Discussion of "Heterogeneity and Trade" by Arnaud Costinot

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Overview of the paper

- Density: $f(\omega, \gamma^c)$
- Revenue: $r(\omega, \sigma^s)$
  - ω is unidimensional characteristic of agent
  - γ^c is multidimensional characteristic of country
  - σ^s is multidimensional characteristic of sector

- Monotone Likelihood Ratio:

$$\gamma^1 > \gamma^2 \qquad \Rightarrow \qquad \frac{f(\omega, \gamma^1)}{f(\omega, \gamma^2)} \quad \text{increases in } \omega$$

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- Single Crossing Condition: $\partial r(\omega, \sigma^s)/\partial \omega$ increases in σ^s, or

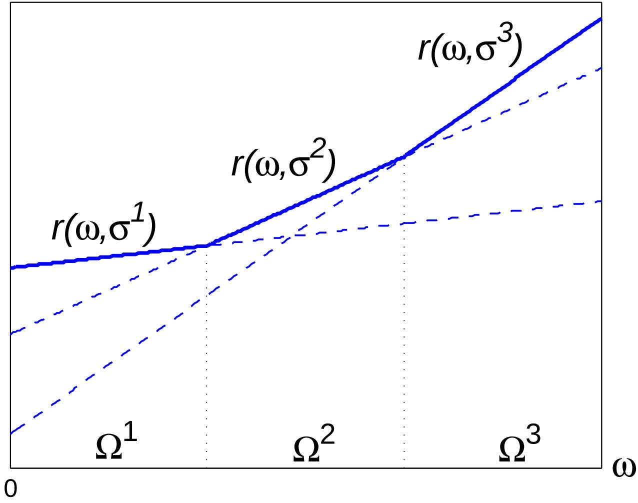
$$\frac{\partial^2 r(\omega, \sigma)}{\partial \omega \partial \sigma} = \frac{\partial}{\partial \sigma} \frac{\partial r(\omega, \sigma)}{\partial \omega} > 0$$

- Sorting of agents:

$$\Omega^s = \left\{ \omega : r\left(\omega, \sigma^s\right) = \max_{s=1,\dots,S} r\left(\omega, \sigma^s\right) \right\}$$

Overview of the paper

$$\sigma^1 < \sigma^2 < \sigma^3$$



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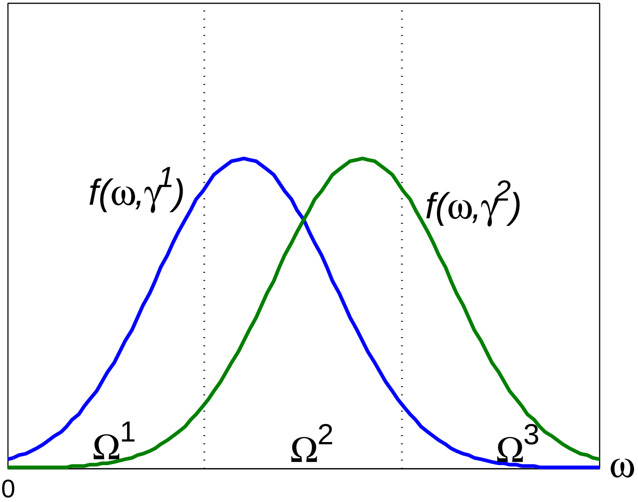

Predictions of the theory

- Sectoral Output:

$$Q(\sigma^s, \gamma^c) = \int_{\Omega^s} q(\omega, \sigma^s) f(\omega, \gamma^c) \mathrm{d}\omega$$

  is log-supermodular in (σ^s, γ^c)

- This means that countries with high γ^c are net exporters in sectors with high σ^s

- Interaction term

$$\sigma^s \cdot \gamma^c$$

  should have a positive coefficient in the gravity equation

Limits of the theory

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  - Multiple factors are fine, as long as only one factor is heterogenous (e.g., Helpman, Melitz and Yeaple, 2004)
  - Two-sided heterogeneity can sometimes be handled as well (e.g., Grossman and Maggi, 2000)

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- No productivity differences between countries
  - Productivity differences are fine, as long as they do not affect sorting (absolute advantage)
  - In the general case, the theory should work controlling for productivity differences

Endogeneity of $f(\omega, \gamma^c)$

- In theories of worker heterogeneity, assumption of exogenous distribution of skills $f(\omega, \gamma^c)$ is often made
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- In theories of firm productivity heterogeneity, $f(\omega, \gamma^c)$ is endogenous:
  - Zero profit cutoffs shift the lower support of the exogenous productivity distribution (e.g., Melitz, 2003)
  - However, Pareto distribution preserves its shape parameter, but different countries can still have different cutoffs

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- Models with one heterogenous factor and one homogenous factor (e.g., Melitz-type models):

$$\begin{aligned} r(\omega, \sigma^s) &= \max_h \left\{ A(\sigma^s) \cdot (\omega h)^\beta - wh - f(\sigma^s) \right\} \\ &= (1-\beta) \left(\frac{\beta}{w} \right)^{\frac{\beta}{1-\beta}} A(\sigma^s)^{\frac{1}{1-\beta}} \omega^{\frac{\beta}{1-\beta}} - f(\sigma^s) \end{aligned}$$

User's Guide for this Theory

1. Write down a model with agent heterogeneity
2. Solve for equilibrium density $f(\omega, \gamma^c)$ and $r(\omega, \sigma^s)$
3. Check MLR condition for $f(\omega, \gamma^c)$
4. Check SC condition for $r(\omega, \sigma^s)$
5. If both conditions are satisfied, apply the theory and immediately get strong predictions