Executive Compensation and International Trade

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Outline

Motivation

Model

Calibration

Estimation (in progress)
Rising Inequality

Well known observations, hot research topics:

- Rising income share of top earners (Piketty & Säez, 2004 [7]).
- Rising wage gap (Autor et al, 2006 [1]).
- Rising CEO income (Murphy, 1999 [5]).

Still no full agreement on their causes.
Rising shares of top earners

Motivation

Model Calibration Estimation (in progress) Summary

Rising shares of top earners

![Graph showing the rising shares of top earners over time.](chart.png)
Rising CEO income levels and dispersion

Figure: CEO pay includes salary, bonus, options. Source: Forbes via Piketty-Säez.
A number of authors find that trade and FDI by heterogeneous potentially explain some of the previous observations:

- Manasse & Turrini, JIE 2001 [3]
- Monte, JIE 2010 [4]
- Pica, JIE forthcoming [6]

Their claim: globalization induces *superstar* effects\(^1\), shifts newly created income disproportionately towards top-earners.

\(^1\)See Rosen, 1981[8].
This Paper

Evaluates these claims quantitatively. Paper outline:

1. Presents the basic model of trade with heterogeneous firms and income inequality.

2. Calibrates the model to obtain quantitative predictions.

3. Estimates a simple model of executive compensation and trade using firm- and industry-level data.

**Preliminary finding:** superstar effects induced by trade appear to match well increases in executive compensation in manufacturing, but these are small with respect to the overall increase in inequality.
Outline

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Framework best described as “Melitz with occupational choice”:

- Individuals endowed with “management talent” $\varphi \sim G(\varphi)$ choose to become either workers or managers.
- Managers get to keep profits, must pay fixed costs $F_x$ to export. Workers earn salary $w$.
- Firm with manager of talent $\varphi$ has linear technology in labor. Production unit cost is $\tau_i w / \varphi$, with $i \in \{h, x\}$.
- Firms produce differentiated varieties, compete monopolistically.
- Consumers love variety, have Dixit-Stiglitz preferences.
Occupational Choice

- Individuals choose to become managers whenever $\pi_h(\varphi) \geq w$.
- Managers choose to become exporters whenever $\pi_x(\varphi) \geq 0$.
- Cutoffs $\bar{\varphi}_h$ and $\bar{\varphi}_x$ satisfy the conditions above with equality, hence
- Individuals with $\varphi > \bar{\varphi}_h$ become managers, individuals with $\varphi > \bar{\varphi}_x$ become exporters.
- As opposed to standard Melitz framework, this generates income heterogeneity among individuals.
Figure: Income function $m(\varphi)$ (left) and its distribution (right).
Effects of Globalization

When nations open up to trade (i.e. $\tau$ falls) a number of things happen in this world:

- More competition from imports, but more opportunities to export.
- Domestic income shifts: less profits for all managers.
- Export income shifts: more profits for all exporters.
- Occupational shifts: less managers, more exporters.

**Result:** If fixed costs of exporting are high enough, there exists $\bar{\varphi}$, such that for all $\varphi > \bar{\varphi}$, gains in export profits dominate losses in domestic profits, and *net gains are an increasing function of $\varphi$.*

- Hence: higher inequality!
Effects of Globalization (cont.)

Figure: Effects on income of a decrease in $\tau$. 

\[ \Delta \pi_x, -\Delta \pi_h \]
Effects of Globalization (cont.)

Figure: Income distribution (pdf) changes after a decrease in $\tau$. 
Outline

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Estimation (in progress)
Calibration Exercise

3. Repeat exercise for asymmetric version and multisector version using 2-digit industry manufacturing data.
4. Check for robustness of results to parameter modifications.
Simulation

Figure: Top CEO income levels (left) and absolute changes (right) (simulated).
Outline

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Estimation (in progress)
Manager Income in the Model

Take \( w \) as numeraire, manager income of an exporting firm in sector \( s \) is

\[
\pi_s(\varphi) = D_{hs}(\varphi) (p_{hs}(\varphi) - \varphi^{-1}) + D_{xs}(\varphi) (p_{xs}(\varphi) - \tau_s \varphi^{-1}) - F_{xs}.
\]

In equilibrium

\[
p_{hs}(\varphi) = \frac{\sigma}{\sigma - 1} \varphi^{-1} \quad \quad D_{hs}(\varphi) = \frac{E_s}{p_{hs}(\varphi) \sigma P_s^{1-\sigma}}
\]

\[
p_{xs}(\varphi) = \tau_s p_{hs}(\varphi) \quad \quad D_{xs}(\varphi) = \tau_s^{-\sigma} D_{hs}(\varphi).
\]

