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Comparative Analysis of Public and Private Investment Patterns: Empirical Insights from the Indian Economy

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Abstract

This study assesses the impact of public investment on the Indian economy and identifies the key components of public investment that have the most significant influence on economic growth. The findings reveal a positive and significant relationship between public investments and the GDP growth rate, indicating that public investments exert a more influential impact than private investments. Specifically, the study identifies construction and electricity, water, and gas supply as the primary sectors where public investment plays a crucial role in fostering economic growth. Furthermore, the research highlights a positive correlation between public investments and the productivity of private investments.

Keywords: Public Investments; Private Investments; GDP growth; Indian Economy

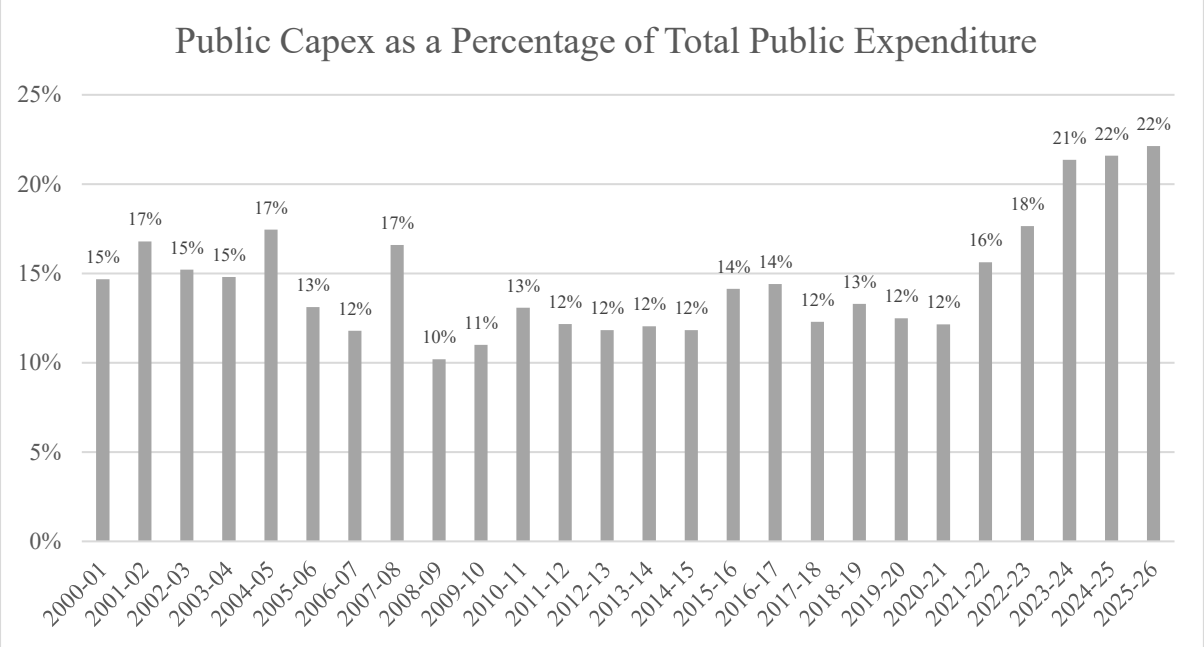
1. Introduction

The Covid-19 pandemic catapulted the Indian economy into a realm of uncertainty, income loss, and weakened growth prospects. The ensuing demand and supply shocks, induced by factors such as the closure of contact-sensitive activities and labour restrictions, resulted in a substantial economic downturn. The first quarter of 2020-21 saw the annual GDP growth rate plummet by approximately 24.4%, marking the largest observed drop since 1980.In response to the economic downturn, fiscal and monetary authorities in India rolled out a series of stimulus packages throughout 2020-21. These measures, totalling Rs. 27.1 lakh crore, aimed to reinvigorate economic activity. The comprehensive package included relief measures for households, employment provisions under the Pradhan Mantri Garib Kalyan Rojgar Abhiyaan, credit guarantees for MSMEs and NBFCs, and regulatory reforms. The AtmaNirbhar Bharat Package introduced significant policy changes, including deregulation in the agricultural sector, new PSU policies, increased FDI limits, and various schemes to boost livelihoods, employment, and the MSME segment.

Recognizing the crucial role of the crucial role of capital investment in economic revival, Finance Minister Nirmala Sitharaman emphasized its multiplier effect in the 2022-23 budget. A 35.4% increase in central government capital expenditure to 7.50 lakh crore rupees was announced, coupled with the creation of capital assets via grants to aid. The focus on capital expenditure is strategic, aiming to stimulate private investments and foster economic growth. Graph 1, depicting annual public capital expenditure as a percentage of total public expenditure, reveals a noteworthy increase after 2020, indicating a deliberate shift in the government's focus on capital expenditure. This underscores

the government's reliance on capital expenditure as a pivotal tool for economic revival and the inducement of private investments.

