Trade and Inequality

Elhanan Helpman

Nobel Symposium on Inequality

August 2022

In the Beginning

- Initial attempts to explain rising wage inequality relied on the Stolper-Samuelson Theorem and factor content analysis. See Stolper and Samuelson (1941) and Leontief (1953).

- Katz and Murphy (1992) found that between 1973 and 1985 trade had a small impact on U.S. wage inequality between college graduates and high school graduates. Main culprit: skill-biased technical change (SBTC).

- Borjas, Freeman and Katz (1997) found that between 1980 and 1995 trade with developed countries had a negligible impact, while trade with less developed countries had a very small impact. Immigration also had a very small impact.

- Leamer (1998) regressed price changes on factor shares to obtain *mandated* w_js.
  - $\hat{p}_i = \sum_j \theta_{ji} \hat{w}_j - TFP_i$.
  - Found a small positive impact on wage inequality in the 1970s (Stolper-Samuelson Decade), but not 60s or 80s.

Indirect Evidence on SBTC

- Berman, Bound and Machin (1998): the share of within-industry contribution to the increased percentage of non-production works was large in Sweden, Austria, U.S., Finland, Denmark, Australia, U.K. and Belgium (between 60% and more than 90%).

- Evidence for U.S., UK, France, Germany, Denmark, Sweden, Japan (Machin and Van Reenen, 1998):
  - Sectors with faster increases in the demand for non-production workers were more innovative, more intensive in R&D, more intensive in computer use.

- Berman and Machin (2000): in the 1980s the within-industry contribution to increases in the non-production workers' wage bill shares were large in all countries (rich, middle income and poor) and positively correlated with skill upgradings in U.S. sectors.

Offshoring

- Feenstra and Hanson (1996,1997): offshoring of low-skill–intensive tasks (e.g., assembly, intermediate inputs) raises the relative demand for skilled workers at home and abroad. Example, Mexican maquiladoras (non-production workers' wage shares):
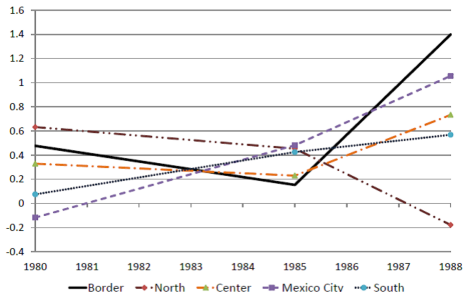

- Feenstra and Hanson (1999): Small effects on U.S. wages from offshoring to China.

Additional Channels

- Sorting and matching: Kremer and Maskin (1996), Costinot and Vogel (2010), Grossman, Helpman, Kircher (2017).

- Within sectoral heterogeneity.
  - Factor intensity variation: Bustos (2011), Harrigan and Reshef (2013), Burstein and Vogel (2017).
  - Residual inequality: Helpman, Itskhoki and Redding (2010) and Helpman, Itskhoki, Muendler and Redding (2017).

Sorting and Matching

- Lee (2020) estimated a model with multiple sectors, 5 occupations, 5 categories of workers (based on education), 32 countries and rest of the world. Individuals differ by productivity in occupation-sector cells.
- Counterfactual: decline in trade costs to match changes in trade flows between 2000 and 2007 results
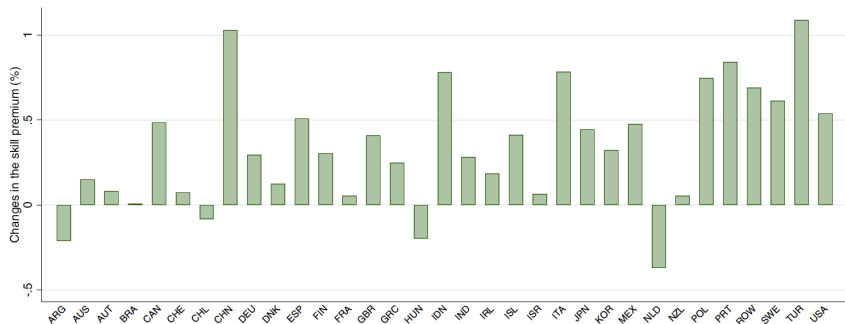
Decomposition of Inequality

- Burstein, Morales and Vogel (2019) studied US data (1984-2003), seeking to attribute rising inequality to workforce composition, occupational demand, computers and other equipment, labor productivity and international trade.
  - 30 labor groups (by gender, education, age) and 30 occupations.
- The rise in the skill premium was 2.1 percent higher than it would have been if the US did not trade in equipment (which amounts to 14 percent of the actual rise in the skill premium).
- The rise in the skill premium was 1.3 percent higher than it would have been if the US did not trade in occupation services.
- Computerization and occupation shifters played big roles.

