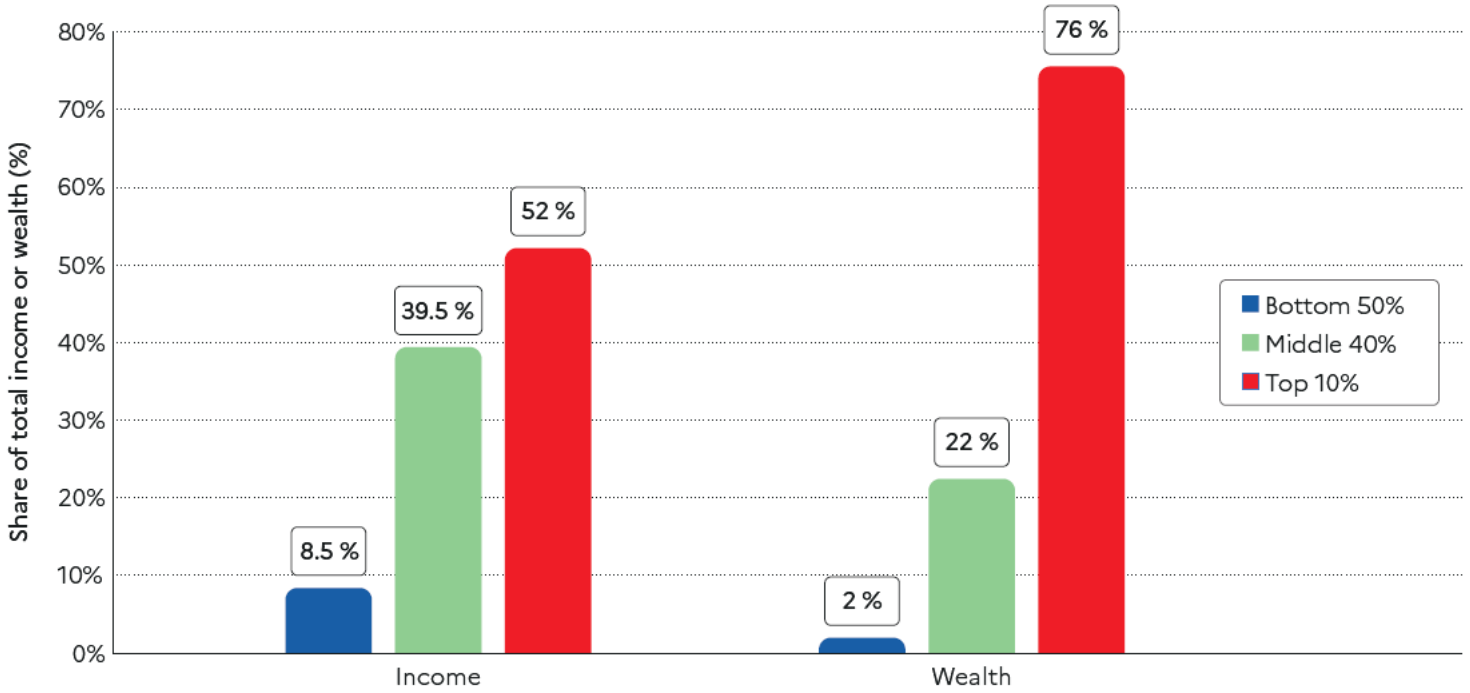
Universität Zürich[UZH]

Topic 5 – Trade and Inequality

Prof. Ralph Ossa

Global income and wealth inequality is high

Figure 1 *Global income and wealth inequality, 2021*



Source: World inequality Report 2022

There is large variation in income and wealth inequality across countries

Figure 2 *The poorest half lags behind: Bottom 50%, middle 40% and top 10% income shares across the world in 2021*

