China’s Industrial Capabilities

Loren Brandt
Thomas G. Rawski
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Conceptual Framework (John Sutton)

- Capabilities ↔ sales to global markets
- How does R&D affect capabilities?
- How do capabilities affect market share?
- Window of capabilities
- Impact of industry characteristics
Linkages Across Submarkets

Figure 1: Industry Characteristics
Figure 2: Industry Characteristics: Example
The New Industries

• Rising capabilities, along with

• Excess entry (Klepper et al)

• Shake-out/escalation (Klepper, Sutton, etc.)

• Examples: Autos, Televisions
Upgrading Mechanism: Auto Sector

• Direct investment by global assembly and component firms
• Chinese firms enter into joint ventures
• China joins global auto parts supply chain
• Institutional structure supports transfer of quality standards and best practice
• Rising demand + M&A → scale economies
• New twist: Chinese firms going global
Defect Rate for 100 Component Suppliers to a Multi-national Car Maker

Defect rate: parts per million

Number of Component Mak
Defect Rates for 101 Component Suppliers to a Chinese Maker of Steering Gear

Number of firms

Defect Rate (percent)

< 1% 1-10% 10-20% 20-40%

70
60
50
40
30
20
10
0
Upgrading Mechanism: TV Sector

- Massive import of production lines
- Direct competition with local JV firms
- Fierce rivalry among Chinese producers
- Large-scale exports to USA etc.
- Cooperation with global market leaders for developing new products: plasma, wide and flat screen TV, etc.

- BUT – technical base remains weak
Figure TV-1.
China: Investment and Production of Color Televisions By Province 1: 1978-1990

\[ y = 0.1116x - 11.553 \]

\[ R^2 = 0.7573 \]
China: Investment and Production of Color Televisions by Province 2: 1978-2000 omitting Guangdong

Annual Capacity of Production Lines Imported 1978-1985 (1000s)

- Guangdong: Output 14,714, Import Cap. 1,860
- Sichuan
- Liaoning
- Shandong
- Jiangsu
- Shanghai
- Shandong
- Jiangsu
- Shanghai
- Shandong
- Shanghai
- Shandong
- Shanghai
- Shandong
- Shanghai
- Shandong
- Shanghai

Regression equations:

- Guangdong:
  \[ y = 2.4292x - 16.23 \]
  \[ R^2 = 0.3662 \]

- Other provinces:
  \[ y = 2.4062x \]
  \[ R^2 = 0.3661 \]
## Concentration in China’s TV Sector

<table>
<thead>
<tr>
<th>Year</th>
<th>CR4</th>
<th>CR8</th>
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<tbody>
<tr>
<td>1994</td>
<td>45.5</td>
<td>62.8</td>
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<td>1997</td>
<td>56.3</td>
<td>73.6</td>
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<td>2000</td>
<td>47.6</td>
<td>76.2</td>
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Old Industries

• Beer – rapid concentration

• Steel – big growth, gradual transformation
Upgrading Mechanism: Beer

• Wake-up call: entry of global firms, Part 1
  • Chinese firms repulse global rivals

• M&A to gain access to scale economies
  • Rapid concentration of production

• Entry of global firms, Part 2
  • Chinese market leaders combine with global beer giants
## The Scale of Beer Producers in China (1994-2003)

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<tr>
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<tbody>
<tr>
<td><strong>Number of Firms</strong></td>
<td>655</td>
<td>656</td>
<td>589</td>
<td>550</td>
<td>495</td>
<td>474</td>
<td>495</td>
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<tr>
<td><strong>Average Size (1000 tons)</strong></td>
<td>21.6</td>
<td>25.1</td>
<td>30.6</td>
<td>34.3</td>
<td>40.2</td>
<td>44.3</td>
<td>45.1</td>
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<tr>
<td><strong>Above 200,000 tons</strong></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Number</td>
<td>3</td>
<td>7</td>
<td>8</td>
<td>13</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>18</td>
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<tr>
<td>Share (%)</td>
<td>5.4</td>
<td>12.1</td>
<td>14.5</td>
<td>21.4</td>
<td>31.3</td>
<td>35.2</td>
<td>41.8</td>
<td>60.5</td>
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<td><strong>100,000 — 200,000 tons</strong></td>
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<td></td>
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<tr>
<td>Number</td>
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<td>23</td>
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<td>28</td>
<td>26</td>
<td>25</td>
<td>26</td>
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<tr>
<td>Share (%)</td>
<td>19.9</td>
<td>18.6</td>
<td>21.8</td>
<td>20.9</td>
<td>17.1</td>
<td>17.1</td>
<td>16.7</td>
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<td>57</td>
<td>60</td>
<td>62</td>
<td>60</td>
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<tr>
<td>Share (%)</td>
<td>16.6</td>
<td>19.1</td>
<td>18.2</td>
<td>20.1</td>
<td>21.2</td>
<td>21.1</td>
<td>18.9</td>
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<tr>
<td><strong>Below 50,000 tons</strong></td>
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<tr>
<td>Share (%)</td>
<td>58.1</td>
<td>50.2</td>
<td>45.5</td>
<td>37.6</td>
<td>30.4</td>
<td>26.6</td>
<td>22.6</td>
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Mechanism for Upgrading: Steel

- Interaction with equipment suppliers
- Pressure from customer requirements
- Import substitution at high end
- Big wave of mergers coming soon?
- Slowdown in autos and construction may cut profits and accelerate shakeout

- BUT progress linked to state enterprise reform
- scale economies elusive
China Steel: Scale vs. Returns at Large Plants in 1984

中国大型钢铁企业规模与效益- 1984

\[ y = 0.1359x + 19.124 \]

\[ R^2 = 0.0142 \]
China Steel: Scale vs. Returns at Large Plants 1990

中国大型钢铁公司规模与效益 - 1990

\[ y = 0.0127x + 18.321 \]

\[ R^2 = 0.0007 \]
China Steel: Scale vs. Returns at Large Plants in 2000

Median NVFA
Y8.6 Billion

Median Return 4.74%

\[ y = -0.0097x + 8.6792 \]

\[ R^2 = 0.0207 \]
Industrial Capabilities: Projections

• New sectors rising: ship-building, semiconductors, biotechnology, and more

• New sources of capability building
  – Outward FDI by Chinese multinationals in resources and manufacturing
  – Efforts to accelerate upgrading in interior
Change in Provincial Shares of Industrial Output, 1980-2003

Provincial Share in Overall Exports, 2003

Central/SE Coast
+14 % points

Northeast & Northern Coast
-14 % points

Interior Provinces
Central Region
Share Unchanged

Western Region
-1 % point

2003 export share 11.6%

2003 export share 81.5%

2003 export share 4.0%

2003 export share 2.9%
Conclusions

• Multiple links to global economy
• Ties to global economy thickening
• Upgrading mechanisms deeply rooted, now impervious to business cycle
• Possible “two front” capability expansion

• Foreign policy implications
  – Economic growth a central objective
  – Growth built on broad global market access
  – Big incentive to emphasize international cooperation