

# International Trade, 31E00500

## Lecture 11: Globalisation and income inequality

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- Introduction and Empirics
- Firm heterogeneity and income inequality (Melitz)
- Egger and Kreickemeier model
- Helpman, Itskihoki, Redding model

# Rising income inequality-why a problem?

The Guardian, 11.1.2017: *"Rising income inequality and the polarisation of societies pose a risk to the global economy in 2017 and could result in the rolling back of globalisation unless urgent action is taken, according to the World Economic Forum"*

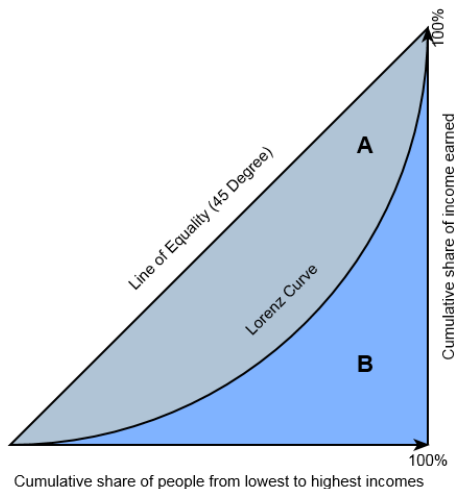
*"..the WEF said the gap between rich and poor had been behind the UK's Brexit vote and Donald Trump's election victory in the US."*

Oxfam, 16.1.2017: *"Eight men own the same wealth as the 3.6 billion people who make up the poorest half of humanity, according to a new report published by Oxfam today to mark the annual meeting of political and business leaders in Davos."*

# Terminology of income inequality

- Between-country income inequality: inequality between all people of the world, when each is assigned the average per capita income of his/her country
- Within-countries income inequality: income differences between citizens of the same country
- Global income inequality, consisting of within- and between-country inequality: inequality between all people of the world, when each is assigned his/her own income
  - Measurement of between and global income inequality with market vs. PPP exchange rates?

# Within-country income inequality: Lorenz curve and Gini coefficient



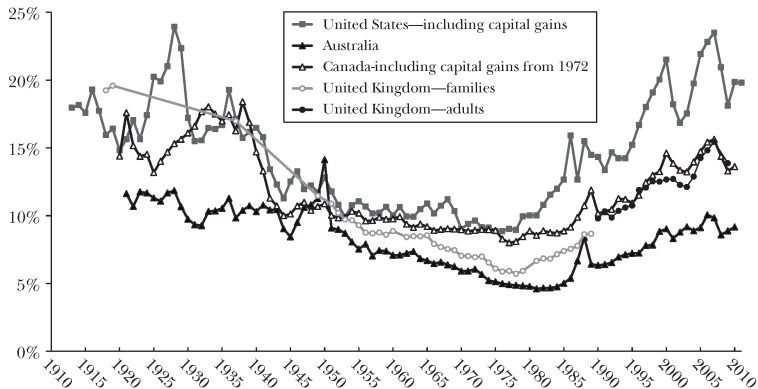
- Ratios of incomes (e.g. 20:20 or top deciles vs. median or lower deciles)
- Shares of income (e.g. share of income going to top 10%, 1%, 0.1% or 0.01% of households, when ranked from poorest to richest)
  - e.g. Aitkinson, Piketty and Saez (2011) study top 1% incomes in the log run of history
- Theil index: based on the ratios of all people's income over mean income.

# Rising inequality:1

- Inequality of income, wages, wage premia, or assets *within-countries* has increased in majority of countries during last 30 years, while trends in *between-country* and *global inequality* are not consistent (Anand & Segal, 2008, Galbraith & Kum, 2005, Harrison et al., 2010)
- *Wage inequality*, measured by the ratio of skilled workers' wage(s) relatively to unskilled workers' wages, increased from 1970's on until early 2000 almost everywhere in the world, both in rich and poor countries.
- Recently especially increase of *capital income* inequality has driven total income inequality within countries (e.g. Roine & Waldenström, 2012, for Sweden, Biewen & Juhasz, 2010, for Germany, Chi, 2012, for urban China)

# Rising inequality in English-speaking countries

A: Top 1 Percent Income Shares in English-speaking Countries (U-Shape)