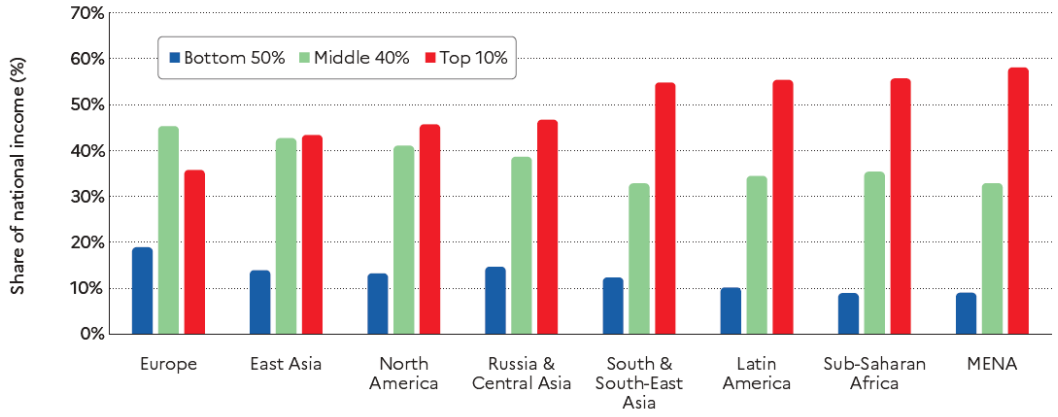
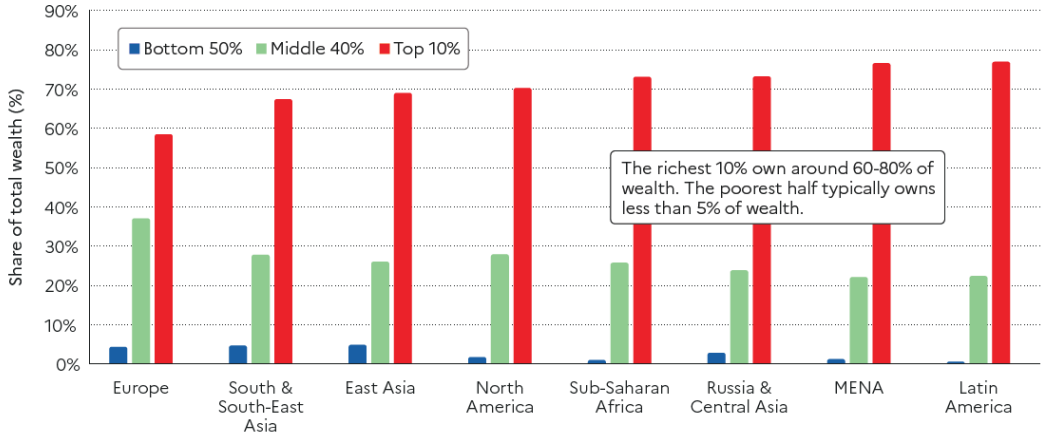
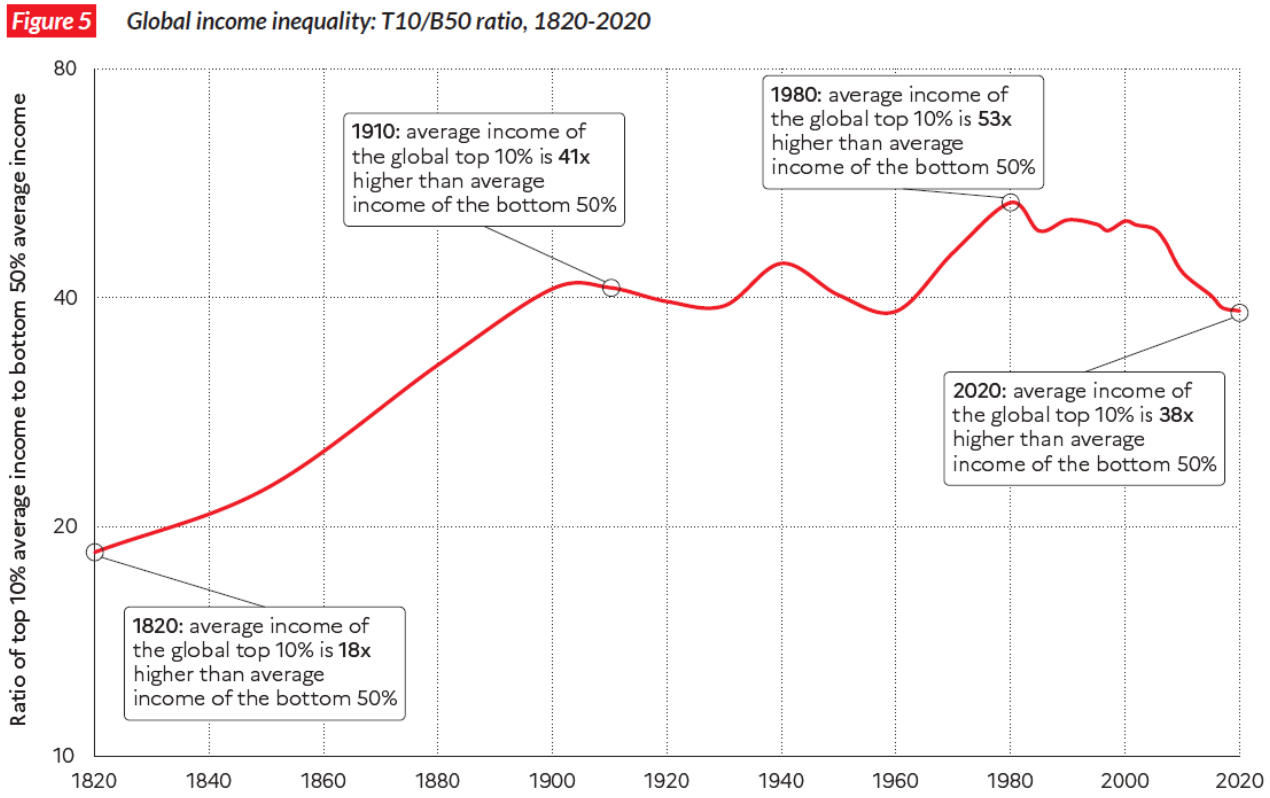


Figure 4 *The extreme concentration of capital: wealth inequality across the world, 2021*



Source: World inequality Report 2022

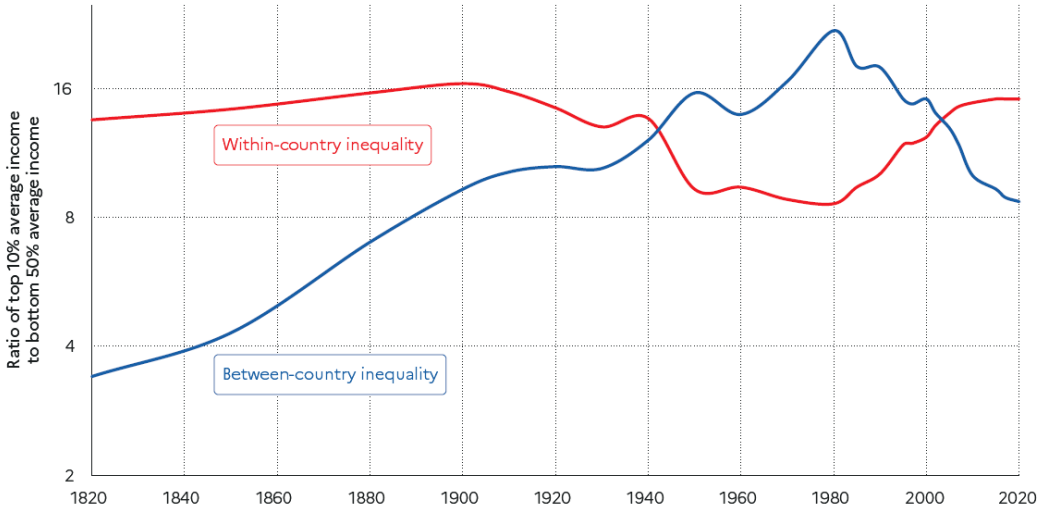
Global income inequality has fallen recently