Factor Intensity Variation

- Bustos (2011), Harrigan and Reshef (2015), Burstein and Vogel (2017):
  - More-productive firms are more skill intensive (evidence from Argentina, Chile, Mexico).
  - According to the theory, trade liberalization leads to selection of more productive firms into exporting, raising relative demand for skilled workers.
  - Wage inequality (skill premium) rises in rich and poor countries.
  - Factor proportions magnify the inequality in rich countries, moderate it in poor countries.

Factor Intensity Variation: Evidence

Burstein and Vogel (2017): From autarky to trade in 2005-2007 (for 61 countries)

A: Real wage   B: Skill premium
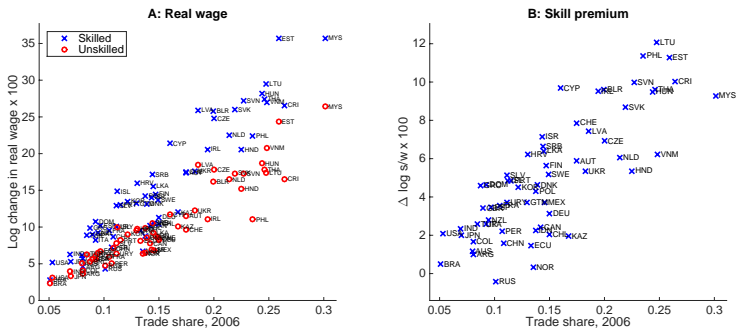
Explains only a fraction of the rise in the college wage premium.

Residual Inequality

- **Residual inequality** is large; e.g., 70% in Sweden in 2001. Firm-specific or establishment-specific effects are sizable (good jobs, bad jobs). There is a size-wage premium and exporters pay higher wages.

- Helpman, Itskhoki and Redding (2010) examined the impact of trade on residual inequality.

  - Workers match with heterogeneous firms and each one draws a match-specific productivity (ex-post heterogeneity).
  - Firms screen workers at cost and hire those with a matched productivity above a chosen cutoff (imperfect information).
  - Multilateral wage bargaining.

Trade and Residual Inequality

- A more productive firm screens to a higher ability cutoff and has a better composition of workers. This generates a size-wage premium while selection into exporting generates an export-wage premium.

- The relationship between trade frictions and residual wage inequality has an inverted-U shape.

- Helpman, Itskhoki, Muendler and Redding (2017) estimated this model with Brazilian worker-firm matched data, explaining 20%-40% of the rise in residual inequality due to MERCOSUR.

Export vs. Import Exposure

- Adão, Carrillo, Costinot, Donaldson and Pomeranz (2022):
  - Data from Ecuador: firm-to-firm transactions, employer-employee matches, owner-firm matches, firm-level customs records.
  - Neoclassical framework, where the domestic factor market clearing conditions are expressed as a mix of factor content of exports and import prices.
  - Estimates assume a mix of C-D and CES in production and preferences, and firm heterogeneity.
- Findings (for 2012):
  - export channel benefited the middle class;
  - import channel benefited the upper class;
  - import channel dominated;
  - trade generated 7% larger gains for the 90th percentile than for the median and a bigger gap for the top-percentile due to capital earnings.

Understudied Mechanism: Directed Technical Change

- Wood (1994) argued that trade can impact Directed Technical Change (DTC) and through this channel have a bigger impact on wage inequality (did not know how to handle it).

- Acemoglu (2003) developed a two-country quality-ladder–type model of economic growth with DTC, in which innovation occurs in the rich country.
  - Calibration: without trade-induced technical change trade would have raised the US skill premium between 1980 and 1995 by 10% and an additional 10% through DTC.

- Acemoglu, Gancia and Zilibotti (2015) incorporated technical change of the expanding variety type into a Grossman and Rossi-Hansberg (2008) model of offshoring.
  - Calibration (using US and Chinese data): In a number of counterfactuals DTC has perceptible quantitative effects, but not large.

Understudied Mechanism: Consumption Heterogeneity

- Trade affects prices of consumer goods differentially. When preferences are non-homothetic, CPIs vary across income levels .

- Fajgelbaum and Khandelwal (2016) studied 40 countries and found large difference in the impact of trade on the CPIs of individuals in the 90th and 10th percentiles of the earnings distribution.

- Borusyak and Jaravel (2021) studied detailed US data and found little variation in import shares across income levels and small differences in the impact of trade on CPIs. They also found more variation within than across income groups.

  - They argue: The AIDS system used by FK is mostly responsible for their findings.

- There is recent ongoing work on monopsony and wage rigidities in labor markets, which has a bearing on trade and inequality. This body of work is still embryonic.