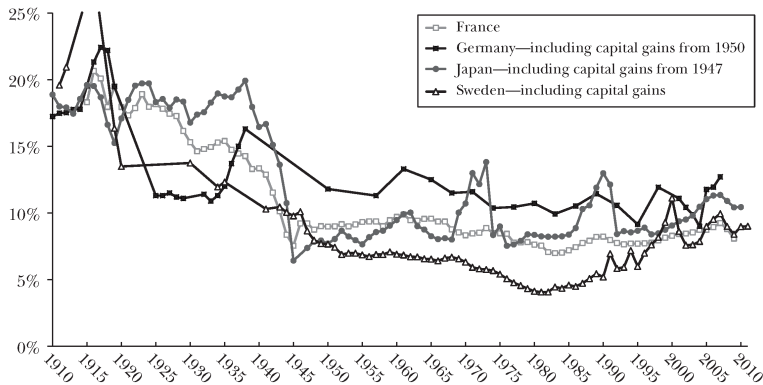


Source: Alvaredo, Aitkinson, Piketty and Saez, 2013



# Rising inequality in Continental Europe and Japan

B: Top 1 Percent Income Shares in Continental Europe and Japan (L-Shape)

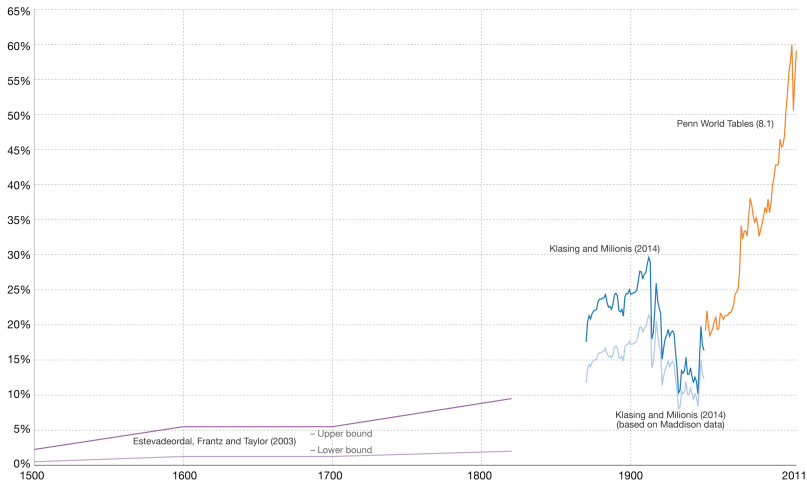


Source: Alvaredo, Aitkinson, Piketty and Saez, 2013

# Globalization over 5 centuries (1500-2011)

Shown is the sum of world exports and imports as a share of world GDP (%)

The individual series are labeled with the source of the data



Data sources: Klasing and Milionis (2014), Esteveadoral, Frantz and Taylor (2003) and the Penn World Tables Version 8.1  
The interactive data visualization is available at [OurWorldinData.org](http://OurWorldinData.org). There you find the raw data and more visualizations on this topic.

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# Globalisation and rising income inequality: 1

- Until the 1990's, the leading framework for understand the possible link between trade and inequality was the Hecksher-Ohlin (HO) model- the Stolper-Samuelson Theorem
- H-O was questioned: in increase in inequality in developing countries that frequently paralleled major trade reforms. (e.g. Mexico, Colombia, Argentina, Brazil, Chile, India, and China (see Goldberg and Pavcnik 2007a, 2007b, Topalova 2007, Harrison and Hanson 1999 and others)
- Other problems: widespread evidence of within-industry increases in demand for skilled workers prior to trade surge (Lawrence and Slaughter, 1993)

## Globalisation and rising income inequality: 2

- Trade as a candidate for explaining rising inequality was dropped
- Other explanations: skill-biased technological change, the weakening of labor market institutions, differential access to schooling, and immigration.
- But trade is back...
- New theoretical developments focusing on heterogeneous firms and bargaining, trade in tasks, labor market frictions, and incomplete contracts provide insights into the effects of trade on income and wage inequality.

# Offshoring and inequality

- Feenstra and Hanson (1996) and Grossman and Rossi-Hansberg (2008) study a model of offshoring; firm producing in one country allocates some tasks to workers in another country.
- Offshoring becomes easier and a range of tasks (or intermediate goods) are moved from the skill-rich country to the skill-poor country.
- The tasks reallocated are the least skill-intensive in the skill rich-country, but are more skill-intensive than the tasks initially done in the skill-poor country.
- H-F: Labor demand becomes more skill-intensive in both countries, and the equilibrium skill premium rises in both countries.
- G-R-H: offshoring can be Pareto improving through productivity effects ( $w^L \uparrow, w^H$  unchanged), can be overturned by T-O-T effects.

- Since 1980's, already before NAFTA 1994, there was a substantial increase of VFDI to Mexico.
- At the same time there was a marked increase in the skill premium in BOTH the US and Mexico
- According to theory, we would expect that VFDI brings factor price convergence with factor price ratios moving into opposite directions
- Remember from lecture 9 what explained the increasing skill premiums in Mexico.