Source: World inequality Report 2022

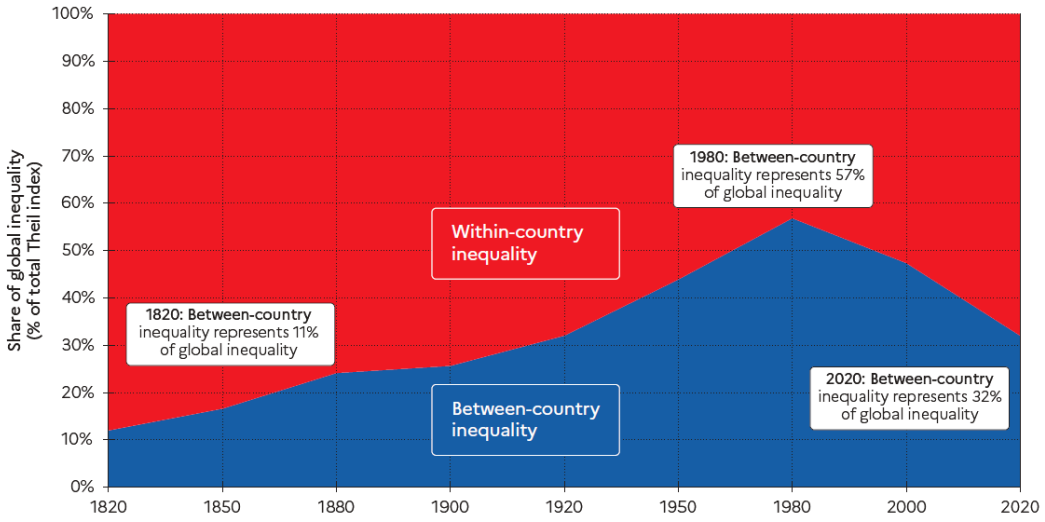
This is driven by falling between-country income inequality despite rising within-country inequality

Figure 2.4 *Global income inequality: Between-country vs Within-country inequality (ratio T10/B50), 1820-2020*



Interpretation: *Between-country inequality, as measured by the ratio T10/B50 between the average incomes of the top 10% and the bottom 50% (assuming everybody within a country has the same income), rose between 1820 and 1980 and has since strongly declined. Within-country inequality, as measured also by the ratio T10/B50 between the average incomes of the top 10% and the bottom 50% (assuming all countries have the same average income), rose slightly between 1820 and 1910, declined between 1910 and 1980, and rose since 1980. Income is measured per capita after pensions and unemployement insurance transfers and before income and wealth taxes.* ***Sources and series:*** *wir2022.wid.world/methodology and Chancel and Piketty (2021).*

Figure 2.5 *Global income inequality: Between-country vs Within-country inequality (Theil index), 1820-2020*



Interpretation: *The importance of between-country inequality in overall global inequality, as measured by the Theil index, rose between 1820 and 1980 and strongly declined since then. In 2020, between-country inequality makes-up about a third of global inequality between individuals. The rest is due to inequality within countries. Income is measured per capita after pension and unemployement insurance transfers and before income and wealth taxes.* ***Sources and series:*** *wir2022.wid.world/methodology and Chancel and Piketty (2021).*

Source: World inequality Report 2022

Two questions

- Against this background, two questions arise:
  1. How much has international trade contributed to the rise in within-country income inequality?
  2. How much has international trade contributed to the decline in between-country income inequality?

– We will address the first question in this lecture on “Trade & Inequality” and return to the second in the topic “Trade & Development” – each time building on the WTO’s World Trade Report 2024

– To simplify the exposition, we will use “inequality” to refer specifically to within-country income inequality in the remainder of this lecture

Overview of the lecture

- Big picture
- Skill premium
- Offshoring
- China shock
- Labor markets

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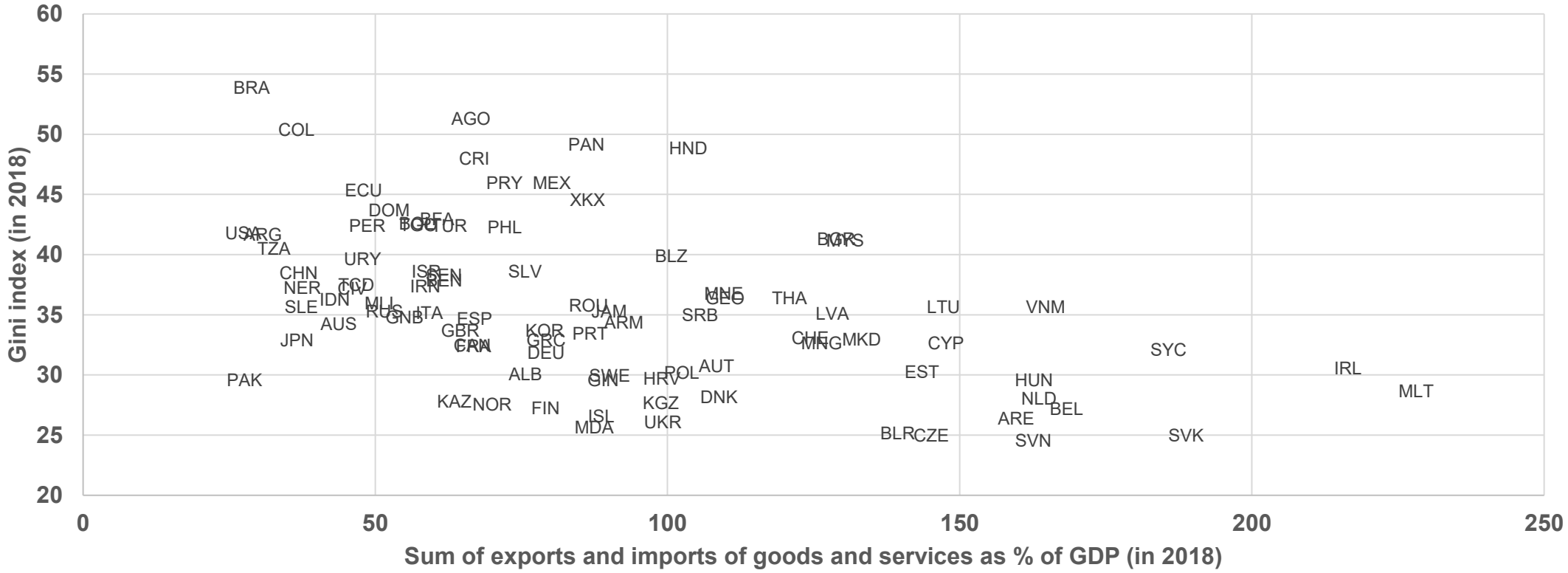
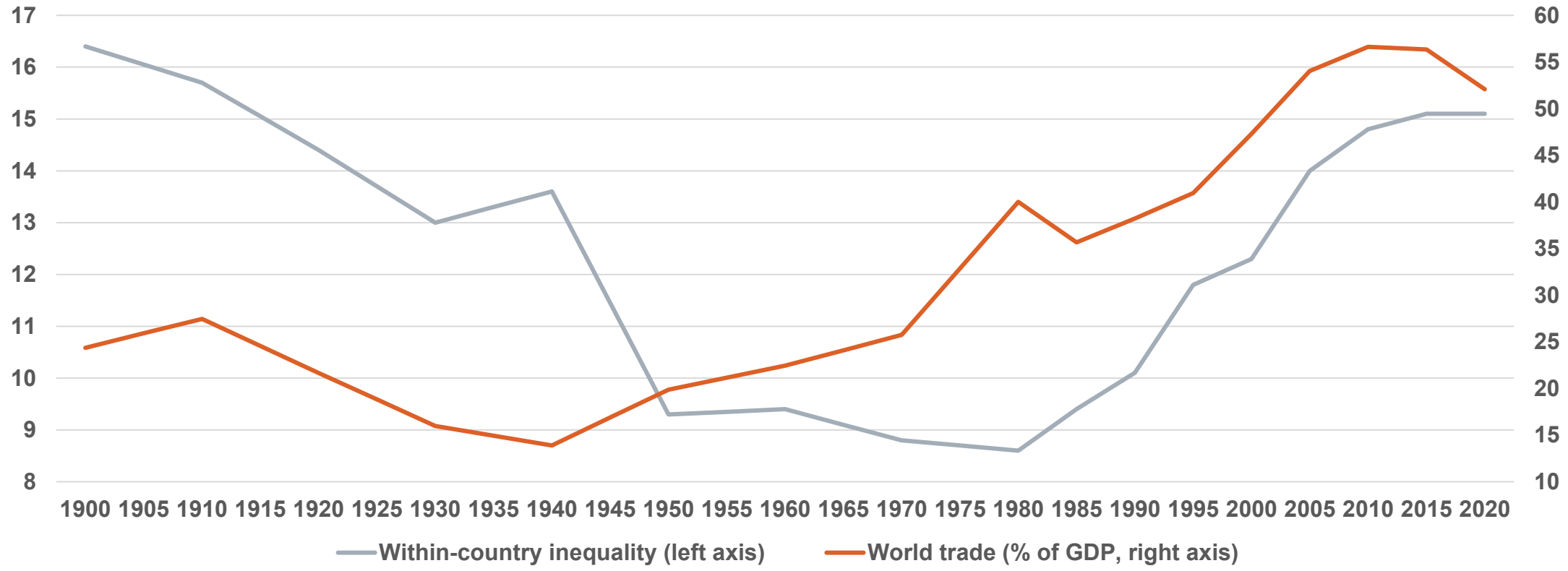
No strong correlation between openness and inequality across countries



