Trade and earnings inequality in middle-income countries

Janneke Pieters (IZA - Institute for the Study of Labor)
Marcel Timmer (University of Groningen)
Gaaitzen de Vries (University of Groningen)

WIOD conference 24-26 April
Introducing

• Trade and inequality in developing countries: challenges for H-O theory, ongoing debate (Golberg and Pavcnik JEL2007; Harrison et al. 2011)

• Rising skill premium in many developing countries, most changes within industries

• Within-industry inequality & trade, in line with quality upgrading (Verhoogen, QJE2008): Southern exporters produce higher quality goods for foreign market

• We explore the role of trade in changing relative demand for different worker types (education): cost-share analysis
• Recent evidence: trade liberalization periods

• Brazil 1988-1995
  Gonzaga et al (JIE 2006) trade liberalization accounted for declining skill premium (tariff reductions → falling prices in skill-intensive sectors, employment shifts)

• India 1980-1998
  Chamarbagwala & Sharma (JDE 2011): capital-skill and output-skill complementarities within formal manufacturing firms, but strongest pre-liberalization

  Berman et al (2006): capital-skill and output-skill complementarity within formal manufacturing industries, no effect of imports or exports
• Contributions

• Six middle-income countries (focus on Brazil and India)
• WIOD data 1995-2009
• All sectors of the economy
• Foreign final demand, share in value added
Wage-bill shares middle-income countries

Total economy: high-skilled share in total wage bill

Source: WIOD and NSSO India
Total economy: medium-skilled share in total wage bill

Source: WIOD and NSSO India
Total economy: low-skilled share in total wage bill

Source: WIOD and NSSO India
Within- and between-industry changes

Share of high-skilled labor

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BRA</td>
<td>0.02</td>
<td>0.00</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.03</td>
<td>0.00</td>
</tr>
<tr>
<td>CHN</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>0.01</td>
<td>0.03</td>
<td>0.01</td>
</tr>
<tr>
<td>IDN</td>
<td>0.00</td>
<td>-0.02</td>
<td>0.04</td>
<td>0.02</td>
<td>0.11</td>
<td>0.00</td>
</tr>
<tr>
<td>IND</td>
<td>0.01</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
<td>0.05</td>
<td>-0.01</td>
</tr>
<tr>
<td>MEX</td>
<td>-0.01</td>
<td>0.00</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>TUR</td>
<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.03</td>
<td>0.02</td>
</tr>
</tbody>
</table>

\[
\Delta S_c^H = \sum_i \Delta S_{i,c}^H \cdot \bar{P}_{i,c} + \sum_i \Delta P_{i,c} \cdot \bar{S}_{i,c}^H
\]
<table>
<thead>
<tr>
<th></th>
<th>1995-1999</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>within</td>
<td>between</td>
<td>within</td>
<td>between</td>
<td>within</td>
<td>between</td>
</tr>
<tr>
<td>BRA</td>
<td>0.01</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>CHN</td>
<td>0.03</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.03</td>
<td>0.01</td>
</tr>
<tr>
<td>IDN</td>
<td>0.01</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>-0.08</td>
<td>-0.01</td>
</tr>
<tr>
<td>IND</td>
<td></td>
<td></td>
<td>0.02</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>MEX</td>
<td>0.03</td>
<td>0.00</td>
<td>0.04</td>
<td>0.00</td>
<td>0.06</td>
<td>0.00</td>
</tr>
<tr>
<td>TUR</td>
<td>0.00</td>
<td>0.00</td>
<td>0.02</td>
<td>0.00</td>
<td>0.02</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Trade and skill demand

International production fragmentation requires new measures of international trade to examine the effects of globalization on skill demand.

The amount of value added produced in a given source country that is ultimately embodied in final goods absorbed abroad (Bems et al., 2011):

\[ \text{va}_{\text{exp}} = \text{diag}(r) (I - A)^{-1} c_j \]

where \( r \) is the ratio of value added to output for each sector in each country, and \( c_j \) is the vector of final demand for country \( j \).
Foreign earnings, share in GDP

- China
- Brazil
- India
- Mexico
- Turkey
- Indonesia

1995 value added export to GDP ratio
change from 1995 to 2008
Cost function approach (Feenstra, 2004)

For each industry \( i = 1, \ldots, I \) in country \( c = 1, \ldots, C \) we consider a production function:

\[
VA_{ic} = f_{ic}(L_{ic}, M_{ic}, H_{ic}, K_{ic})
\]  

(1)

The (short-run) cost function, obtained when the levels of capital and output are fixed but labor is flexible, is defined as:

\[
C_{ic}(w_{Lic}, w_{Mic}, w_{Hic}, K_{ic}, VA_{ic}) = \\
\min\{w_{Lic}L_{ic} + w_{Mic}M_{ic} + w_{Hic}H_{ic}\},
\]  

(2)

subject to equation (1).
Econometric specification

Taking differences between two periods, the econometric model is given by:

\[ \Delta s_{c,i,t} = \alpha_c + \theta_K \Delta \ln K_{c,i,t} + \theta_{GO} \Delta \ln VA_{c,i,t} + \theta_{IID} \Delta FD/VA_{c,i,t} + \epsilon_{c,i,t} \]

Where:
- s  cost share
- K  capital
- VA value added
- FD foreign earnings
Summarizing

Descriptive analysis of skill demand in emerging markets challenges H-O:
• Rising wage bill share for high-skilled workers
• Within-industry skill upgrading

At the same time, increasing international fragmentation of production challenges conventional trade statistics:
• Measure income earned abroad due to participation in value chains
• Aim: relate foreign earnings to changing skill demand

Thank you
pieters@iza.org
g.j.de.vries@rug.nl