# Fragmentation and Skill Premium

- Feenstra and Hanson (1996):
- Production activities relocated to Mexico were unskilled labor intensive by US standards, but skilled labor intensive by Mexican standards
- The likelihood of this case arising is greater the wider is the difference between countries' factor endowment ratios

# Heterogenous firms and inequality

- Melitz (2003) incorporated heterogeneous firms monopolistic competition into a model of international trade.
- According to model free trade raises productivity, which has nothing per se to do with income inequality.
- The labor market is frictionless and all workers are identical, so all workers receive the same wage.
- The only possibility for income inequality is in profits, since different firms earn different levels of profits ex post.
- The model is not set up with a focus on income distribution, and so does not provide a theory of income distribution



# Heterogenous firms and inequality

- The inclusion of firm heterogeneity in the trade model is important to understand the effects of trade on within-countries inequality.
- ① Models with competitive labor markets, all workers with same characteristics are paid the same wage, differences across firms due to work force composition (e.g. Verhoogen 2008 and Yeaple, 2005)
- ② Models with labor market frictions, workers with same characteristics can be paid different wages by different firms
- - Search and matching frictions and unemployment (e.g. Davidson and Matusz, 2010 and Helpman Itskhoki and Redding, 2010)
  - Efficiency or fair wages (e.g. Amiti and Davis, 2010, Egger Kreickemeier 2009)

- The model features
  - Inequality between production workers and managers
  - Within the group of production workers
  - Within the group of managers
  - Involuntary unemployment
- Trade generates aggregate welfare gains, but also increase unemployment and inequality in multiple dimensions

- Every individual, knowing her productivity  $\varphi$  can choose to become a manager (M) or a production worker (L),  $v = (1 - f)\varphi$
- Each firm has one manager that earns the profits,  $\pi(\varphi^*)$ , and workers have the expected income  $(1 - U)\bar{w}$
- Production of differentiated intermediate goods,  $v$ , and homogenous final output,  $Y$

- Significant market friction: workers are paid a fair wage (Akerlof and Yellen 1990), their reference wage is

$$\widehat{w}(\varphi) = (\pi(\varphi))^\theta [(1 - U) \bar{w}]^{1-\theta}$$

- Workers in more productive firms feel entitled to a higher income, between-firm wage differences.
- $U$  is the aggregate unemployment rate,  $\bar{w}$  is the average wage among employed workers; and
- $\theta \in (0, 1)$  can be interpreted as rent sharing parameter, indicating how important workers' own firm's  $\varphi$  is to the evaluation of fairness.
- The term  $[(1 - U) \bar{w}]$  is the average income of a worker in the economy, taking account the fact that a fraction  $U$  are unemployed.

- Productivity of firms (=the manager's productivity) follows Pareto distribution,  $G(\varphi) = 1 - \varphi^{-k}$ , only firms with productivity  $\varphi^*$  or higher can operate.
- Labor indifference condition  $(1 - U) \bar{w} = \pi(\varphi^*)$
- In autarky, all individuals with  $\varphi \geq \varphi^*$  choose to become managers.
- Labor indifference condition requires the average labour income to be equal to the profits of the marginal firm.

- Start of trade with a similar country
- Decision to export depend on productivity and trade costs
- Exporters sell both domestically and abroad,
- Exporters pay iceberg transport costs,  $\tau > 1$ , and need to hire a local expert with salary  $s$ .
- In open economy: only firms with productivity  $\varphi_x^*$  or higher can export, marginal firms are squeezed out by increasing competition
- Firm with  $\varphi^* < \varphi < \varphi_x^*$  will stay and firms with  $\varphi > \varphi_x^*$  will export, note that  $\varphi_A^* < \varphi^*$  because new expected profits.

- Exporters are more productive, sales increase with productivity, exporters on average larger than non-exporters
- Larger aggregate output implies higher welfare
- The average real wage of employed workers rise
- Wage inequality,  $\frac{\bar{w}}{\widehat{w}(\varphi^*)}$ , rises due to heterogeneity of firms and selection effect of trade,  $\varphi_A^* < \varphi^*$  . Mere truncation of distribution does not necessarily reduce inequality in it!
- High-productivity firms expand, less productive shed workers,  $\bar{w}$  more heavily weighted to high-wage, high-productivity firms.

