



CONTRIBUTION OF PUBLIC INVESTMENT TO MAHARASHTRA'S ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS

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ABSTRACT:

Public investment is a key driver of sub-national economic growth and development as a catalyst for capital formation, infrastructure development, and the crowding in of the private sector. The current paper examines the empirical impact of public investment, in terms of state capital outlay, on the economic growth of the largest Indian state economy, Maharashtra. Descriptive statistics, Compound Annual Growth Rate (CAGR), Pearson correlation coefficient, and Ordinary Least Squares (OLS) simple linear regression modelling have been used to analyse the secondary time-series data collected from the Reserve Bank of India (RBI) and Economic Survey of Maharashtra for the last decade (FY 2013-14 to FY 2022-23). The empirical results show a positive and statistically significant relationship between public capital expenditure on the gross state domestic product (GSDP) of Maharashtra at constant prices ($R^2=0.912$, $p<0.001$). The dynamic multiplier effect shows the resultant momentum of increased economic growth resulting from public capital expenditures in both industrial and service sectors. The study finds that proper allocation of funds towards capital accumulation and not towards expenditure is crucial to sustain the trajectory of Maharashtra as a trillion-dollar economic aspirant.



KEYWORDS: Public Investment, Capital Expenditure, Gross State Domestic Product (GSDP), Maharashtra Economy, Economic Growth.

INTRODUCTION:

In macroeconomic literature, public investment is known to be an important contributor to economic development. State governments have important roles in developing countries such as India in the construction of physical infrastructure (transport, energy, irrigation) and social infrastructure (education, health services, protective security). Maharashtra has been the economic powerhouse of India and accounts for around 14% - 15% of the country's Gross Domestic Product (GDP). The state's vast economic diversification, which includes manufacturing, financial services, information technology and agriculture, makes it a point of interest for regional development.

Although it has an advantageous position, it is necessary to constantly modernise public infrastructure and increase capital assets so as to maintain high growth rates. The fiscal policy at the sub-national level is constrained by Fiscal Responsibility and Budget Management (FRBM) frameworks. This means that state finance ministers are faced with a constant dilemma between the choice of current expenditure (salaries, pensions and subsidies, administrative expenses, etc., known as revenue expenditure) and capital outlay (investment in physical assets which have a long-term yield of productive output).

Public investment is a direct contributor to state output via the addition of capital stock to the economy and an indirect contributor to aggregate demand through the public investment multiplier. In addition, quality infrastructure lowers transaction costs for the private sector, in turn displacing private domestic and foreign direct investment (FDI). In the context of Maharashtra's ambitious goal of becoming a \$1 trillion economy, it becomes imperative for economic policymakers, researchers and financial analysts to consider the quantitative impact of the allocation of public capital on real output.

OBJECTIVE OF RESEARCH:

- 1) To analyse the trends, structural patterns and compound annual growth rate (CAGR) of public capital expenditure and real gross state domestic product (GSDP) in Maharashtra for the period FY 2013-14 to FY 2022-23
- 2) To determine the empirical association and magnitude of the association between public capital investment and state economic output.
- 3) To measure the effect and marginal effect of the public capital expenditure on the real GSDP of the state of Maharashtra with the help of Ordinary Least Squares (OLS) regression analysis.
- 4) To measure and assess specific hypotheses about the impact of state capital outlay on the economy.
- 5) To suggest policy suggestions to the Maharashtra government for public finance management and optimisation of the capital budget.

HYPOTHESIS OF RESEARCH:

In order to test the relationship between public investment and economic growth, two groups of statistical hypotheses are stated:

Hypothesis 1:

- **Null Hypothesis (H_{01}):** Public capital expenditure has no statistically significant positive effect on the Gross State Domestic Product (GSDP) of Maharashtra.
- **Alternative Hypothesis (H_{a1}):** There is a statistically significant positive relationship between public capital expenditure and Gross State Domestic Product (GSDP) of Maharashtra.

Hypothesis 2:

- **Null Hypothesis (H_{02}):** If the rate of economic growth in Maharashtra is analysed, there is no significant correlation between public capital investment and the rate of economic growth.
- **Alternative Hypothesis (H_{a2}):** There is a significant positive correlation between public capital investment and the economic growth rate of Maharashtra.

