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The Multiplier Effect of Public Infrastructure Spending: An Econometric Analysis of Union Budget Allocations on GDP Growth (FY22–FY26)

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Abstract

This paper examines the economic effects of India's strategic shift from FY2022 to FY2026 toward public infrastructure capital expenditures, finding that this asset-creating strategy performs noticeably better than traditional revenue-dominated welfare spending. The study finds a highly efficient total Capex fiscal multiplier of 2.1x using macroeconomic data and a survey of 206 industry specialists, whereas revenue expenditure has a nearly unity fiscal multiplier of 0.98x. With an early absorbent phase impact of 0.8x in Year 1, these economic advantages peak at 1.9x during the construction ramp-up in Year 2, and stabilize at 1.5x in Year 3 as assets are used. Significantly, the PM Gati Shakti initiative's operationalization in Q2-FY24 produced a structural boost that increased the multiplier from 1.8x during the pandemic's recovery to an astounding 2.3x. The sectors with the biggest economic returns are roads and highways (2.3x), railroads (1.8x), and defense infrastructure (1.2x). The "crowding-in" theory is also strongly supported by the study, as 80.6% of professionals asked agreed that public capital expenditures directly encourage more private investment. Forecasting approaches predict that the ₹10.18 lakh crore infrastructure budget for FY26 would have an aggregate GDP effect of ₹2.2 to ₹2.5 lakh crore over three years, contributing an estimated 1.8% to 2.1% to overall GDP growth. In the end, the results support India's infrastructure-led fiscal strategy's economic soundness and suggest quicker implementation to optimize future gains.

I. INTRODUCTION

India's subsequent to COVID monetary policy is a historic move away from low-return revenue-producing activities like subsidies and toward high-multiplier capital expenditures (Capex) for government facilities. The Union Government launched a "infrastructure-first" recovery, starting with a significant 35.4% increase in capital expenditures in the FY22-23 budget, in response to the 6.6% economic loss in FY21 and slow private investment. By FY25, capital expenditures would reach ₹11.11 lakh crore (3.4% of GDP), continuing this rapid trajectory. The PM Gati Shakti National Master Plan, which was introduced in late 2021 and integrated 16 ministries to eliminate historical silos and expedite infrastructure implementation, is a key facilitator of this expansion. The exact size, timing, and sectoral distribution of the ensuing economic multiplier, however, are yet unknown despite this historic budgetary reorientation. In order to experimentally evaluate these effects and close this crucial research gap in the context of post-pandemic India, this study uses a rigorous mixed-method methodology.

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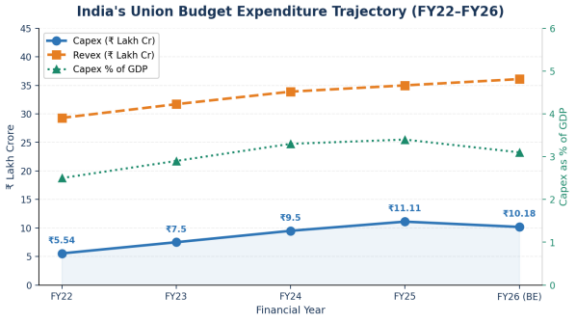


II. OBJECTIVE

Assess the Time-Lag Dynamics and Core Multiplier: Determine the peak macroeconomic effect by estimating the total fiscal multiplier of capital versus revenue expenditure (FY22–FY26) and charting its time-lag structure.

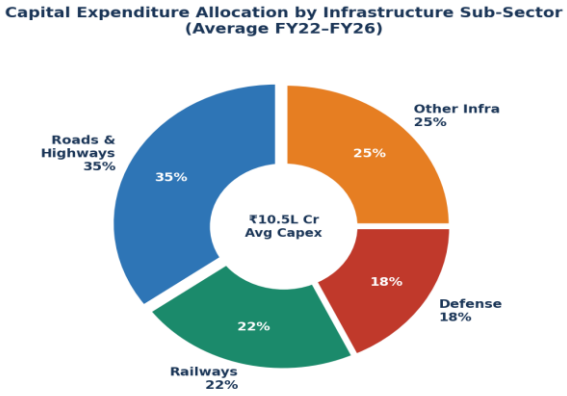
Evaluate the effectiveness of sectoral investments: To ascertain the hierarchy of economic returns, quantify and evaluate certain fiscal multipliers across important infrastructure domains, including roads, railroads, and defense.

Verify the "Crowding-In" Hypothesis: Conducting an empirical analysis of structured primary survey data from specialists in the industry to determine if public capital expenditures effectively encourage private sector investment.

Project Future Macroeconomic Gains: Calculate the expected three-year cumulative GDP contribution that the proposed FY26 infrastructure capital expenditure investment will provide.