Source: World Bank, World Development Indicators

No strong correlation between openness and inequality across time



Source: World inequality Report 2022 & https://ourworldindata.org/

Key drivers of inequality identified in the literature

1. Technology

2. Policy

3. Institutions

Technology as a key driver of inequality

- Skill-biased technical change has raised demand for educated workers faster than supply, widening wage gaps (Katz & Murphy 1992; Acemoglu 2002)

- Automation and digitalization have polarized labor markets, displacing routine middle-skill jobs while boosting returns to high- and low-skill work (Autor, Katz & Kearney 2008; Autor & Dorn 2013)

- Overall, technology is widely seen as the primary long-run driver of rising wage inequality in advanced economies

Policy as a key driver of inequality

– Changes in tax and transfer systems have reduced redistribution in some countries (e.g. the US and UK), amplifying inequality at the top (Piketty & Saez 2003)

– Labor market institutions matter: weaker unions and lower minimum wages in some economies have allowed wage dispersion to widen (DiNardo, Fortin & Lemieux 1996)

– Education policy shapes how well societies respond to skill-biased change. Countries that expanded higher education rapidly (e.g. Northern Europe) managed to keep inequality in check (Goldin & Katz 2008)

Institutions as a key driver of inequality

- Financial deregulation and the rise of finance increased top incomes and contributed to inequality (Philippon & Reshef 2012)

- Political institutions shape redistribution: stronger welfare states and collective bargaining (e.g. continental Europe) contained inequality, while liberal regimes allowed larger increases (Rodrik 1999; Acemoglu & Robinson 2012)

- Institutional choices explain divergence: similar technological shocks produced very different outcomes (e.g. US vs Germany)

Trade has nuanced distributional implications

- Even though technology, policy, and institutions are the main drivers of inequality, trade also has important distributional consequences

- A large body of empirical work now shows that these consequences are far more nuanced than suggested by the simple Heckscher–Ohlin logic

- Most importantly, losses from import competition and gains from export opportunities do not evenly dissipate among broad skill groups

- Indeed, recent work suggests that much of the inequality caused by trade is “horizontal,” i.e. occurring within rather than between income brackets (Borusyak & Jaravel 2024)

How trade affects people as workers

	Low adjustment barriers (e.g., high mobility, easy retraining, supportive labor market policies)	**High adjustment barriers** (e.g., low mobility, no retraining, rigid labor market policies)
Exposed to the benefits of trade (e.g., working in export-oriented sector or firm that relies heavily on imported intermediates)	**Inclusive gains** – many workers can shift into expanding sectors and share the benefits	**Exclusive gains** – benefits concentrated among those already in the right jobs, regions, or firms
Exposed to the costs of trade (e.g., working in import-competing sector or hard-hit region)	**Manageable losses** – workers can reallocate to new opportunities, losses short-lived	**Persistent losses** – concentrated harm for workers stuck in declining industries or regions

How trade affects people as consumers

- Few people are directly exposed to trade shocks as workers, but almost everyone benefits as consumers — especially via lower prices

- Conventional wisdom: consumer gains are pro-poor, since poorer households spend a disproportionate share of income on tradables (Fajgelbaum & Khandelwal 2016)

- Recent work questions this: high-income households consume more imported varieties within sectors, suggesting flatter gains across the income distribution (Borusyak & Jaravel 2021)

- Yet, low-income households buy relatively more from low-income trading partners, e.g. direct-to-consumer imports from China (Fajgelbaum & Khandelwal 2024)