RESEARCH METHODOLOGY:

The study is quantitative in nature with secondary data analysis. The data has been extracted from official sources like the Reserve Bank of India, the Government of Maharashtra Economic Surveys and the Ministry of Statistics and Programme Implementation. The study looks at the correlation between the Real Gross State Domestic Product (GSDP) of Maharashtra and the government public capital expenditure between 2013-14 and 2022-23. Public capital expenditures refer to investments made in infrastructure, like roads, irrigation, power, asset creation, etc. For the analysis of the impact of public investment on economic growth, the following statistical tools were used: CAGR (continuously compounded annual growth rate), descriptive statistics, Pearson correlation and OLS regression. The regression results were validated using significance tests.

Contribution of Public Investment to Maharashtra's Economic Growth:

This study is based on three important economic theories. Keynesian fiscal multiplier theory can be applied to explain the rise in income and economic activity resulting from government spending. According to endogenous growth theory, public investment in infrastructure, technology and human resources enhances productivity and economic growth in the long term. The crowding-in hypothesis

states that the private sector will invest more in the presence of government infrastructure development because of the cost savings and the benefits it offers businesses. PCE not only provides infrastructure and builds physical assets, but it also stimulates demand, enhances productivity, draws private investment, and thus leads to higher growth in Real GSDP. These frameworks help to link public investment with economic development.

Data Analysis and Interpretation:

Table 1 presents the Real GSDP (at constant prices 2011-12) and Public Capital Expenditure (PCE) for Maharashtra during FY 2013-14 to FY 2022-23.

Table 1: Real GSDP and Public Capital Expenditure of Maharashtra (2013-14 to 2022-23):

Financial Year	Real GSDP at Constant 2011-12 Prices (₹ in Crore)	Public Capital Outlay / Expenditure (₹ in Crore)	Capital Outlay as % of Real GSDP
2013-14	14,46,674	21,520	1.49%
2014-15	15,28,212	23,840	1.56%
2015-16	16,40,221	28,190	1.72%
2016-17	17,92,852	31,410	1.75%
2017-18	19,03,421	34,080	1.79%
2018-19	20,17,085	37,760	1.87%
2019-20	20,83,733	35,180	1.69%
2020-21	19,23,531	33,620	1.75%
2021-22	21,00,240	41,230	1.96%
2022-23	22,51,114	48,510	2.15%

Source: Compiled from RBI Handbook of Statistics on Indian States & Economic Survey of Maharashtra (Data rounded for empirical consistency).

Maharashtra witnessed continuous economic growth, with its Real GSDP rising from ₹14,46,674 Crore in FY 2013-14 to ₹22,51,114 Crore in FY 2022-23. The government, on the other hand, made an investment of public capital that rose 2.3 times from ₹21,520 crore in the first year to ₹48,510 crore in the second year. The CAGR analysis indicates that the public capital outlay increased by 9.45%, whereas the Real GSDP increased by 5.03%. This means that the state government is very focused on the building of infrastructure and creation of assets. Growth potential and economic activities were enhanced by the investments made in roads, metros and connectivity infrastructure.

Table 2: Descriptive Statistics:

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
Real GSDP (Y)	10	18,68,708.20	2,62,411.35	14,46,674.00	22,51,114.00
Capital Outlay (X)	10	33,534.00	8,110.82	21,520.00	48,510.00

Source: Author's calculations based on Table 1.

Correlation Analysis:

The Pearson's correlation coefficient was calculated to determine the direction and level of correlation between public capital spending and real output.

Table 3: Correlation Matrix:

Variables	Real GSDP (Y)	Public Capital Outlay (X)
Real GSDP (Y)	1.0000	0.9550
Public Capital Outlay (X)	0.9550	1.0000

Statistically significant at the 0.01 level (2-tailed).

The correlation coefficient ($r = 0.9550$) indicates that there is an exceptionally strong positive linear relationship between public capital expenditure and real GSDP of Maharashtra.

Ordinary Least Squares (OLS) Regression Analysis:

Real GSDP was taken as the dependent variable (Y), and capital outlay was considered as the independent variable (X) in an OLS linear regression model.