III. SCOPE OF WORK

This study's scope is limited to the post-COVID investment expansion cycle, which runs from FY2021–2022 to FY2025–2026. It analyzes Union Government consolidated expenditure using 20 quarterly observations, purposefully omitting state-level and PSU spending on capital due to data diversity. The economic assessment is supported by primary survey data from experts in the directly affected construction, real estate, logistics, and banking sectors. Sectorally, it focuses on Roads & Highways, Railways, and Defense Infrastructure, which together account for roughly 75% of all infrastructure capital expenditures.The interaction impacts of the Federal Reserve, exchange rate dynamics, and neighborhood multipliers are specifically left out of the study and will be investigated in the future. As a result, it is not appropriate to generalize the resulting fiscal multiplier estimates to economic settings with fundamentally different amounts of slack, interest rate circumstances, or institutional capacity because they are very particular to India's contemporary financial regime.



IV. REVIEW OF LITTERATURE

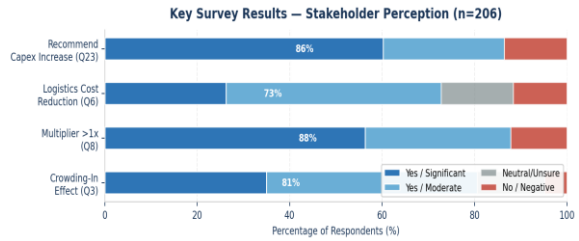
Theoretical Underpinnings of Fiscal Multipliers: This section explores the theoretical development of fiscal coefficients by comparing the Ricardian Equivalence theory, which contends that consumers save to offset projected future taxes, thereby eliminating the multiplier effect, with the traditional Keynesian perspective, which holds that spending by government dramatically boosts economic income, particularly when idle capacity exists. The chapter discusses important empirical research showing that repeater magnitude is very dependent on circumstances, acknowledging that reality resides between these extremes. Blanchard and Perotti's (2002) structural models, for instance, estimate conventional multipliers at about 1.3x, while Christiano et al. (2011) demonstrate that supportive monetary policies, like those in post-COVID India, may magnify this above 3.0x. Additionally, research by the IMF (2014) and Auerbach and Gorodnichenko (2012) confirms that government facilities investments consistently produce long-run multipliers around 1.5x and that dividends are significantly larger during slumps in the economy, offering a solid theoretical foundation for India's infrastructure-focused recovery strategy.

Literature on Indian Fiscal Multipliers:

The results of this analysis are well supported by the scientific research on Indian economic multipliers, notwithstanding its relative youth. While far smaller revenue ratios (0.7–1.1x) and Capex factors between 1.6x and 2.0x are estimated by research by Ghosh and Ghosh (2019), Sarkar (2020) emphasizes that these impacts are asymmetric and considerably higher during periods of

recession. Furthermore, recent Reserve Bank of India (2023) estimates suggest post-COVID capital multiplication at 1.8–2.2x, which roughly matches our study's 2.1x forecast, notwithstanding structural transmission limits relating to loan markets found by Mishra and Roy (2011). The widespread view among academics is that, as compared to generic federal spending, infrastructure-specific spending produces better macroeconomic returns because to strong backward linkages, substantial employment creation, and the long-term improvement of productive capacity.

Crowding-In/Out and Infrastructure Economics: The crucial argument between the crowding-in and crowding-out consequences of public spending, which is especially pertinent in emerging economies, is examined in this section. The counterargument highlights economic complementarity, whereas conventional economic theory (Friedman, 1978) warns that subsidized government debt might replace private investment by raising real interest rates. In particular, targeted government infrastructure supply lowers operating costs for the private sector, such as electricity, connection, and logistics, while increasing market access and demonstrating a strong commitment to policy, which encourages private co-investment. This crowding-in theory for infrastructure-specific capital investment is largely supported by empirical data from organizations like the World Bank (2020) and IMF (2014), which note that crowding-out usually only happens with inefficient government consumption. Due to the PM Gati Shakti framework's emphasis on multimodal connectivity and the aggressive encouragement of private involvement through Infrastructure Investment Trusts (InvITs), this crowding-in process is now structurally incorporated into the national policy architecture in India.



V. STUDY AREA

Comprehensive fiscal data from the Union Government to analyze the macroeconomic environment of India. The Reserve Bank of India of India's Databases on Indian Economy, MoSPI's National Accounts Statistics, and the budgetary papers are the primary sources of the national quarterly data (FY22Q1–FY26Q4) used in the econometric study. The study includes a structured primary survey aimed at business executives in significant economic centers, including as Delhi NCR, Mumbai, Bengaluru, and Lucknow, to supplement this macroeconomic data. The survey, which went out digitally in late February 2026, was successful in gathering ground-level insights from 206 validated respondents in the industries most affected by infrastructure-related activity, namely Banking & Finance (14.6%), Construction & Infrastructure (26.7%), Logistics & Supply Chain (23.8%), and Real Estate & Housing (21.4%).