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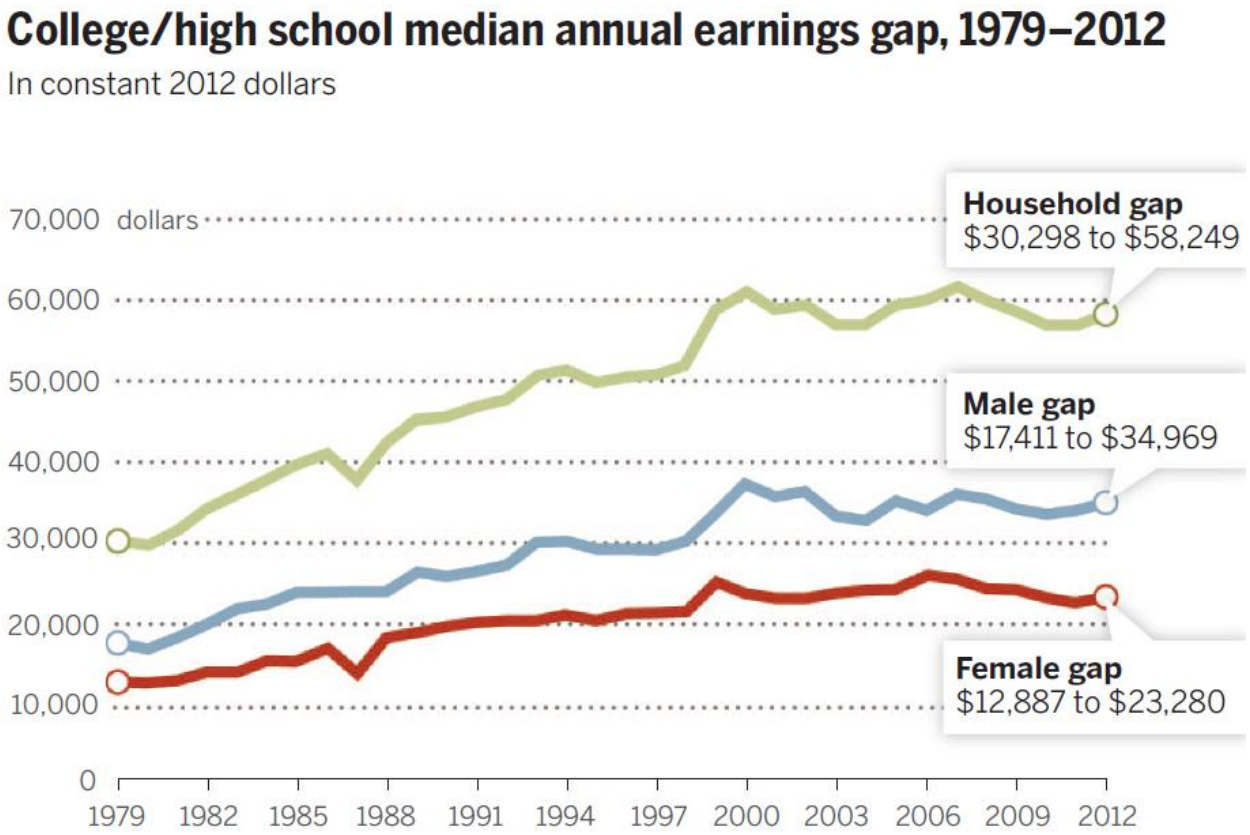
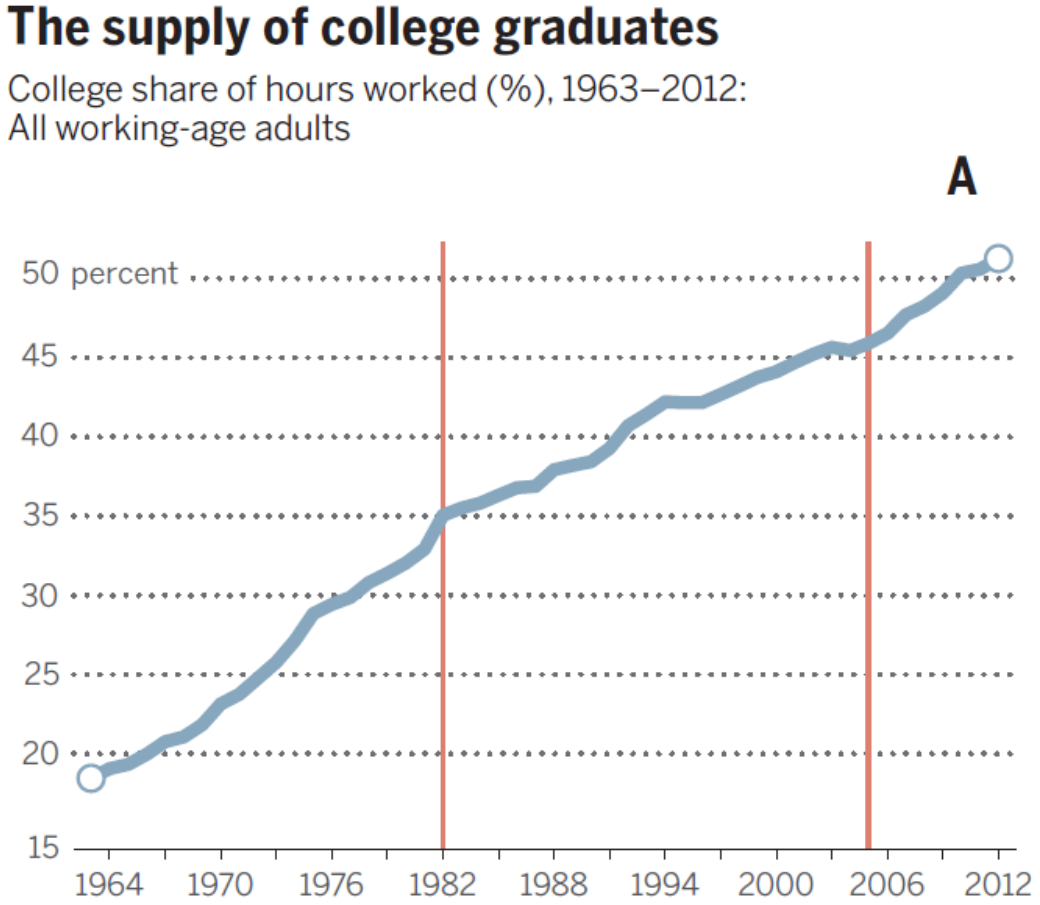
Basic facts – Skill premium in the US



