{7.9439} = \frac{4.697}{7.9439} = 0.5912 \quad (1)$$

In the β_2 is specified under the null hypothesis, the t value of equation (1) can readily be computed from the available the sample, and therefore, it can serve as a test statistic. And the since this test follows the t distribution, confidence-interval statement can be made:

$$\Pr \left[-t_{\alpha/2} \leq \frac{\hat{\beta}_2 - \beta_2^*}{\text{se}(\hat{\beta}_2)} \leq t_{\alpha/2} \right] = 1 - \alpha \quad (2)$$

Where β_2^* is the value of β_2 under H_0 and where are the values of t (the critical values) obtained from the t table for $(\alpha/2)$ level of significance and $n - 2$ df equation (2). The t table is given in t -table. Rearranging equation (2), we obtain

$$\Pr [\hat{\beta}_2 - t_{\alpha/2} \text{se}(\hat{\beta}_2) \leq \beta_2 \leq \hat{\beta}_2 + t_{\alpha/2} \text{se}(\hat{\beta}_2)] = 1 - \alpha \quad (3)$$

$$[0.5 - 1.729 * 7.944 \leq \beta_2 \leq 0.5 + 1.729 * 7.944] = 1 - 0.05$$

$$[0.5 - 13.73518 \leq \beta_2 \leq 0.5 + 13.73518] = 0.95$$

$$(-13.2352 \leq \beta_2 \leq 14.23518)$$

$$t = 0.5912 \quad t_{\alpha/2} (19)df = 1.729$$

Reject H_0 at 5 percent level of significance.

The government-private relationship investment in crore Rupees is not sufficient correlation on NSDP percapita (nominal) income. Therefore, the probability is either 1 or 0. Thus, for our NSDP percapita income (nominal)-public private partnership example, if the 95 percent confidence interval were obtained as $(-13.2352 \leq \beta_2 \leq 14.23518)$, as we do shortly in equation (3) cannot say the probability is 95 percent that this includes the true β_2 . That probability is either 1 or 0.

Which gives the interval in which β_2 will fall with $1 - \alpha$ probability, given $\beta_2 = \beta_2^*$. In the language of hypothesis testing, the $100(1 - \alpha)\%$ confidence interval established in equation as the region of acceptance (of the null hypothesis) and the region(s) outside the confidence limits, the end points of the confidence interval, are also called critical values.

The intimate connection between the confidence interval test-of-significance approaches to hypothesis testing can now be seen by comparing equation (1) with equation (3) in the confidence interval procedure we try to establish a range or an interval that has a certain probability of including the true but unknown β_2 . Whereas in the

test-of-significance approach we have hypothesize some value for β_2 and try to see whether the computed β_2 lies within reasonable (confidence) limits around the hypothesized value.

Where figures in parentheses are the estimate standard errors, before we interpret this regression, observe the partial slope coefficient of Sub-Sector Public Private Partnership, Project Cost (Actual), namely, 5.197987103. Is it not precisely the same as that obtained from the two standard errors are precisely the same?

