Global Supply Chains and Outsourcing

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International Commerce and the World Economy

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What are Global Supply Chains?

- 80 percent of trade now occurs within *global supply chains*.
- Global supply chain for specific good: *value added* of all activities required to produce good for final consumption.
- First appeared in early-1990s, rapidly developing across several industrial sectors.
- Key feature: manufacturing has become increasingly fragmented across countries as production process has been “unbundled”.
What are Global Supply Chains?

- Stages of production dispersed geographically
- Apple’s iPod: assembled in China using components sourced globally, e.g., display and hard drive produced in Japan by Toshiba
- Using its supply chain, Apple captures 36 percent of retail price, compared to 2 percent for assembly in China (Dedrick et al., 2009)
- Two factors driving fragmentation: (a) information and communications technology (ICT) revolution, and (b) unskilled labor in emerging economies
Supply Chain Characteristics

- Timmer et al. (2012) have established:
  - International fragmentation is expanding – measured by foreign value-added content of production (Figure 1)
  - Increasing share of value-added going to capital and high-skilled labor, falling share to medium-skilled labor (Figure 2 and Table 1)
  - Countries in North increasingly specialized in using services of high-skilled labor in combination with intellectual capital
Supply Chain Characteristics

Figure 1: Foreign Value-Added Shares in Global Value Chains, 1995 and 2008

Source: Timmer et al., 2012
Supply Chain Characteristics

Figure 2: Input Shares in Value-Added in Global Value Chains, 1995 and 2008

Source: Timmer et al., 2012
# Supply Chain Characteristics

<table>
<thead>
<tr>
<th>Country</th>
<th>Capital</th>
<th>Low-skilled labor</th>
<th>Medium-skilled labor</th>
<th>High-skilled labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>3.9</td>
<td>-1.9</td>
<td>-5.9</td>
<td>4.0</td>
</tr>
<tr>
<td>Japan</td>
<td>4.5</td>
<td>-5.4</td>
<td>-2.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Germany</td>
<td>6.8</td>
<td>-2.8</td>
<td>-7.4</td>
<td>3.4</td>
</tr>
<tr>
<td>France</td>
<td>0.2</td>
<td>-8.7</td>
<td>0.1</td>
<td>8.4</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-3.4</td>
<td>-8.0</td>
<td>1.2</td>
<td>10.2</td>
</tr>
<tr>
<td>Italy</td>
<td>-1.1</td>
<td>-14.8</td>
<td>10.4</td>
<td>5.5</td>
</tr>
<tr>
<td>Spain</td>
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<tr>
<td>Canada</td>
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<tr>
<td>Australia</td>
<td>6.0</td>
<td>-8.4</td>
<td>-0.9</td>
<td>3.3</td>
</tr>
<tr>
<td>South Korea</td>
<td>9.3</td>
<td>-11.6</td>
<td>-5.6</td>
<td>8.0</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5.5</td>
<td>-7.3</td>
<td>-7.1</td>
<td>8.9</td>
</tr>
<tr>
<td>Total all high-income</td>
<td>2.9</td>
<td>-4.9</td>
<td>-3.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Source: Timmer et al., 2012
Outsourcing

After economist Gregory Mankiw described outsourcing as “...a good thing...”, it became a hot-button issue in 2004 Presidential election

Procuring of *service* inputs by firm from foreign source, i.e., outside firm from unaffiliated supplier

Origin - contracting out of design work in UK auto industry to Germany in 1970s (Amiti and Wei, 2005)

Focus on service outsourcing to low-wage countries – 6/10 leading cities for outsourcing are Indian
By Whom, Where To, What Jobs?

- Focus has typically been on US and UK-based firms to English-speaking countries.
- However, other developed countries outsource too, e.g., Germany, Japan, Italy, France.
- Interestingly, India and China also outsource business and computer services.
- Back-office services (accounting), telephone call centers, computer programming, and testing components through computer modeling.
What Has Caused Outsourcing?

- Lower costs of production overseas, main difference being in labor costs, e.g., computer programmers - in 2001, India: $45,000/annum vs. US: $70,000/annum

- Increase in educated workers overseas – especially in fast developing countries such as India

- Technological advances in computers and telecommunications

- Deregulation and trade liberalization in services sector over past two decades
The Great “Unbundling”*

- Advances in transport/communication have weakened link between geographic concentration and specialization
- Possible to separate tasks in time and space
- Blinder (2006) denotes this as “third industrial revolution”, i.e., (i) agriculture to manufacturing (18th -19th Century); (ii) manufacturing to services (20th Century); (iii) outsourcing (21st Century)
- Friedman (2005) describes it in terms of forces he believes have “flattened” world

* Baldwin (2006)
Assume one good, produced with labor and capital, with diminishing returns to both factors (Figure 1)

If $L^o$ is labor endowment, wage is $w^o$, wage bill is $0w^oE^o L^o$, and return to capital is $aw^oE^o$

Suppose innovation allows labor to be purchased at $w'$ from overseas, and domestic labor is paid lower wage

Domestic labor now gets $0w'R L^o$, and capital gets $aw'E'$, net gain being $E^oR E'$

Captures key reason for concern about outsourcing – domestic labor loses, capital gains
Each sector uses medium-skilled labor (S), import-competing sector uses unskilled labor, export sector uses high-skilled labor (human capital)

Prior to outsourcing, equilibrium at \( E^0, S^0 \) allocation of medium-skilled workers, wage \( w^0 \)

Suppose innovation allows outsourcing of medium-skilled labor at wage \( w' \), creating excess demand of \( GE' \)

Excess demand met through outsourcing – expands total supply of S by \( O_2O'_2 \)

Shift sector 2’s demand for labor to \( D'_2 \)
Economic Analysis

Medium-skilled wage

Medium-skilled wage

Medium-skilled wage

Outsourcing

$D_1$

$D_2$

$E^o$

$F$

$E'$

$B$

$A$

$G$

$S^o$

$S'$

$S''$

$0_1$

$0_2$

$w^o$

$w'$

$w'$

$0'_2$
Economic Analysis

- GE’=E₀A by construction, sector 1 employs extra medium-skilled labor S₀S’, and sector 2 employs S’S”

- Outsourcing increases national income – net gain in sector 1 is E₀FE’, and in sector 2 is ABE’

- Given diminishing returns to all factors, outsourcing of medium-skilled labor, and decline in its wage, results in unskilled wage and return to human capital increasing

- Outsourcing benefits economy as a whole, but redistribution to unskilled labor and human capital
US Real Incomes

Table 2: Changes in US Real Income by Education and for top 1%

Source: Haskel et al., 2012
Future of Outsourcing

- Forecast that outsourcing of service jobs will actually slow down over next decade:
  - easiest jobs to outsource have already gone
  - many jobs that could have been outsourced have been lost due to productivity improvements

- Firms also discovering hidden costs to outsourcing:
  - salaries for software engineers increasing in emerging markets
  - looking after customers is core part of business