Entry along the supply chain: removing growth restrictions on firms in India

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Motivation

- Policies to protect and promote small firms are common
  - US: Small Business Jobs Act - procurement contracts, grants, loans
  - Europe: Small Business Act - tax incentives, loans, guarantees

- Unintended negative consequences
  - barriers to growth for markets they aim to protect
  - constrain linked downstream (customer) markets
This paper: spill-over effects of barriers to growth

- How do removal of growth restrictions in intermediate input markets spill-over to entry and growth of firms in downstream markets?

- Inefficient intermediate input market
  - Firms incentivised to remain small produce low quality goods
  - This hampers access to high quality raw materials for downstream firms
Preview

- **Setting:** Repeal of product reservation policy
  - Hundreds of products stop being reserved for exclusive production by small firms

- **Economic mechanism:**
  - Segmentation based on product quality
  - Post reform increase in production of high quality goods

- **Main results:**
  - Downstream entry increases following deregulation
  - No observable decline in characteristics of new entrants
  - Ex-ante less productive downstream firms shrink (capex, employment)
Setting: Dismantling of product reservation in India

- Product reservation: hundreds of products historically only allowed to be produced by small firms

- Large firms producing reserved products prior to reservation were allowed to continue operating but production was capped at existing levels

- 'Small' firm defined based on investment in fixed assets (plant and machinery)

- Products spanned many sectors including food, chemicals, electronics, and textiles. 1000+ products on the reserved list

- In 2000, firms producing reserved products accounted for 20% of employment

- Starting 1997, products began to be removed from the reserved list - staggered across time, and industries
Data

- Fourth round of the All India Census of Micro, Small and Medium Enterprises (MSME census)
  - Provides information on start year, location, employment, initial value of plant and machinery, inputs used, products produced for the reference year
  - Covers universe of small and medium establishments registered up to 31 March 2007

- Establishment level data from Annual Survey of Industries (ASI)
  - Provide information on balance sheet variables, employment, inputs used, products produced
  - Cover all establishments with 10+ (20+) workers using (not using) power
  - Larger establishments surveyed every year while smaller establishments covered on a sampling basis

- Combined data used to construct input-output (I-O) table
Mechanism: segmentation + product de-reservation

Pre-reform

Low quality

Small firm

Post-reform

Production of low quality goods declines

High quality

Large firm

Entrant

Incumbent

Production of high quality goods increases
Mechanism: segmentation based on product quality

- Segmentation of regulated market:
  - Hypothesis: small firms produce low quality and large firms produce high quality products
  - Product quality is not observable
  - Assumption: price is a good proxy for quality in long quality ladder industries (Khandelwal, 2010)
  - Long quality ladder: industries with high range of product quality

- Prediction:
  - Significant difference in price of products produced by large and small firms in regulated markets in long quality ladder industries
Overview of mechanism

1. Segmentation based on product quality

2. Cap on production of reserved products by large firms prior to reform → cap on supply of high quality goods

3. Post reform:
   - Small incumbents shrink (Martin et al., 2017) → production of low quality goods declines
   - Large incumbents and entrants produce high quality goods
   - Large incumbents and new entrants grow (Martin et al., 2017) → production of high quality goods increases

4. Implications for downstream markets:
   - Improved access to high-quality inputs for downstream firms
   - Effect on downstream entry and downstream incumbents
Hypothesis: downstream entry

- **Prediction:**
  - With more efficient input markets $\rightarrow$ increase in downstream entry
  - Downstream markets that use long quality ladder (high range of quality) inputs benefit more
Empirical specification: difference-in-differences

\[ y_{p,d,t} = \beta_1 DownDereg_{p,t} + \delta_d + \delta_t + \delta_p + \epsilon_{p,d,t} \]

- \( y_{p,d,t} \): log of number of new firms for product \( p \) in district \( d \) started in year \( t \)
- DownDereg: switches from 0 to 1 when an input used in production of product \( p \) is de-reserved
- \( \delta_d \): District FE
- \( \delta_t \): Year FE
- \( \delta_p \): Product FE
- Control group: products unrelated to the regulation (products directly affected by the regulation and upstream products excluded)
Threats to identification

- Most major reforms completed before de-reservation
  - Tariffs largely harmonised across industries by the late 1990s
  - By 1998, 93% of industries were no longer subject to licensing requirements

- Identifying assumption: timing of de-regulation is unrelated to investment opportunities in downstream market
  - Path of a product to de-regulation circuitous
  - Timing unlikely to be systematically related to downstream industry conditions
  - Variation in timing of de-regulation
### Downstream entry

<table>
<thead>
<tr>
<th></th>
<th>(1) log(#entrants)</th>
<th>(2) log(#entrants)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DownDereg</td>
<td>0.016</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.711)</td>
<td></td>
</tr>
<tr>
<td>DownDereg × Short QL inputs</td>
<td></td>
<td>-0.017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.951)</td>
</tr>
<tr>
<td>DownDereg × Long QL inputs</td>
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<td>0.062**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.983)</td>
</tr>
<tr>
<td>District FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Product FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>115282</td>
<td>113605</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.217</td>
<td>0.217</td>
</tr>
</tbody>
</table>

- No effect for downstream markets that use short quality ladder inputs
- 6.2% increase in entry in downstream markets that use long quality ladder inputs
- Back of the envelope calculation: 77k additional firms created in 3 years
Downstream entry by heterogeneity of quality of inputs