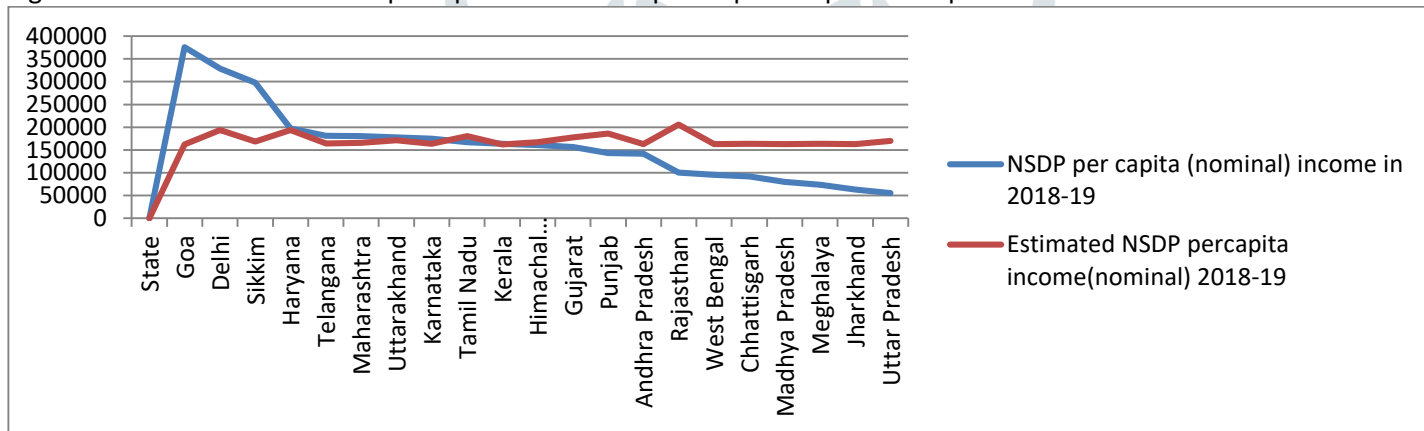
Let us now interpret these regression coefficients: 5.197987103 is the partial regression coefficient of Sub-Sector Public Private Partnership, Project Cost (Actual) and tells us that with the influence of public private partnership increases, say, by a Rupees, on average, NSDP per capita (nominal) income goes increase by 5.1979 Rupees. To make it more economically interpretable, if the per capita NSDP goes up by thousand Rupees, on average, the NSDP per capita income (nominal) Rupees goes increase Rupees 51979.87 crores income increase from public private partnership in India. the intercept value of about Rupees 162147.57, mechanically, interpreted, means that if the value of public private partnership rate where fixed at zero, the mean NSDP per capita income (nominal) would be about Rs. 162147.57 crores per State income is zero. If the two Regressors were fixed at zero, NSDP per capita income (nominal) will be quite high, which means practical sense. The r^2 value of about 8.94 means that about 894 percent of the variation in NSDP per capita income (nominal) Rupees in crore is explained by public-private partnership, a fairly high value considering that the maximum value of r^2 can at most be 1. All told the regression results make sense.

Table 1.4 after estimated State wise NSDP per capita (nominal) income in 2017-18 public-private partnership sub sector investment in selected States in India

	NSDP per capita (nominal) income in 2018-19	Estimated NSDP per capita income (nominal) 2017-18
State	(nominal)Rs. Crore ₹	$\hat{Y}_i = \beta_1 + \beta_2 X_i$
Goa	375554	162147.57
Delhi	329093	193444.6503
Sikkim	297765	168325.7415
Haryana	196982	193939.2908
Telangana	181034	163940.8756
Maharashtra	180596	165538.165
Uttarakhand	177356	170952.9602
Karnataka	174551	163514.3287
Tamil Nadu	166934	180413.2967

Kerala	163475	162407.4694
Himachal Pradesh	160719	167361.1511
Gujarat	156527	177741.5313
Punjab	142958	185917.965
Andhra Pradesh	142054	163000.0399
Rajasthan	100551	205410.4167
West Bengal	95562	162837.3949
Chhattisgarh	92035	163223.5533
Madhya Pradesh	79907	163130.2495
Meghalaya	73291	163322.8869
Jharkhand	62816	163090.017
Uttar Pradesh	55339	169721.0372

Fig 1.1 after estimated of NSDP percapita income and public-private partnership in 2017-18



In the figure, shows that, Goa, Delhi, Sikkim, Hariyana, Tealngana, Maharashtra, Uttarakhand, Karnataka states incomes decreasing after estimation NSDP and public-private partnership in crore rupees because more improves remaining Thirteen States.

Conclusion

The following points are conclusion of the following:

1. Government more investment on public sector
2. Private role expand area to village level
3. Public-private partnership contrite all sectors
4. To remove poverty and unemployed throw public-private partnership
5. To reduce income and wealth inequalities through public-private partnership
6. Government introduce to high level basic infrastructure

7. To provide good drinking water supply through PPP
8. To provide lower cost of education and health to provide poor people

Bibliography

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