- Unemployment is affected by international trade through three channels:
  - *Output effect*: Increases demand for labor
  - *Productivity effect*: intermediate goods are now produced by firms that are more productive on average, thus the increase in aggregate output can be achieved without a change in employment
  - *Wage premium effect*: the increase in revenues of the most productive firms leads to a higher reference wage of workers in these firms, according to fair wage mechanism, thereby reducing labor demand, *ceteris paribus*

**Proposition 1** *International trade increases welfare and the rate of unemployment*



- *Inter-group inequality* is determined by the ratio between the average profit of domestic firms and the expected labor income of production workers

$$\frac{\tilde{\pi}_t}{[(1 - U) \bar{w}]}$$

- Most productive firms earn additional profit gains due to exports to foreign markets and as a consequence the average profit income (both exporters and non-exporters) rises disproportionately, increasing the wedge between the remuneration of managers and the wage income of workers.

- *Intra-group inequality* is given by gini coefficients for profit income and labor income (complicated to derive)
  - Managerial Gini: selection of most productive firms to exporters raises these firms' profits (+), the cost of a local expert is the same for all exporters, costing more for smaller ones (+)
  - Labor Gini: linked to managerial income via the rent sharing mechanism, the exporter wage premium increases the wedge among workers in different firms (+). Fraction of unemployed increases, inequality strengthens.
  - Wage inequality  $\frac{\bar{w}}{\hat{w}(\varphi^*)}$  average wage relative to the lowest wage for employed workers rises

**Proposition 2** *International trade increases inter-group inequality as well as intra-group inequality for both managers and workers*

- Exporters are more productive than non-exporters, and sales increase with productivity  
⇒ *Exporters are on average larger than non-exporters in their domestic market*
- Increased production of intermediate goods (explained by the increase in cut-off ability)

⇒ *Larger aggregate output implies higher total welfare*

- Exporters obtain higher revenue and pay higher wages than domestic firms

⇒ *Pure exporter premium consistent with empirical evidence (e.g. Schank et al. 2007; Frias et al., 2009)*

- Due to exporter wage premium, the smallest exporters have a lower market share in their domestic market than the most productive non-exporters

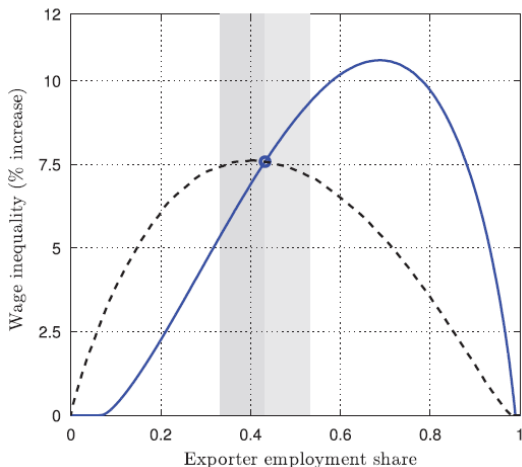
# Helpman, Itskhoki and Redding-model

- Search frictions, bargaining between workers and employers
- Idiosyncratic match quality
- Employer screening to identify which workers will be the most productive, but screening costs are increasing in threshold ability
- Higher-quality-match result in more productivity on the job, low-quality match can reduce the firm's overall output
- More productive firms set a higher threshold which is more costly, only worthwhile for the highest productivity firms.
- High productivity matches yields a larger bargaining surplus: workers at large high-productivity firm get higher wages

- When the economy is opened to trade, the selection of more productive firms into exporting increases their revenue relative to less productive firms
- It further enhances their incentive to screen workers and reduces it for the marginal surviving firms
- Trade increases wage inequality (and in a stronger sense than in the EK model)
- Once the economy is open to trade the relationship between wage inequality and trade openness is at first increasing and later decreasing
  - the increase in firm wages that occurs at the productivity threshold above which firms export, which is only present when some but not all firms export

- Trade increases unemployment by increasing the market share of large (and more productive) firms and making them more picky about hiring
- But the tightness of labor market can rise (the fraction of workers searching for employment that are matched)
- Therefore the net effect of opening a closed economy to trade on the unemployment rate is ambiguous.

# Exporters and wage inequality (Helpman et al, 2017)



A hump-shaped relationship between wage inequality and trade openness

- Theoretical models linking firm heterogeneity to income inequality find
  - trade increases wage income inequality (Helpman et al, 2010, Econometrica, Basco & Mestieri, 2013, JIE)
  - trade increases wage income inequality in a non-linear way where trade liberalization at first raises and later reduces wage inequality (Helpman et al, 2010, Econometrica)
  - trade increases capital income inequality (Foellmi & Oechslin, 2010, JIE)
  - trade increases unemployment rates and both wage and capital income inequality (Egger & Kreckemeier, 2012, JIE, later referred as EK)



- Helpman et al, 2017:
  - Much of within-country wage inequality occurs *within sectors and occupations*, rather than between
  - Large share of this wage inequality within sectors/occupations is driven by *wage inequality between firms*
  - Both findings are robust to controlling for observed worker characteristics