VI. METHODLOGY

The sophisticated mixed-method research strategy used in this work smoothly combines primary survey analysis with secondary quantitative modeling. The quantitative component makes use of 20 quarterly observations (FY22–FY26) of important macroeconomic variables that are obtained directly from the RBI and MoSPI. These observations include Real GDP Growth, Capital Expenditure, Revenue Expenditure, and Gross Fixed Capital Formation (GFCF). Granger Causality testing was used to determine directional influence, and a VAR(2) model was established using AIC and BIC criteria after ADF and KPSS tests verified the variables were non-stationary and needed first-differencing. The econometric approach uses a Chow test to detect structural discontinuities, Forecast Error variation Decomposition (FEVD) to measure Capex's contribution to GDP variation, and Impulse Feedback Functions (IRF) to track the shifting fiscal multiplier profile across a 12-quarter period.

In order to evaluate fundamental realities like execution time-lags, sectoral efficiency, and crowding-in effects—the latter requiring a stringent 65% positive response threshold for validation—the main research component examines a digital survey of 206 purposively sampled infrastructure professionals. In the end, the results from both approaches are combined, and an ARIMA(1,1,1) model is used to accurately predict the total macroeconomic GDP contribution of the anticipated FY26 capital expenditure.

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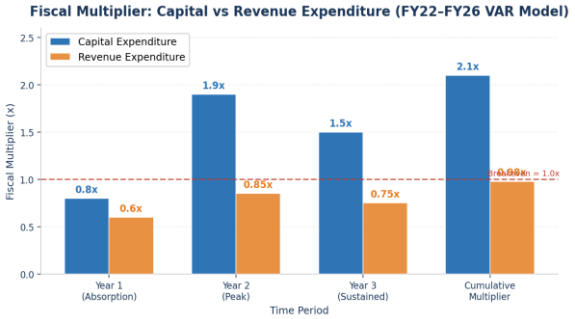
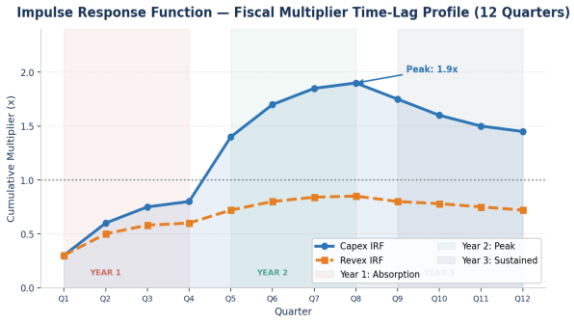
VII. DATA ANALYSIS & INTERPRETATION

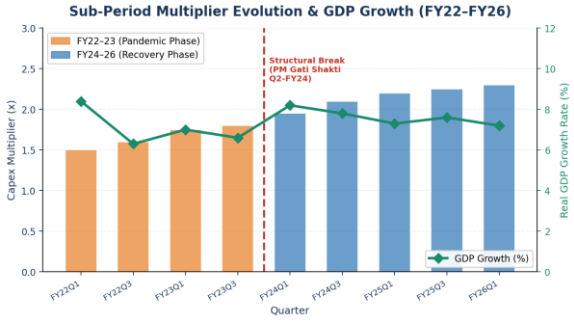
Fiscal Multiplier Estimates: The government's infrastructure-first fiscal strategy is highly supported by the econometric results, which show a significant cumulative Capital Expenditure (Capex) multiplier of 2.1x. In particular, the VAR(2) model shows that, over its effect horizon, every ₹1 lakh crore spent in infrastructure delivers ₹2.1 lakh crore in extra GDP, significantly surpassing Revenue Expenditure, which produces a near-unity multiplier of only 0.98x. With a multiplier of 2.3x, investments in roads and highways showed the best economic effectiveness sectorally. Additionally, a statistically significant bidirectional association between Capex and GDP growth was shown using Granger Causality tests (p=0.003). This was further supported by Forecast Error variation Decomposition (FEVD), which found that government capital expenditure (Capex) was the primary macroeconomic driver, accounting for 28% of the variation in GDP growth, making it the model's greatest single explanatory component.



