Un-incorporation and Misallocation: Firm-level Evidence from Sri Lanka

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ESA 2021
13 July 2021
Motivation: Incorporation and misallocation

• Incorporation is an important legal institution
  o Incorporated – separate legal entity
  o Unincorporated – business and the owner are the same

• Legal factors in un-incorporation affect productivity and misallocation
  o Unlimited liability
    ▪ Risk of expansion
    ▪ No delegation of management
  o Probable progressive income tax schedules
Literature and research gap

- Studies on incorporation and firm-level productivity (Quadrini, 2000; Cagetti and De Nardi, 2006; Alp, 2020; Barro and Whwaton, 2020)
  - Unincorporated firms are less productive
  - Tax wedges decrease firm-level productivity
- Studies on misallocation across firms (Hsieh and Klenow, 2009; Kumari et al, 2021)
  - Misallocation leads to aggregate TFP loss
- No studies on incorporation and misallocation across firms
- Important to study the impact of un-incorporation on aggregate productivity
Research question

What is the relative magnitude of misallocation and its impact on aggregate productivity?

- across unincorporated and incorporated firms
- in Sri Lanka’s manufacturing sector
- during 2005-2017
Sri Lanka

- Sri Lanka is an appropriate candidate for this study:
  - Around 60% of firms are unincorporated *(Advocata, 2020)*
  - Sole proprietorships are less productive *(Kumari et al, 2021)*
  - Different tax schedules *(DIR of Sri Lanka, 2021)*
  - Financial frictions *(Thilakaweera, 2016; Wijewardena, 2021)*
  - Data availability *(DCS 2006-2018)*
Methodology

- Adopted by Hsieh and Klenow (2009)

\[ Y_{si} = A_{si} K_{si}^{\alpha_s} L_{si}^{1-\alpha_s} \]

\[ TFPR_s = \frac{P_s Y_s}{K_s^{\alpha_s} L_s^{1-\alpha_s}} \]

Firm-level distortions (tax wedge)

- Output distortions \( (\tau_{Y_i}) \)
- Capital distortions \( (\tau_{K_i}) \)

Misallocation: Symptoms and Measurement

- Firm-level TFP
- Aggregate TFP gains/losses
- Correlation between un-incorporation and misallocation
- Sources of misallocation
Data

• Firm-level data in Sri Lanka’s manufacturing sector for 2005-2017 from Annual Survey of Industries

• Around 14,000 firms per year

• Firms with five or more employees

• 120 industries at four-digit level
Structure of the Manufacturing Sector

Aggregate Level
\[ Y = \prod_{s=1}^{S} Y_s^{\theta_s} \]

Industry Level
\[ Y_s = \left( \sum_{i=1}^{M_s} \frac{\sigma^\theta}{\sigma-1} \right) \]
Around 120 four-digit-level industries

Firm Level
\[ Y_{si} = A_{si} K_{si}^{\alpha_s} L_{si}^{1-\alpha_s} \]
Around 14,000 firms
\[ (\tau_{yi}, \tau_{ki}) \]
Variables

From ASI 2006-2018

• \( K_{si} \) = year end capital stock adjusted for depreciation

• \( L_{si} \) = number of persons engaged

• \( w \) = total wage bill/total persons engaged

• \( \alpha_s \) = 1- (wage bill/value added) Hsieh and Klenow, 2009

• Ownership: Unincorporated = sole + partnership
  Incorporated = private + public
### Stylized facts

<table>
<thead>
<tr>
<th>Variable (unit)</th>
<th>Mean</th>
<th>Un-incorporated (1)</th>
<th>Incorporated (2)</th>
<th>Difference (times) (2)/(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour (Number)</td>
<td></td>
<td>41</td>
<td>260</td>
<td>6.3</td>
</tr>
<tr>
<td>Capital (LKR 000’)</td>
<td></td>
<td>20,600</td>
<td>179,000</td>
<td>8.7</td>
</tr>
<tr>
<td>Output (LKR 000’)</td>
<td></td>
<td>51,400</td>
<td>510,000</td>
<td>9.9</td>
</tr>
<tr>
<td>Value-added (LKR 000’)</td>
<td></td>
<td>21,600</td>
<td>203,000</td>
<td>9.4</td>
</tr>
<tr>
<td>Wage bill (LKR 000’)</td>
<td></td>
<td>15,400</td>
<td>153,000</td>
<td>9.9</td>
</tr>
<tr>
<td>Age (Years)</td>
<td></td>
<td>18</td>
<td>24</td>
<td>1.3</td>
</tr>
</tbody>
</table>

- Unincorporated firms are relatively small and young
Results: Dispersion in Revenue Productivity

(A) Revenue productivity

- Productivity dispersion is high in unincorporated firms
- Higher dispersion leads to high level of misallocation
Results: Aggregate TFP gains

- Aggregate TFP gains of unincorporated firms are higher than that of incorporated firms by 42%.
Results: Incorporation and Misallocation

\[
\text{Log}(\text{TFPR}_{sit}) = \sum_{p=1}^{2} \lambda_p \times \text{ownership}_{ist}^p + \sum_{p=1}^{2} \mu_p \times \text{ownership}_{ist}^p \times \text{Log}(\text{TFPQ}_{sit}) + \gamma_t + \eta_{ist} + \varepsilon_{sit}
\]

<table>
<thead>
<tr>
<th></th>
<th>TFPR (1)</th>
<th>TFPR (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unincorporated</td>
<td>2.083***</td>
<td>2.300***</td>
</tr>
<tr>
<td></td>
<td>(0.036)</td>
<td>(0.054)</td>
</tr>
<tr>
<td>Incorporated</td>
<td>1.633***</td>
<td>1.858***</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.051)</td>
</tr>
<tr>
<td>TFPQ * Unincorporated</td>
<td>0.502***</td>
<td>0.504***</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>TFPQ * Incorporated</td>
<td>0.444***</td>
<td>0.452***</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Age FE</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>10669</td>
<td>10669</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.762</td>
<td>0.902</td>
</tr>
</tbody>
</table>

- Positive correlation between TFPQ and TFPR implies misallocation
- Both types face misallocation
- High coefficients show more productive firms face more misallocation
- Unincorporated firms are highly misallocated

Note: TFPQ and TFPR are relative to industry mean
Results: Causes of Misallocation

• Output distortions are higher relative to capital distortions in both types.

• Capital misallocation in unincorporated firms is 112% of incorporated where as output distortion is just 31%.
Conclusions

- TFP of unincorporated firms is lower than incorporated firms.
- Misallocation is more severe in unincorporated firms.
- Stronger positive correlation between TFPQ and misallocation among unincorporated firms.
- Capital is more misallocated in unincorporated firms.
Available Qualitative Evidence from Sri Lanka

• Sole-proprietors, lacking management skills and financial literacy, lack access to finance (Wijewardena, 2021)

• Access to finance is a critical problem for micro and small sized firms in Sri Lanka (Advocata, 2020)

• Unfavourable credit market frictions coming to SME sector from state-owned banks (Thilakaweera, 2016; CID, 2018)

• Small firms face challenges due to taxes and para-tariff (ICT, 2011)
Contributions

• Provide innovative evidence on the relationship between incorporation and misallocation

• Lay important empirical foundation for further theoretical analyses.
Thank You!