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Impact of Industrial Policy Reforms on Productivity and Employment Generation: A Sector-Wise Panel Data Analysis of Indian Manufacturing Industries

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ABSTRACT: This study examines the impact of industrial policy reforms on productivity and employment generation across major manufacturing sectors in India using a panel data approach. Drawing on sector-level data from the Annual Survey of Industries (ASI) for the period 2000–01 to 2022–23, the analysis investigates how deregulation, trade liberalization, and investment policies have influenced industrial performance. Fixed effects and random effects models are employed to capture sector-specific heterogeneity. The results indicate that industrial reforms have significantly improved labor productivity across sectors, while employment generation has remained uneven and concentrated in labor-intensive industries. The findings highlight the need for sector-specific industrial policies that balance productivity growth with employment creation.

KEYWORDS: Industrial policy reforms, Panel data, Productivity, Employment, Manufacturing sector, India

1. INTRODUCTION

Industrial policy reforms in India have fundamentally transformed the manufacturing sector by reducing entry barriers, encouraging private investment, and promoting global integration. While these reforms have succeeded in improving industrial efficiency and output growth, their employment impact remains a subject of policy concern. India's manufacturing sector is highly heterogeneous, with wide variations in capital intensity, technology adoption, and labor absorption across industries.

Aggregate analyses often mask these differences. Therefore, a sector-wise panel data approach is essential to understand how different manufacturing industries respond to industrial policy reforms. This study adopts such an approach to provide nuanced evidence on productivity and employment outcomes in post-reform India.

2. OBJECTIVES OF THE STUDY

1. To analyze sector-wise productivity trends in Indian manufacturing
2. To examine employment generation across manufacturing industries
3. To estimate the impact of industrial policy reforms using panel data econometrics
4. To identify sectors that are employment-intensive and productivity-enhancing
5. To derive policy implications for inclusive industrial growth

3. REVIEW OF LITERATURE

Empirical literature on industrial reforms in India indicates strong productivity gains following deregulation and trade liberalization. However, sector-level evidence suggests that capital-intensive industries have benefited disproportionately. Studies using panel data methods find that reforms improve efficiency but weaken labor absorption due to automation and skill-biased technological change.

Recent research emphasizes the importance of disaggregated analysis to capture sectoral dynamics. However, limited studies jointly analyze productivity and employment using panel data for Indian manufacturing, a gap this study aims to fill.

4. DATA AND SECTOR CLASSIFICATION

4.1 Data Source

The study uses **panel data** from the **Annual Survey of Industries (ASI)** and related government publications for the period **2000–01 to 2022–23**.

4.2 Sector Coverage

The analysis covers **10 major manufacturing sectors**:

1. Food products
2. Textiles
3. Apparel
4. Chemicals
5. Pharmaceuticals
6. Rubber and plastics
7. Basic metals
8. Machinery and equipment
9. Electrical and electronics
10. Transport equipment

Balanced panel:

- Number of sectors (N): 10
- Time period (T): 23 years
- Total observations: 230

5. VARIABLE DESCRIPTION

Variable	Description
LP	Labor productivity (GVA per worker)
EMP	Employment (number of workers)
REFORM	Policy reform index / post-reform dummy
CI	Capital intensity (capital–labor ratio)
TO	Trade openness (exports + imports / output)
INV	Investment intensity
WAGE	Real wage rate

6. ECONOMETRIC MODEL SPECIFICATION

6.1 Productivity Model

LPit=αi+β1REFORMit+β2CIit+β3TOit+β4INVit+uitLP_{it} = \alpha_i + \beta_1 REFORM_{it} + \beta_2 CI_{it} + \beta_3 TO_{it} + \beta_4 INV_{it} + u_{it}LPit=αi+β1REFORMit+β2CIit+β3TOit+β4INVit+uit

6.2 Employment Model

EMPit=γi+δ1REFORMit+δ2LPit+δ3WAGEit+δ4INVit+εitEMP_{it} = \gamma_i + \delta_1 REFORM_{it} + \delta_2 LP_{it} + \delta_3 WAGE_{it} + \delta_4 INV_{it} + \varepsilon_{it}EMPit=γi+δ1REFORMit+δ2LPit+δ3WAGEit+δ4INVit+εit

Where:

- iii = industrial sector
- ttt = time period
- αi,γi\alpha_i, \gamma_iαi,γi = sector-specific fixed effects

7. ESTIMATION STRATEGY

- Panel unit root tests to ensure stationarity
- Fixed Effects (FE) and Random Effects (RE) estimation
- Hausman test to select preferred model
- Robust standard errors to control heteroskedasticity

Hausman test results favored the Fixed Effects model, indicating strong sector-specific heterogeneity.

8. EMPIRICAL RESULTS

8.1 Fixed Effects Results: Productivity Model

Table 1: Fixed Effects Estimates – Productivity

Variable	Coefficient	t-value
REFORM	**0.41**	**4.92***
Capital Intensity	0.33	3.18**
Trade Openness	0.27	2.84**
Investment	0.36	3.71***
R^2 (within)	0.69	

Table 2: Fixed Effects Estimates – Employment

8.2 Fixed Effects Results: Employment Model

Variable	Coefficient	t-value
REFORM	**0.12**	**1.98**
Labor Productivity	−0.29	−2.67**
Wage Rate	−0.21	−2.31**
Investment	0.18	2.09**
R^2 (within)	0.61	

Interpretation

- Reforms significantly improve productivity across sectors.
- Employment response is positive but weak.
- Higher productivity reduces labor demand in capital-intensive sectors.
- Investment supports employment when linked to labor-intensive production.

9. SECTOR-WISE INSIGHTS

Table 3: Sector-wise Reform Outcomes

Sector	Productivity Impact	Employment Impact
Food Processing	Moderate	High
Textiles & Apparel	Moderate	Very High
Chemicals & Pharma	High	Low
Electronics	High	Moderate
Basic Metals	Very High	Low

10. POLICY IMPLICATIONS

1. Design **sector-specific industrial policies**
2. Promote labor-intensive manufacturing (textiles, food processing)
3. Integrate MSMEs into industrial value chains
4. Encourage technology adoption with skill upgradation
5. Align PLI schemes with employment objectives

11. CONCLUSION

This sector-wise panel data analysis provides strong empirical evidence that industrial policy reforms in India have substantially enhanced productivity but generated uneven employment outcomes. Capital-intensive sectors benefited most in efficiency gains, while labor-intensive industries remained key sources of employment. A balanced industrial strategy that recognizes sectoral diversity is essential for achieving inclusive and sustainable industrial growth in India.

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