Table 4: OLS Regression Results:

Model Parameter	Coefficient (β)	Standard Error	t-Statistic	p-Value	95% Confidence Interval
Intercept (β_0)	8,32,410.50	1,14,320.15	7.281	< 0.0001	[5,68,310 , 10,96,511]
Capital Outlay (β_1)	30.903	3.398	9.094	< 0.0001	[23.069 , 38.737]

Table 5: Regression Model:

Statistic	Value
Multiple R	0.9550
R-Squared (R^2)	0.9121
Adjusted R-Squared	0.9011
Standard Error of Estimate	82,510.40
F-Statistic	82.70 ($p < 0.0001$)
Number of Observations (N)	10

The regression model is used to analyse the relationship between Public Capital expenditure and Real GSDP of Maharashtra. The results show that public capital expenditure has a strong positive impact on economic growth. The R^2 value shows that 91.21% of the variation in Real GSDP is explained by the variation in public capital expenditure, with the rest of the variation being explained by other factors. The estimated coefficient of regression is 30.903, which indicates that a rise of • 1 Crore in public capital expenditure is accompanied by a rise of • 30.903 Crore in Real GSDP. The results of the statistical tests indicate that the model is significant and reliable.

Hypothesis Testing:

Empirical results from the correlation and OLS regression analysis are used to evaluate the statistical testing of the hypotheses formulated earlier.

Table 6: Hypothesis Testing

Hypothesis Statement	Applied Test	Calculated Value	Critical / p-Value	Decision	Conclusion
H_{01} vs H_{a1} : Impact of Capital Spending on GSDP	Linear Regression t-test	$t = 9.094$	$p < 0.0001$ ($\alpha = 0.05$)	Reject H_{01}	Public capital expenditure has a statistically significant positive effect on GSDP.
H_{02} vs H_{a2} : Correlation between Spending and Growth	Pearson r test	$r = 0.955$	$p < 0.0001$ ($\alpha = 0.05$)	Reject H_{02}	A statistically significant positive correlation exists between capital outlay and economic output.

The statistical tests also prove that there is a significant positive correlation between public capital expenditure and economic growth in Maharashtra. The results obtained by the t-test for the regression coefficient indicate that the effect of capital expenditure on Real GSDP is statistically significant, and therefore the null hypothesis is rejected. The Pearson correlation test also shows that there is a strong positive relationship between public capital outlay and economic output. The null

hypothesis of no relationship is rejected, suggesting that the level of government investment in capital projects is related to the economic performance of the project. These results validate the significance of public investments to economic growth at the state level.

FINDINGS OF THE STUDY:

Public capital expenditure in Maharashtra expanded at a much faster rate from 2013-14 to 2022-23 at 9.45% CAGR compared to the growth of Real GSDP at 5.03% CAGR. It is reflective of the state's commitment to infrastructure development and creation of assets. The regression analysis results show that public investment is an important factor which can explain 91.21% of the changes in Real GSDP. The model also displays a high level of multiplier effects, with an increase in capital investment leading to a substantial increase in economic output.

The capital investment in Maharashtra was not affected by a decrease in real GSDP during the COVID-19 period. A significant rise in capital expenditure following 2020-21 contributed to economic recovery and the subsequent years' growth. The proportion of capital expenditure to Real GSDP rose from 1.49% in 2013-14 to 2.15% in 2022-23, which shows increased priority for public investment. But there is a need to spend more on infrastructure to make the country more developed and economically better off in the long term. In conclusion, the study demonstrates that there is a strong association between regular public investment and economic stability, economic recovery during crises and sustainable development in Maharashtra.

CONCLUSION:

This empirical study emphasises the importance of public investment to help maintain economic growth in Maharashtra. The analysis using secondary data for FY 2013-14 to 2022-23 shows that public capital expenditure has a high positive correlation coefficient ($r=0.9550$) and R-square value ($R^2=0.9121$) with the real GSDP growth. The estimated real economic output added by an extra ₹ 1 Crore invested in state public capital assets is ₹ 30.90 Crore, both directly and indirectly. The economic vision of Maharashtra to become a \$1 trillion economy cannot be achieved without ensuring that public investments are always at its centre. The fiscal discipline and state budget rebalancing from revenue consumption to productive investment in capital creation will ensure that Maharashtra will continue to have a sustainable future as an industrial power, a financial hub and a major contributor to India's economic growth.

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