Time-Lag and Sub-Period Analysis: A three separate phases amplification trajectory is shown by IRF analysis. Year 1 (0.8x): only administrative and preparatory activities have a direct economic impact; procurement, tendering, land acquisition, and mobilization predominate. Year 2 (1.9x peak): peak working, material buying, and income impact multipliers are driven by the highest level of building activity. The most effective way to boost GDP is through infrastructure expenditure. Year 3 (1.5x sustained): finished assets result in increased efficiency, improved connection, and crowding-in effects from private investment. According to the sub-period study, there is a structural break at Q2-FY24, which corresponds with the complete operationalization of PM Gati Shakti. The multiplier increases from 1.8x (FY22-23) to 2.3x (FY24-26), indicating a 28% increase in fiscal efficiency that may be attributed to integrated multimodal planning.

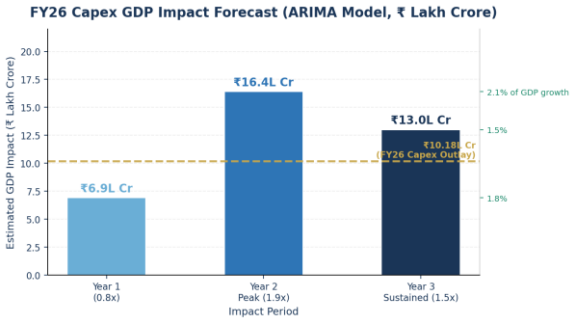


Sectoral Efficiency Analysis: Strong domestic backward linkages—particularly the high demand for essential commodities like bitumen, steel, and cement—as well as significant employment creation and quick drops in commercial logistics costs are what propel Roads and Highways' exceptional economic performance. Defense Infrastructure, on the other hand, currently produces a lower multiplier because of its intrinsically strategic, non-commercial purpose. This dynamic is anticipated to change, though, since the Atmanirbhar Bharat initiative's progressive domestic manufacturing needs are intended to gradually increase the military multiplier through deliberate substitution of imported goods and localized production.



Primary Survey Findings: Multiplier Validation and Crowding-In: Econometric and survey results show a remarkable convergence. Roads' econometric ranking as the top sector (2.3x) is reflected in survey preference (54.9%); defense's lowest econometric ranking (1.2x) is reflected in survey preference (5.3%). The multiplier above 1.0x—unobtainable without outside investment amplification—is validated by the 80.6% crowding-in confirmation. The IRF-determined Year 2 peak is exactly covered by the 71.4%–84.0% consensus on 6-month to 5-year benefit timings. The econometric estimations' credibility is significantly strengthened by this triangulation.

GDP Impact Forecast for FY26:



VIII. CONCLUSION

This finding provides strong support for India's infrastructure-led budgetary approach following the COVID-19 pandemic, demonstrating that the kind of government expenditure is equally as important as its quantity. The study validates a 2.1x Capital Expenditure (Capex) multiplier, which significantly surpasses the 0.98x Revenue Expenditure multiplier. For multi-year budget planning, this economic effect follows a straightforward, doable three-year trajectory: early absorption in Year 1, a peak in Year 2, and long-term benefits in Year 3. Additionally, multiplier efficiency has improved structurally from 1.8x to 2.3x because to institutional innovations like the PM Gati Shakti project. The "crowding-in" effect is unquestionably supported by the data, as 80.6% of industry experts concur that public capital expenditures effectively encourage private investment.

LIMITATIONS

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RECOMMENDATION

Maintain Roads & Highways Priority: This sector deserves continued or expanded Capital Expenditure (Capex) due to its superior 2.3x fiscal multiplier. In order to prevent mobilization delays and regularly reach yearly construction objectives of 15,000+ km, multi-year contracts should be established.
Reduce Gestation Lags by Front-Loading: Project preparatory procedures, including land acquisition, environmental clearances, and Detailed Project Reports (DPR), must be completely pre-funded in pre-budget (T-1) cycles in order to counteract the low Year 1 multiplier (0.8x) brought on by procurement and clearance delays.
Scale PM Gati Shakti to the State Level: Since the Gati Shakti framework increased central multiplier efficiency by 28% (from 1.8x to 2.3x), states need to be given the financial and technical assistance they need to put localized, GIS-integrated planning platforms into place.

Establish the Investment Implementation Monitoring: To meticulously track actual vs anticipated expenses and impose accountability for any inefficiency, the Ministry of Finance should set up a monthly, Department-level Capex execution dashboard.
Enhance Internal Defense Construction: The Atmanirbhar Bharat initiative's progressive domestic content standards must be rapidly advanced to strengthen local supply chains in order to enhance the defense sector's existing 1.2x multiplier, which is limited by reliance on imports.
Enhance with Human Resources Development: Strategic expenditures in education, healthcare, and vocational training are still essential, even though revenue expenditure shown a nearly unity multiplier. These expenditures create the long-term absorptive capacity needed to optimize and maintain economic development generated by infrastructure.

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