Graph 1: Public Capex as a Percentage of Total Public Expenditure



Source: RBI's Handbook of Statistics on Indian Economy

The present study is dedicated to examining the impact of public investments on economic growth in the Indian context and comparing it to the impact of private investments. Additionally, the research delves into the differential effects of various components of public investment, aiming to decipher essential routes for government investment strategies. Furthermore, the study explores the impact of public investment on the productivity of private capital, determining whether it serves as a catalyst or impediment to private investments. This empirical investigation is structured to offer comprehensive insights into the evolving dynamics of public and private investment patterns in the Indian economy. The subsequent sections review theoretical and empirical literature, outline the methodology and data validation, and culminate in policy recommendations.

2. Literature Review

The interplay between public and private investment and its repercussions on economic growth has long been a focal point of scholarly discourse. This literature review navigates through contrasting theoretical frameworks, from Keynesian notions of positive fiscal multipliers to Classical concerns about crowding-out effects, and the Ricardian concept of future tax implications. We also discuss some of the key empirical studies undertaken in this domain.

2.1 Theoretical debates

The literature on the relationship between government spending and economic growth is rich with theoretical debates, primarily centered around the contrasting perspectives of Keynesian, Classical, and Ricardian theories.

2.1.1 Keynesian theories

Keynesian theories posit that increased government expenditure stimulates economic activity. The fiscal multiplier principle is central to this perspective, suggesting that government spending triggers a larger change in the economy. Scholars like Ram (1986) and Ghalib (1998) support the idea that a rise in government expenditure can lead to higher economic growth.

Studies following Keynesian ideas explore two main themes: the impact of public investments on the marginal productivity of private investments and the cost reduction of businesses with the presence of public capital. Infrastructure projects, such as education, power generation, and transportation, are believed to boost private sector economic activity and spur economic growth (Eberts and Fogarty, 1987; Merriman, 1990; Wang, 2005). The catalytic effect of public investment on private sector capital formation is seen through cost adjustments, lowering the barriers for private businesses (Turnovsky, 1996).

2.1.2 Classical theories

Contrary to Keynesian views, classical theories, including neo-classical and public choice perspectives, argue that government spending crowds out private investment. This is based on the notion that resource constraints limit critical private sector investments, leading to negative effects on economic growth. Scholars such as Majumder (2007) emphasize the adverse impact of government budget deficits on inflation and consumption. Research supporting classical ideas suggests that public investment, particularly when debt-financed and concentrated in inefficient industries, can obstruct private investment and impede economic progress (Devarajan et al., 1996; Khan and Kumar, 1997). The crowding-out effect may occur when public investment competes directly with the private sector, stifling private investment growth.

2.1.3 Ricardian equivalence

The Ricardian equivalence theorem argues that private investment and government spending are independent of each other. Private investment has neither a crowding-in nor a crowding-out effect, assuming that increased government spending will be offset by future taxes. This viewpoint, based on intertemporal considerations, contends that private actors anticipate future tax implications, leading to unchanged interest rates and private investment levels (Arestis, 2011).

2.2 *Empirical studies*

Aschauer (1989) conducted one of the initial empirical studies in this field, examining the impact of public investment in non-military infrastructure on productivity and GDP growth in the United States from 1949 to 1985. The study, utilising the aggregate Cobb-Douglas production function, revealed a positive and significant relationship between public capital and economic growth, indicating a 0.4% increase in productivity with each percent rise in public capital. Munnell (1990) later affirmed these findings. However, critiques surfaced regarding the magnitudes of elasticities, attributing them to non-stationarity issues. To address this, subsequent studies employed the first difference estimation technique, resulting in lower reported elasticities.

Yang (2006) offered a comparative empirical analysis of public and private investment's impact on economic growth in the United States and Japan. Notably, private investment contributed more significantly to economic growth in the United States, contradicting Aschauer's conclusions. Lighthart (2000) studied public capital's impact on GDP growth in Portugal from 1965 to 1995, reporting an output elasticity of 0.20 for public investment, with higher elasticities for private investment and labour.

In the Indian context, a plethora of studies compare relative productivity impacts of government capital expenditure and private capital expenditure and whether government expenditure creates an environment to enhance private investments and does stimulating economic growth. Unnikrishnan, N., & Kattookaran, T. P. (2020) concluded that private

investments are more capable of driving economic growth than government investments. Krajewsk (2024) compared government consumption expenditure with government investments expenditure, where they concluded that in long run government expenditure on investments has a more pronounced impact on economic growth than consumption expenditure. Turning to the role of transportation infrastructure, Skorobogatova and Kuzmina-Merlino (2016) emphasized its importance in the Latvian economic development. Njoh (2012), exploring East Africa and the Indian Ocean Region, utilized CIA data to reveal positive associations between paved roads and development, while railways exhibited a negative correlation with Gross National Income per capita.

The present study aims to contribute valuable insights to the existing empirical evidence by addressing three key questions pertaining to government capital expenditure and its influence on the Indian economy. Firstly, we seek to unravel the differential impact of a unit amount increase in public investment compared to private investments, aiming to discern whether government investments exhibit greater productivity than their private counterparts.