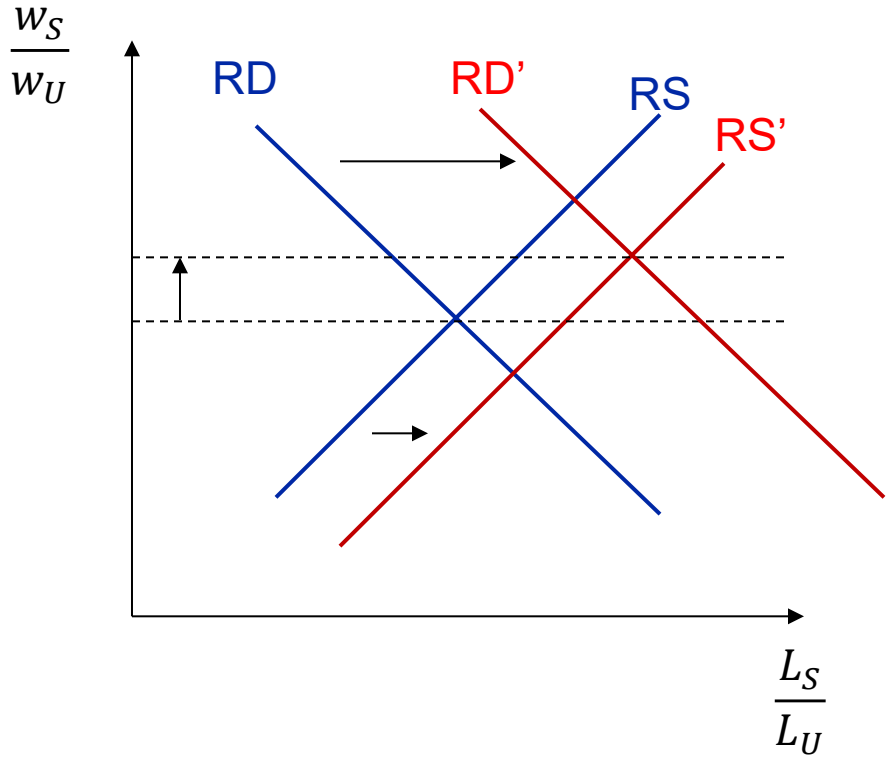
Source: Autor (2014)

Basic facts – Relative supply of college graduates in the US



Source: Autor (2014)

Basic facts – Drivers of the rise in the skill premium



- In principle, the skill-premium can increase because of a fall in the relative supply of skills or an increase in the relative demand for skills

- Given that there has been an increase in the relative supply of skills, the driver must be an increase in the relative demand for skills

Question:
Consider a Heckscher-Ohlin model in which one country is skilled-labor abundant and one industry is skilled-labor intensive. In this model, the RD for skilled workers would shift out in both countries upon trade liberalization. True or false?

Stolper Samuelson at work?

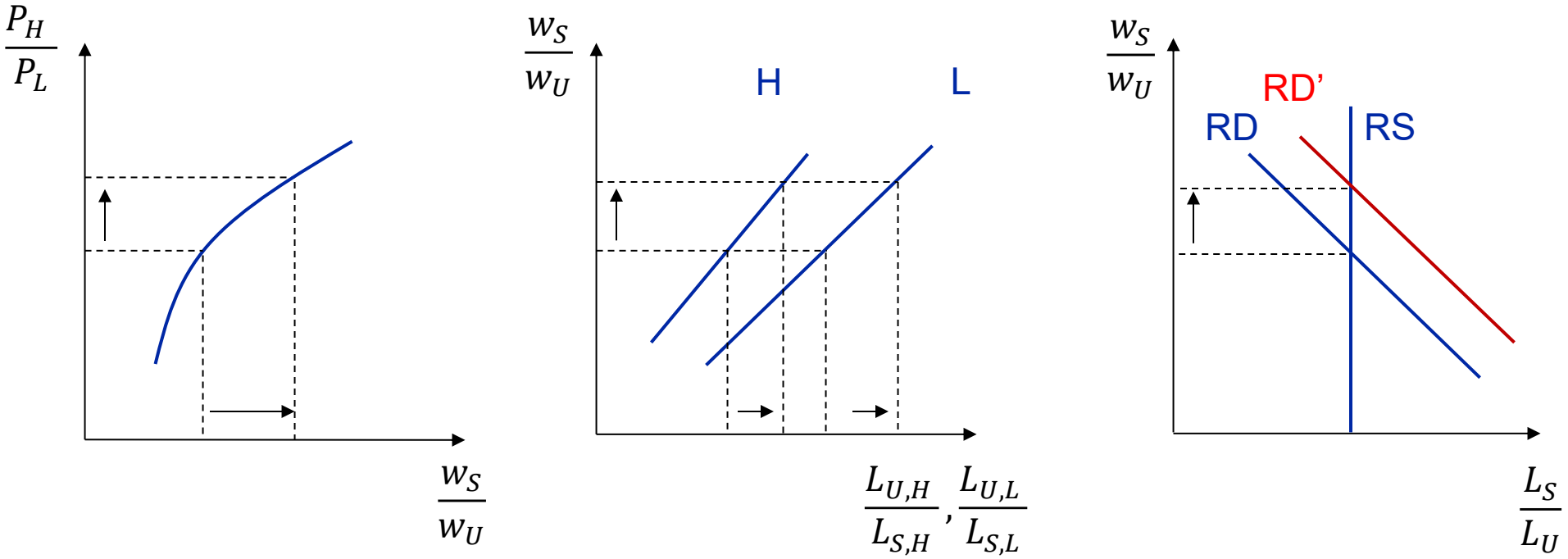
- At first sight, Stolper-Samuelson effects look like a natural explanation for the observed increase in the skill premium in the US

- To see this, relabel our earlier Heckscher-Ohlin model to be about the US and China, skilled labor and unskilled labor, and high-tech and low-tech manufactures

- Moreover, assume realistically that the US is skilled labor abundant and high-tech manufactures are skilled labor intensive

- Following our earlier discussion in the previous lecture, the model then predicts the following effects of trade liberalization in the US

Stolper Samuelson at work? (contd.)



Stolper Samuelson at work? (contd.)

- Hence, an increase in the relative price of high-tech manufacturing goods is predicted to lead to an increase in the skill premium in the US (left panel)

- The increase in the skill premium is then predicted to lead to skill downgrading within industries in the sense that firms substitute away from skilled workers (center panel)

- The relative demand for skilled workers is nevertheless predicted to increase since the high-tech industry expands as a whole (right panel)

- The exact reverse is predicted to happen in China. Among other things, the skill premium is predicted to fall in China

Stolper Samuelson at work? (contd.)

