

GOVERNMENT SUBSIDY SCHEMES AND FINANCIAL PERFORMANCE OF MICRO, SMALL AND MEDIUM ENTERPRISES: EVIDENCE FROM A DIFFERENCE-IN-DIFFERENCES ANALYSIS IN JHARKHAND, INDIA

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ABSTRACT

Micro, Small and Medium Enterprises (MSMEs) have emerged as the backbone of India's industrial economy. This study evaluates the causal impact of government subsidy schemes on financial performance of MSMEs in Jharkhand using a quasi-experimental Difference-in-Differences approach combined with propensity score matching. Analysis of 672 enterprises (336 beneficiaries and 336 non-beneficiaries) over a five-year period reveals that subsidy recipients experienced significant improvements: net profit margin increased by 1.79 percentage points, return on assets increased by 1.48 percentage points, revenue growth accelerated by 5.2 percent annually, and employment expanded by an average of 1.1 additional workers per enterprise. Effects emerged gradually and accumulated over subsequent years.

KEYWORDS: MSMEs, Government Subsidies, Difference-in-Differences, Propensity Score Matching, Jharkhand, India.

1. INTRODUCTION

MSMEs are critical engines of economic transformation. In India, the MSME sector comprises over 63 million enterprises, contributes approximately 30% of GDP, and employs over 110 million individuals. Despite their importance, MSMEs face persistent constraints including limited access to formal finance, technological obsolescence, and skill shortages. The government runs multiple support programmes (PMMY, PMEGP, CGTMSE, CLCSS, state schemes) aimed at easing these constraints. This paper provides rigorous quasi-

experimental evidence on the effect of subsidy programmes on enterprise financial performance in Jharkhand.

2. LITERATURE REVIEW

The literature provides mixed evidence on subsidy effectiveness. Theoretical rationales (market failure, endogenous growth) justify public support. International studies show innovation and industrial subsidies can increase productivity and revenue, while other work documents modest or non-persistent effects arising from implementation weaknesses. Indian programme evaluations report positive outcomes but highlight administrative delays and regional disparities. This study contributes state-level causal evidence using PSM + DiD methods.

3. METHODOLOGY

3.1 Research design and sample

Quasi-experimental Difference-in-Differences combined with propensity score matching. Balanced panel of 672 enterprises: 336 beneficiaries and 336 matched controls; observation window = 5 years (2 pre-subsidy, 3 post-subsidy).

3.2 Data collection and outcome measures

Primary survey data supplemented with administrative records (Jharkhand MSME database, Ministry of MSME, district archives, bank records). Key outcomes: net profit, total assets, revenue, ROA, ROCE, liquidity ratio, and employment.

3.3 Propensity score matching (PSM)

Logistic regression estimated probability of subsidy participation using covariates: enterprise age, founder education, initial assets, baseline revenue, sector, location (urban/rural), initial employment, previous loan history. Nearest-neighbor matching with caliper 0.05; balance assessed using standardized differences (threshold ≤ 0.10).

3.4 Difference-in-Differences estimation

DiD specification: $outcome_{it} = \beta_0 + \beta_1 Treatment_i + \beta_2 Post_t + \beta_3 (Treatment_i \times Post_t) + X_{it} + \epsilon_{it}$. β_3 is the DiD estimator. Dynamic DiD used year indicators relative to subsidy enrollment to capture timing of effects.

3.5 Robustness checks

Placebo tests (fake treatment year), alternative matching algorithms (kernel, radius), Rosenbaum bounds for unobserved confounding, and subgroup analyses by location, size, and sector.

4. RESULTS

4.1 Descriptive statistics and covariate balance

Table 1 presents pre-matching descriptive statistics. After matching, all standardized differences fell below 0.10, indicating good balance. (See Table 1 below.)

Variable	Treatment (n=336)	Control (n=1,200)	Std. Diff.
Enterprise Age (years)	8.2 (4.1)	7.9 (4.3)	0.07
Founder Education (years)	10.5 (3.2)	10.8 (3.1)	-0.09
Initial Assets (INR lakh)	12.3 (8.5)	13.1 (9.2)	-0.09
Baseline Revenue (INR lakh)	18.7 (12.4)	19.2 (13.1)	-0.04
Initial Employment	4.2 (2.1)	4.1 (2.3)	0.04
Rural Location (%)	68.5	69.2	-0.02

4.2 Difference-in-Differences estimates (average treatment effect)

Table 2 displays DiD estimates for main outcomes. All key treatment effects are statistically significant.

Outcome Variable	DiD Estimate	Std. Error	95% CI	t-statistic	p-value
Net Profit Margin (pp)	1.79**	0.42	[0.97, 2.61]	4.26	0.000
Return on Assets (pp)	1.48**	0.38	[0.73, 2.23]	3.89	0.000
Return on Capital Employed (pp)	2.14**	0.51	[1.14, 3.14]	4.20	0.000
Revenue Growth (% p.a.)	5.2**	1.3	[2.7, 7.7]	4.00	0.000
Employment Growth (workers)	1.1**	0.3	[0.5, 1.7]	3.67	0.000
Asset Growth (INR lakh)	8.2**	1.9	[4.5, 11.9]	4.32	0.000
Liquidity Ratio	0.18**	0.06	[0.07, 0.29]	3.00	0.003

4.3 Dynamic treatment effects by year

Table 3 reports year-by-year effects relative to baseline. Effects emerge in Year 1 and grow in Years 2–3.

