The Evolution of Manufacturing Efficiency: Evidence from Indian States

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Goals

- Pattern of overall industrial efficiency changes across Indian states
- Highlight large industry-specific fluctuations across regions and states
- Identify regional comparative advantage as potential growth drivers
Goals

- Primary focus on **pattern** of efficiency changes
  - Importance of India’s federal structure: Differential effect of Central Govt. reform policies
  - Analysis contributes to a broader debate
  - Resource endowments, agriculture/services focus, etc as growth drivers
  - Importance of other policies: health, education, infrastructure, etc
Fig. 1: Average Growth Rates

Difference in Average Annual Growth Rates: 92-97 to 98-02

Source: Central Statistical Office
Methodology and Data

- 15 states – 95% of population
- 18 industries
- Stochastic Frontier Analysis
  - Repeated for each individual industry group
  - Consistency of production technology across states
- Two time sub-groups (1992-97, 1998-02)
  - Analysis constrained by data availability
Overall Performance of States
<table>
<thead>
<tr>
<th>Ranking</th>
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## Aggregate State Performances

### State ranks in 1992-97

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Key Highlights

- Western states improved performance
- Performance of Eastern and Southern states more mixed
  - Eastern states appear to outperform Southern states, which is surprising
  - Bihar: moves away from extremes
- Northern states perform poorly
  - Punjab: Worst performing state
Context and Caveats

- Efficiency rankings say nothing about:
  - Size of a particular industry in a given state
  - Growth rates of the industries or states

- Technical Efficiency is simply how well an industry uses inputs to create output

- Same number of industries, across time, may not correspond to same industries

- Manufacturing relative to other sectors
Disaggregated Results – Highlights of Regional Performance
Generally good/improved performance in heavy industries

- Chemicals, Paper, Electrical Machinery, Basic Metals, Fabricated Metals

Bihar: maintained 1st and 3rd ranks in Basic Metals and Motor Vehicles

Assam: top ranks in Paper and Wood Products

WB: top rank in Furniture industry
Relatively poor performance in light, labour-intensive industries

Orissa and Bihar lost 8 ranks each in Rubber/Plastics and Tobacco, resp. (1st to 9th)

Assam: lowest rank in Food Products

WB: lost 13 ranks to reach 14th in Food Products

Orissa and WB: generally poor performance
  • Mostly confined to moderate ranks (incl. improvements)
- Greatest overall efficiency improvements
- Significant ranking fluctuations in heavy industries; moderate in light industries
- Guj. and Mah. lost efficiency in only 6/18 and 7/18 industries, respectively
  - Almost all ranking reductions were marginal
- **Mah**: top rank in Refined Petroleum Products, Non-Metallic Mineral Products, and Publishing/Recorded Media
  - In first two of these, made large efficiency gains
- Further large gains in Food/Beverages (15\textsuperscript{th} to 2\textsuperscript{nd}) and Paper/Paper Products (15\textsuperscript{th} to 3\textsuperscript{rd})
- **Rajasthan**: mixed experience
  - Top rank in Chemicals & Fabricated Metal Products
  - Large drops in Motor Vehicles, Wood, Paper, Furniture
No consistent pattern of performance across light or heavy industries

AP: general declining pattern; 2 exceptions
- Motor Vehicles (14th to 1st rank)
- Office and Computing Machinery (8th to 2nd)

Kerala: lost efficiency rankings in 2/3rd industries (12 out of 18)
- 5/6 industries with efficiency improvements are labour-intensive industries
Karnataka: significant improvements
- Wood and Wood Products (13th to 2nd)
- Rubber and Plastic Products (14th to 1st)
- Electrical Machinery and Apparatus (15th to 1st)
- Relatively moderate declines in Leather and Refined Petroleum Products industries

TN: Relatively static performance
- Most efficiency changes are of moderate magnitude
- Punjab: mostly confined to intermediate or low efficiency rankings
  - Lost 13 ranks (2nd to 15th) in Electrical Machinery industry
  - Particularly poor performance in light industries

- Haryana: gains in Refined Petroleum Products and Printing/Publishing industries
  - No consistent pattern across H/L industries

- UP: overall poor performance in heavy industries; mixed results in light industries
State Strengths:

Some Conjectures and Hypotheses

- These results, along with other (anecdotal) information, allows informed hypotheses about comparative advantage of states/regions:
  - West and East have CA in manufacturing
    - Eastern growth driven by resource endowments, Western growth by entrepreneurship and investment climate
  - South and North regions have relatively poor efficiency performance
    - High literacy not enough for industrial efficiency
    - Scope for services led growth in the South
    - Northern states, especially Punjab, are more agriculture-dependent; little scope for services-led growth
Conclusions

- Validate several conventional beliefs about state and regional strengths, with some surprises!
- Identify current/potential areas of state comparative advantage and growth drivers
- Results, in conjunction with other information, can contribute to future policy
- Efficiency effects limited in first decade of reforms, but may become more important over time.
Thank you!