- However, three facts suggest that this mechanism was not the main driver of the increase in inequality observed in the data:

  1. The skill-premium has also increased in China (and other developing countries)
  2. There has been skill upgrading in most US industries
  3. The relative prices of skilled labor-.intensive goods appear to have fallen in the US

- Also, the change in inequality is simply too large to be plausibly explained by external forces. Trade is just not that important in the US

- Notice that this is not a refutation of the Heckscher-Ohlin model per se but merely says that other forces have been more powerful in the data

Stolper Samuelson at work? (contd.)

- One reason why Stolper-Samuelson effects were weak in the US is that firms responded to import competition by quality differentiation

- In particular, Khandewal (2010) shows that US firms were able to escape low wage competition by differentiating their products along the quality dimension

- This effect was stronger in sectors which have a larger potential for quality differentiation (sectors in which many different qualities are observed)

- Countries no longer produce the same goods if they engage in quality differentiation thereby breaking the Stolper-Samuelson result

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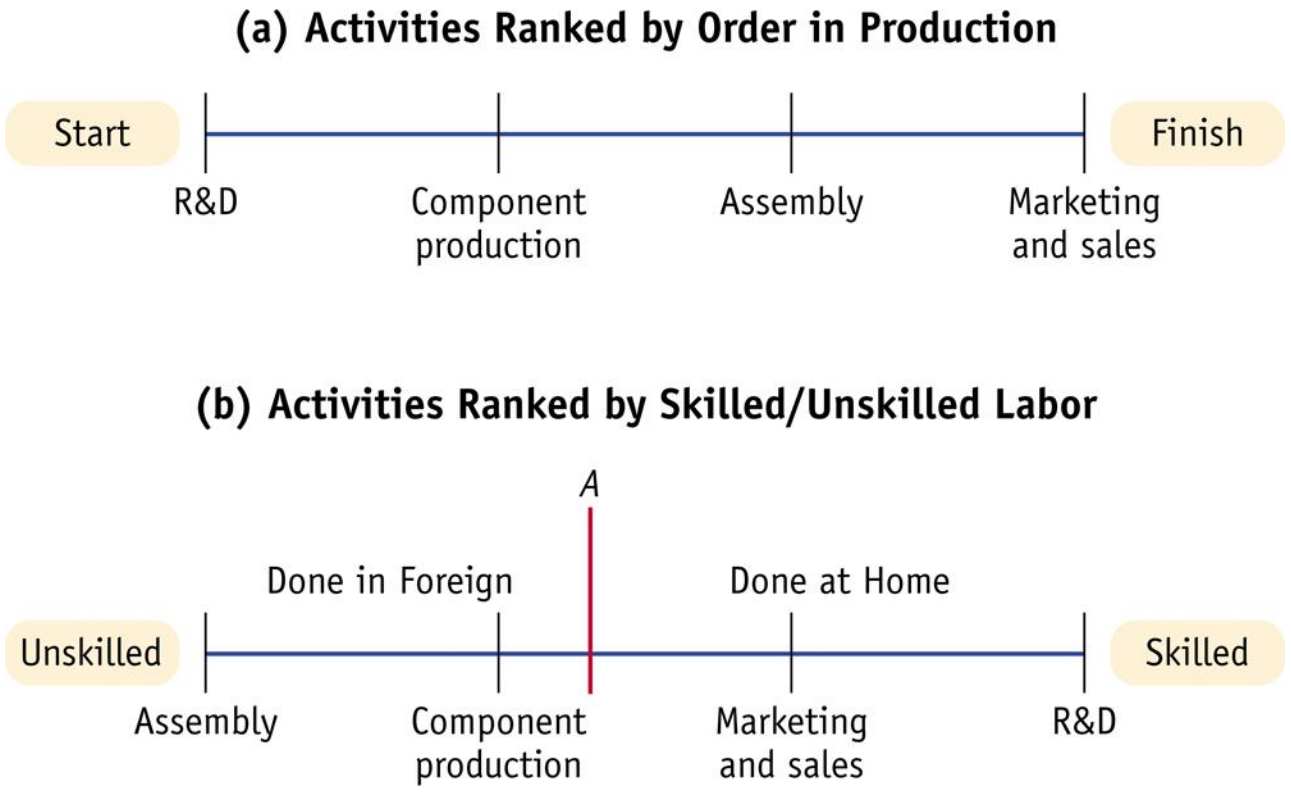
Could offshoring explain the rise in the skill premium?

- The rise of offshoring, i.e. the global sourcing of intermediate inputs by firms, brought a revival of interest in the effects of trade on inequality

- The seminal paper is Feenstra and Hanson (1999), which studies the effects of US outsourcing to Mexico on the skill premium in the US

- It starts from the insight that the Stolper-Samuelson logic becomes consistent with the three stylized facts discussed earlier if it is applied to intermediate goods trade

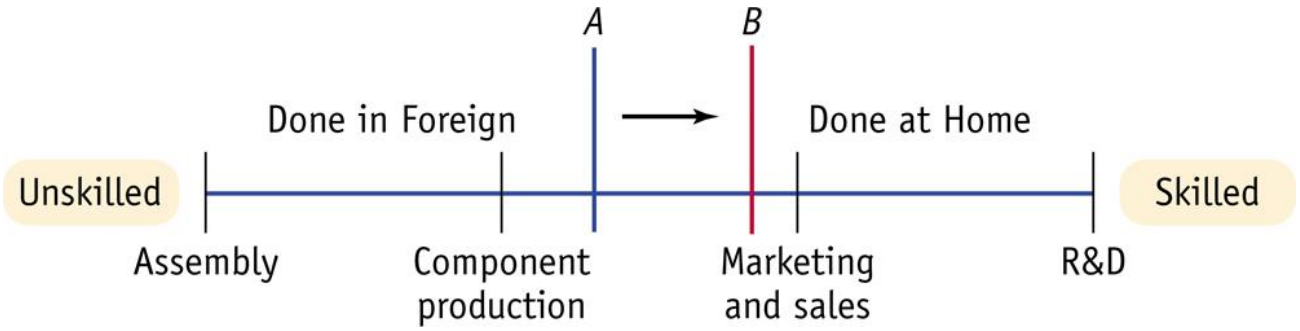
A stylized model of offshoring



Source: Krugman, Melitz, and Obstfeld textbook

- This graph represents a stylized model of offshoring which can apply within or across the boundaries of firms
- All the activities to the left of A are performed in China and all the activities to the right of A are performed in the US
- It is basic Heckscher-Ohlin-type specialization just applied to intermediate goods