Year Relative to Subsidy	Effect Estimate	Std. Error	95% CI	p-value
Year -2 (baseline)	0.00	-	-	-
Year -1	0.12	0.35	[-0.57, 0.81]	0.726
Year 0 (enrolment)	0.34	0.42	[-0.48, 1.16]	0.411
Year 1	1.23*	0.48	[0.29, 2.17]	0.011
Year 2	1.89**	0.44	[1.03, 2.75]	0.000
Year 3	2.31**	0.51	[1.31, 3.31]	0.000

4.4 Heterogeneous treatment effects by enterprise size

Table 4 shows effects by micro, small, and medium enterprises. Micro firms show the largest gains.

Enterprise Type	n	Net Profit Margin (pp)	ROA (pp)	Revenue Growth (%)	Employment Growth
Micro	168	2.14**	1.82**	6.1**	1.3**
Small	136	1.54**	1.28*	4.8**	0.9**

Enterprise Type	n	Net Profit Margin (pp)	ROA (pp)	Revenue Growth (%)	Employment Growth
Medium	32	1.21	1.08	3.9*	0.6*

4.5 Treatment effects by sector

Table 5 reports sectoral heterogeneity; manufacturing benefits most.

Sector	n	Net Profit Margin (pp)	Revenue Growth (%)	Employment Growth
Manufacturing	168	2.31**	6.2**	1.4**
Services	128	1.43**	4.7**	0.9**
Trade/Retail	40	0.98	3.1*	0.5

5. Graphical analysis (figure captions and placeholders)

Figure 1: Trends in Net Profit Margin (Treatment vs. Control) — pre-subsidy parallel trends; divergence post-subsidy with Year 3 peak at +2.31 pp. (Placeholder: insert line chart showing Y-2 to Y3.)

Figure 2: Employment Growth Trajectory — treatment group rises from ~4 to ~5.1 workers; control stable at ~4; net gain ≈1.1 workers. (Placeholder: insert line chart.)

Figure 3: Revenue Growth Comparison — treatment group average 5.2% p.a. vs control ~0.3% p.a. (Placeholder: insert bar/line chart.)

Figure 4: Return on Assets (ROA) Evolution — DiD difference ≈1.48 pp in post-period. (Placeholder: insert chart.)

6. Robustness checks and sensitivity analysis

Placebo tests (fake treatment year) showed negligible effects (coefficient = -0.08, $p = 0.832$). Alternative matching: kernel (NPM = 1.76 pp, SE 0.44), radius (1.81 pp, SE 0.41), nearest neighbor (1:2) 1.82 pp (SE 0.43). Rosenbaum bounds indicate effects remain significant up to $\gamma = 1.5$. Subgroup analyses show consistent positive effects across rural/urban and high/low growth potential firms.

7. DISCUSSION

Key interpretations: (1) Profitability increased by 1.79 pp (~18% relative improvement over baseline mean 9.9%); (2) Asset utilization improved (ROA +1.48 pp) indicating better capital productivity; (3) Effects accumulate over time, suggesting sustained operational improvements rather than one-off financial boosts; (4) Employment increased by ~1.1 workers per enterprise (≈1,100 jobs across 336 beneficiaries over three years); (5) Heterogeneous impacts largest for micro and manufacturing firms.

Mechanisms likely include technology adoption, improved working capital and liquidity management (liquidity ratio +0.18), market expansion, workforce development, and reduced financial stress. Comparisons with international literature show magnitudes consistent with other subsidy and innovation programmes.

8. Policy implications and recommendations

- Prioritize micro enterprises showing strongest treatment effects; rebalance allocations toward smaller firms.
- Implement differential subsidy amounts by sector; manufacturing benefits most while services/retail may need non-financial support.
- Digitize application processing to reduce implementation delays and accelerate benefits realization.
- Institute mandatory post-disbursement monitoring for the first 18 months to guide early implementation.
- Integrate technology transfer and management training alongside financial support; combined support yields larger NPM effects.
- Establish feedback loops for region-specific subsidy design and adaptive programme adjustments.
- Develop graduated, time-limited subsidy structures to promote market graduation rather than dependence.
- Institutionalize robust evaluation mechanisms embedded in programme design (use matching-based approaches).
- Expand routine data collection to track technology adoption, market diversification, supply-chain integration, and export participation.

9. LIMITATIONS

- Potential unobserved heterogeneity (managerial ability, risk preferences) despite Rosenbaum bounds robustness.
- External validity limited to Jharkhand; results may differ in other states with different institutional contexts.
- Outcome selection focused on financial metrics; product innovation and export impacts not analyzed.
- Attrition: 8% of enterprises ceased operations; sensitivity checks suggest minimal bias, but caution warranted.

10. CONCLUSION

Using PSM combined with DiD on a five-year panel, the study finds statistically and economically significant improvements for subsidy beneficiaries: Net profit margin +1.79 pp, ROA +1.48 pp, revenue growth +5.2% p.a., and employment +1.1 workers per enterprise. Evidence supports continued and better-targeted government support for MSMEs alongside strengthened implementation and monitoring.

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