Set this in the expression above to obtain

\[
\pi_s(\varphi) = \frac{1}{\sigma} \left( \frac{\sigma}{\sigma - 1} \right)^{1-\sigma} (1 + \tau_s^{1-\sigma}) \frac{E_s}{P_s^{1-\sigma}} \varphi^{\sigma-1} - F_{xs}. \quad (1)
\]
Estimation Strategy

- **Assumption 1**: fixed cost to export small relative to operating profits.
- **Assumption 2**: Model parameters constant except $\tau_s$ and $\varphi$.
- Take logs in (1). Difference over two points in time, then:

$$
\Delta \log \pi_s = \Delta \log \left(1 + \tau_s^{1-\sigma}\right) + \Delta \log \frac{E_s}{P_s^{1-\sigma}} + (\sigma - 1) \Delta \log \varphi.
$$

- First term captures changes in barriers to trade in sector $s$.
- Second term captures real production growth in sector $s$.
- Third term captures firm level productivity gains.
- **Challenge**: find good proxies (esp. 1 and 3).
## Data

<table>
<thead>
<tr>
<th>Effect</th>
<th>Variable</th>
<th>Data</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta \log \pi_s$</td>
<td>Income</td>
<td>CEO compensation</td>
<td>Execucomp</td>
</tr>
<tr>
<td>$\Delta \log \left(1 + \tau_s^{1-\sigma}\right)$</td>
<td>Trade</td>
<td>Industrial openness</td>
<td>NBER-CES Industry Database</td>
</tr>
<tr>
<td>$\Delta \log \left(\frac{E_s}{P_s^{1-\sigma}}\right)$</td>
<td>Output</td>
<td>Industrial output</td>
<td>NBER-CES Industry Database</td>
</tr>
<tr>
<td>$\Delta \log \varphi$</td>
<td>Prod Sales</td>
<td>$\sim$ Trade + Output</td>
<td>Execucomp</td>
</tr>
<tr>
<td>$??$</td>
<td>FDI</td>
<td>Industrial FDI volume</td>
<td>UN</td>
</tr>
</tbody>
</table>

2 Observations are differences between log averages of the periods 1992-94.
## Preliminary Results

<table>
<thead>
<tr>
<th>Income</th>
<th>Salary</th>
<th>Salary+Bonus</th>
<th>TDC1</th>
</tr>
</thead>
<tbody>
<tr>
<td>$DF$</td>
<td>406</td>
<td>406</td>
<td>315</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.25</td>
<td>0.16</td>
<td>0.18</td>
</tr>
<tr>
<td>Trade</td>
<td>$-0.05$</td>
<td>0.01</td>
<td>0.16 *</td>
</tr>
<tr>
<td>Output</td>
<td>$-0.23$</td>
<td><strong>$-0.29$</strong></td>
<td><strong>$-0.19$</strong> *</td>
</tr>
<tr>
<td>Prod</td>
<td>0.20</td>
<td><strong>0.24</strong></td>
<td>0.36 ***</td>
</tr>
</tbody>
</table>

Signif. codes: ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘#’ 0.1
Summary

- This paper evaluates the quantitative importance of superstar effects induced by trade in explaining the phenomena of rising inequality among top earners and rising executive compensation.
- It develops a simple model of trade with heterogeneous agents and occupational choice that generates superstar effects when trade barriers fall.
- It proceeds to try to determine the size of these effects using two strategies: calibration and estimation using firm level data.
- Preliminary results suggest that broadly defined executive pay increases more rapidly in sectors that become more open to trade.
- They also give support to claims (e.g. [2]) that trade alters the composition of executive compensation.
The polarization of the us labor market.  

V. Cuñat and M. Guadalupe.  
Globalization and the provision of incentives inside the firm: 
The effect of foreign competition.  

Paolo Manasse and Alessandro Turrini.  
Trade, wages, and ‘superstars’.  

F. Monte.  
Skill bias, trade, and wage dispersion.  
2009.

K.J. Murphy.  
Executive compensation.

G. Pica and J.V.R. Mora.  
Who is afraid of a globalized world? FDI and the allocation of talent.  

Thomas Piketty and Emmanuel Saez.  

Sherwin Rosen.  
The economics of superstars.  