3. Empirical Model

This model is designed to address the primary objective of this study by evaluating the impact of public and private investments on the Indian economy. The neoclassical approach is employed for econometric estimation, employing a Cobb Douglas Production function with GDP as the output (Q) and Capital (K) and Labor (L) as inputs. Capital is further categorized into private and public capital, denoted as KP and KG, respectively.

$$Model\ :\ Q = MFP_t * KP_t^a * KG_t^b * L_t^c$$

The relationship is captured using the logarithmic transformation:

$$Log(Q_t) = Log(MFP_t) + aLog(KP_t) + bLog(KG_t) + cLog(L_t) + e_t$$

The quantity Q representing the Output is quantified by the GDP at current prices and has been sourced from the RBI handbook on Indian economy. Marginal factor productivity (MFP) is included in the equation to capture the effects of production technology that are not explicitly accounted for in the model. Here, 'KP' represents private investment which is proxied by gross fixed capital formation published in Table 1.9 of the Economic Survey for the Financial Year 2021. The statistical manual published by 'National Accounts Statistics' informs that GFCF in private sector is provided by RBI as a part of their continuous sample studies of the Indian corporate sector. 'KG' represents public sector investments which are proxied by 'Gross Fixed Capital Formation' in public sector. KG' is also sourced from table 1.9 of the Economic Survey of India published in Financial Year 2021. The Public Sector GFCF is calculated as a sum of actual expenditures incurred on building roads and other construction works, as well as new expenditures on machinery, transport vehicles, equipment, software, and other capital outlays on livestock, as estimated in the GFCF at current prices. Finally, 'L' represents the Labour, defined as the supply of workers available to produce goods and services in the economy. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers. The data for labour inputs is taken as the labour force in the country from the World bank. This series has been estimated by International Labour Organization.

The variables are subscripted by t representing the time dimension and quantities a,b and c represent the output elasticates of KP, KG and L respectively. The data selected for this model spans from 1990 AD to 2020 AD. To address multicollinearity, drawing on insights from Makuyana and Odhiambo (2018), the model was estimated using first differences. The modified equation hence is represented as:

$$\delta Log(Q_t) = \delta Log(MFP_t) + \delta aLog(KP_t) + \delta bLog(KG_t) + \delta cLog(L_t) + e_t$$

4. Empirical Estimation and Findings

The regression findings in Table 1 suggest a significant and positive relationship between public investment and GDP, affirming the influential role of public capital in the growth of the domestic economy. The reported elasticities indicate the impact of a 1% increase in private and public capital on GDP, with values of 0.145 and 0.185, respectively.

Table 1: Regression Results

	Estimate	t-value	p-value
Intercept	0.09204	5.938	0.000
KP	0.14566	2.872	0.008***
KG	0.18584	2.475	0.020**
L	-0.26384	-0.578	0.568

*** and **, represent significance at 1% and 5%, respectively

Private and public investments are found to exert a significant impact on growth, while the contribution of increased labour does not display a significant impact on its growth. The results affirm that public investment positively impacts GDP in India. A 1% increase in public investment corresponds to a 0.18% increase in output, consistent with findings by Linghart (2000) and Finn (1993). Notably, these results diverge from those reported by Munell and Aschauer (1998).

5. Conclusion and Policy Recommendations

This study sought to explore the necessity and role of capital expenditure by the government in the Indian economy's recovery. The three broad research objectives led to insightful findings that significantly contribute to our understanding of the impact of public investment. Firstly, the differential impact of public investment on the Indian economy emerged as notably positive, with a 1% increase in public investment correlating with a 0.18% rise in GDP. Moreover, public investment showcased its indispensability by playing a more crucial role in private investment growth. Based on these compelling results, it can be affirmed that the decision to increase public capital expenditure aligns with the imperative to stimulate economic growth and recover from the contraction triggered by the Covid-19 pandemic. The study's recommendations advocate for a strategic focus on construction capital and investments in electricity, gas, and water supply. These sectors emerge as pivotal components in the production of goods and services, aligning with the study's results that emphasize their utmost importance.

Building on the study's findings, following policy recommendations are put forth to guide government strategies for optimal economic recovery and sustained growth. Firstly, policymakers are encouraged to continue prioritising and augmenting public capital expenditure, acknowledging its pivotal role in fostering economic revival. The positive correlation between public investment and GDP growth reinforces the importance of sustained and strategic investments in the capital. Secondly, the study emphasizes the need for a holistic approach that recognizes the interconnectedness of public and private sectors. Encouraging public investment not only stimulates economic growth but also enhances the productivity of private investments. Policymakers should foster an environment that encourages collaboration between the two sectors, harnessing the synergies for a more robust and resilient economy.

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We wish to declare that this study utilized AI tools, including ChatGPT and Grammarly, to enhance the text's structure, language, spelling, and grammar. We take full responsibility for the content presented in the published article.

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