Reform led to 2.6%, 5.0%, 10.9% and 7.0% increase in entry in downstream markets that use long quality ladder inputs.
Hypothesis: quality of new entrants

- Hypothesis:
  - Low quality entrepreneurs start firms $\rightarrow$ new firms smaller and grow less
  - Entrepreneurs drawn from homogenous quality distribution $\rightarrow$ no difference in quality of new entrants

- Measures of quality
  - ex-ante: size (plant and machinery) at startup
  - ex-post: output
Ex-ante measure of quality of entrants

(1) log(startup assets)

<table>
<thead>
<tr>
<th>Term</th>
<th>Coefficient</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>DownDereg</td>
<td>-0.005</td>
<td>-0.156</td>
</tr>
<tr>
<td>District FE</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>State × Product FE</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Start year FE</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Observations: 693520

$R^2$: 0.654

No statistically significant difference in the size at entry
Ex-post measure of quality of entrants

<table>
<thead>
<tr>
<th></th>
<th>Full sample (1)</th>
<th>Within 1yr of entry (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>log(output)</td>
<td>log(output)</td>
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<tr>
<td>DownDereg</td>
<td>-0.019</td>
<td>0.016</td>
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<tr>
<td></td>
<td>(-0.900)</td>
<td>(0.321)</td>
</tr>
<tr>
<td>District × Firm age FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>State × Product × Firm age FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year of entry × Firm age FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>906839</td>
<td>92024</td>
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<tr>
<td>$R^2$</td>
<td>0.610</td>
<td>0.582</td>
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</tbody>
</table>

No statistically significant difference in ex-post output
Empirical specification: downstream incumbents

\[ y_{i,t} = \beta_1 DownDereg_{i,t} + \delta_i + \delta_t + \varepsilon_{i,t} \]

- Downstream incumbents: customers of de-regulated market
- \( y_{p,d,t} \): log of sales, employment, capex, profits, or debt for firm i in year t
- DownDereg: switches from 0 to 1 when input used in production of product \( p \) is de-reserved
- \( \delta_i \): Firm FE
- \( \delta_t \): Year FE
- \( Productivitydummy_i \): takes value 1 for above median ex-ante productivity
- Control group: firms producing products unrelated to the regulation (products directly affected by the regulation and upstream products excluded)
Downstream incumbents

Productive downstream firms grow and less productive ones shrink
Robustness

- **Hold up story**
  - Larger firms (higher bargaining power) increase investment

- **Uncertainty/risk of sourcing inputs from small firms**
  - Older, more established firms pose lower risks as suppliers
  - Results similar for downstream markets that source inputs from below and above median proportion of older firms in upstream markets

- **Product switching**
  - Exclude products that firms switch out of from control group
Conclusion

**Improved access to high quality raw materials:**
- Downstream entry increases in markets using long quality ladder inputs
- No observable decline in quality of new entrants
- Productive downstream firms grow while less productive ones shrink

**Implications:**
- Business dynamism has positive spill-over effects along the supply chain
- Removal of barriers to growth led to increased entry and reallocation
Thank you!
Criteria to be considered ‘small’

- 'Small' firm defined based on investment in fixed assets (plant and machinery)
- Eligibility at the establishment level
- Limit changed roughly every 6 years
- Changes until late 1990s - to keep pace with inflation
- Period of study: 2000-2010 where limit changed from INR 10mn (USD 140k) to INR 50mn (USD 700k) in 2006; eligibility cutoff also changed for reserved products

Source: Rotemberg, AER 2019
Measure of length of quality ladder

- Khandelwal (2010) uses imports to the US to infer quality

- Intuition: conditional on price, imports with higher market share are assigned a higher quality

- Significant heterogeneity in product market scope for quality differentiation

- Quality ladder: range of qualities within a product market (HS code)

- Aggregate measure to 4 digit ISIC (NIC 98) to classify industries into long (above median dispersion) and short (below median dispersion) quality ladder industries
### Segmentation of the market

<table>
<thead>
<tr>
<th></th>
<th>Prices relative to small firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>log(Price)</td>
</tr>
<tr>
<td>Medium</td>
<td>0.147**</td>
</tr>
<tr>
<td></td>
<td>(2.251)</td>
</tr>
<tr>
<td>Large</td>
<td>0.357**</td>
</tr>
<tr>
<td></td>
<td>(2.181)</td>
</tr>
<tr>
<td>Product FE</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
</tr>
<tr>
<td>Sample</td>
<td>Regulated</td>
</tr>
<tr>
<td>Years</td>
<td>Pre</td>
</tr>
<tr>
<td>&quot;Clean&quot; prices</td>
<td>No</td>
</tr>
<tr>
<td>Observations</td>
<td>7135</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.855</td>
</tr>
</tbody>
</table>

Large firms produce higher quality goods (charge higher prices) relative to small firms in regulated markets.
Identifying products along the supply chain

- Establishments report all main inputs used and products produced (product code, quantity and total value)

- Input-output (I-O) table constructed using single-product firms
  - Percentage by value of an input $\times$ percentage of total production of product by this establishment in the economy - summed across each input-product pair
  - Only inputs above a 1% threshold considered for identifying the supply chain

- Downstream products: at least one input used in their production (as per I-O table) is deregulated
  - Match list of deregulated products to inputs used from I-O table
  - Products produced using these inputs

- Upstream products: all inputs used in the production (as per I-O table) of deregulated products
  - Match list of deregulated products to products produced from I-O table
  - Inputs used in the production of these products