Offshoring and the relative demand for skills



Source: Krugman, Melitz, and Obstfeld textbook

- As trade costs fall, it becomes more attractive to offshore to China
- The key insight is that the newly offshored activities are at the upper end of the skill spectrum for China but at the lower end of the skill spectrum for the US
- As a result, the relative demand for skills increases in the US and China thus pushing up the skill premium everywhere

Offshoring and the skill premium

- Hence, this story is immediately consistent with the fact that the skill premium increased in the US and China

- Similar to the skill-biased technological change story, it is also consistent with the other two facts that indicated that the textbook Stolper-Samuelson mechanism was not at work

- In particular, offshoring leads to skill upgrading in most industries and the argument does not rely on any particular movement in relative goods prices

- Feenstra and Hanson (1999) estimate that outsourcing accounts for approximately 15% of the increase in the skill premium while computers contribute around 35%

More recent evidence on the effects of offshoring

- A more recent study by Hummels et al (2014) backs up the basic Feenstra and Hanson (1999) story using substantially better data

- In particular, the authors have access to matched employer-employee data for the universe of private sector firms in Denmark

- They document significant effects of offshoring on wages, with the wages of skilled workers increasing and the wages of unskilled workers decreasing as a result of offshoring

- They also find that workers who where displaced from offshoring firms suffer greater earnings losses than other displaced workers, and that the earnings losses are greater and more persistent for low-skilled than high-skilled workers

A variation of Stolper-Samuelson

- The bottom line is that a Stolper-Samuelson-like story can explain some of the increase in inequality even though the textbook Stolper-Samuelson theorem can't

- This basic theme also reappears in other recent studies such as an interesting calibration exercise by Burstein and Vogel (2017)

- As we will discuss in more detail later, not all firms export, and exporters hire relatively more skilled workers than non-exporters which generates another Stolper-Samuelson-like link between trade and inequality

- Burstein and Vogel (2017) add this channel to a quantitative Ricardo-Heckscher-Ohlin model and show that a reduction in trade costs leads to an increase in the skill premium almost everywhere

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The “China shock”

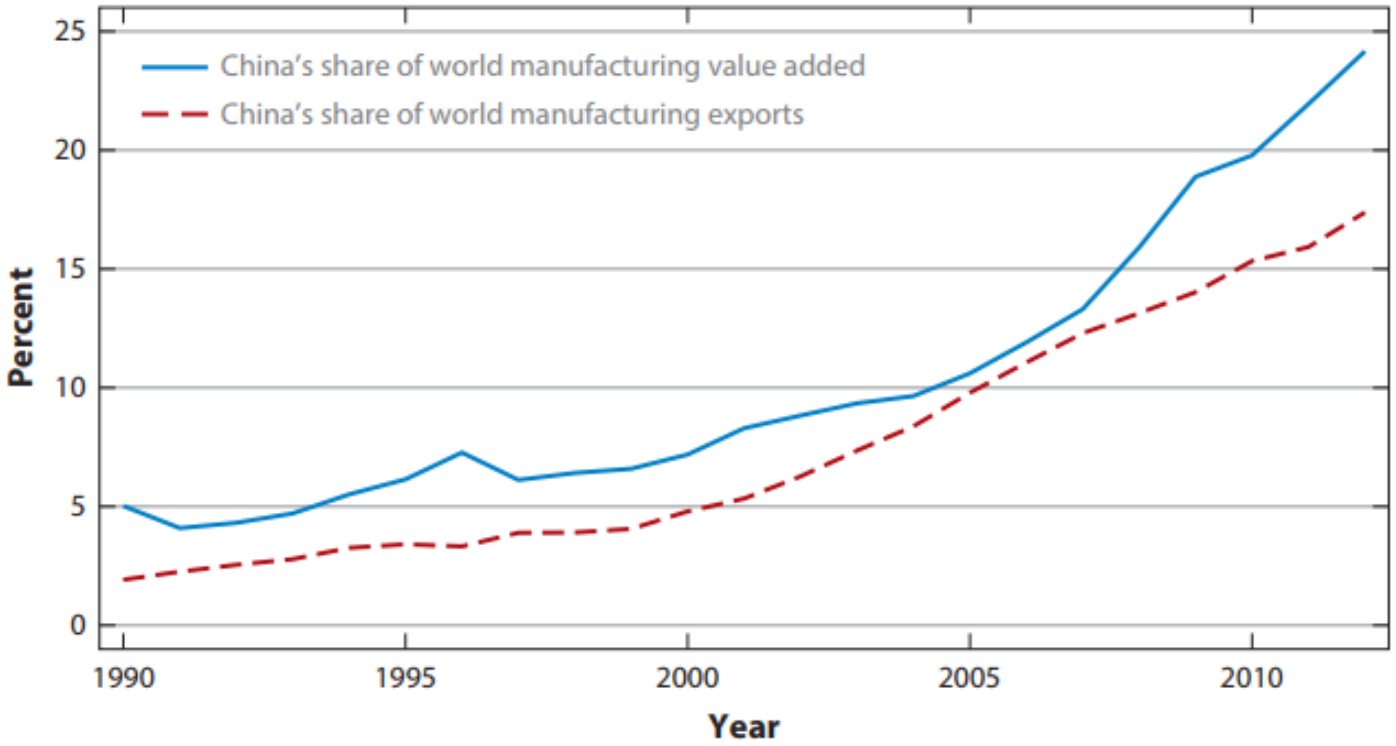
- Another line of work departs entirely from the Heckscher-Ohlin model and takes a reduced-form approach to the effects of trade on inequality

- Autor et al (2013) study the effects of the spectacular rise of China’s manufacturing sector on labor markets in the United States

- The main insight is that the effects of import competition do not immediately dissipate across skill groups as in the Heckscher-Ohlin model but rather hit people working in the wrong job in the wrong place

- This suggests that there are substantial adjustment frictions in real-world labor markets which the Heckscher-Ohlin model does not take into account

China's emergence as a manufacturing powerhouse



Source: Autor et al (2016)

Large variation in exposure of US local labor markets

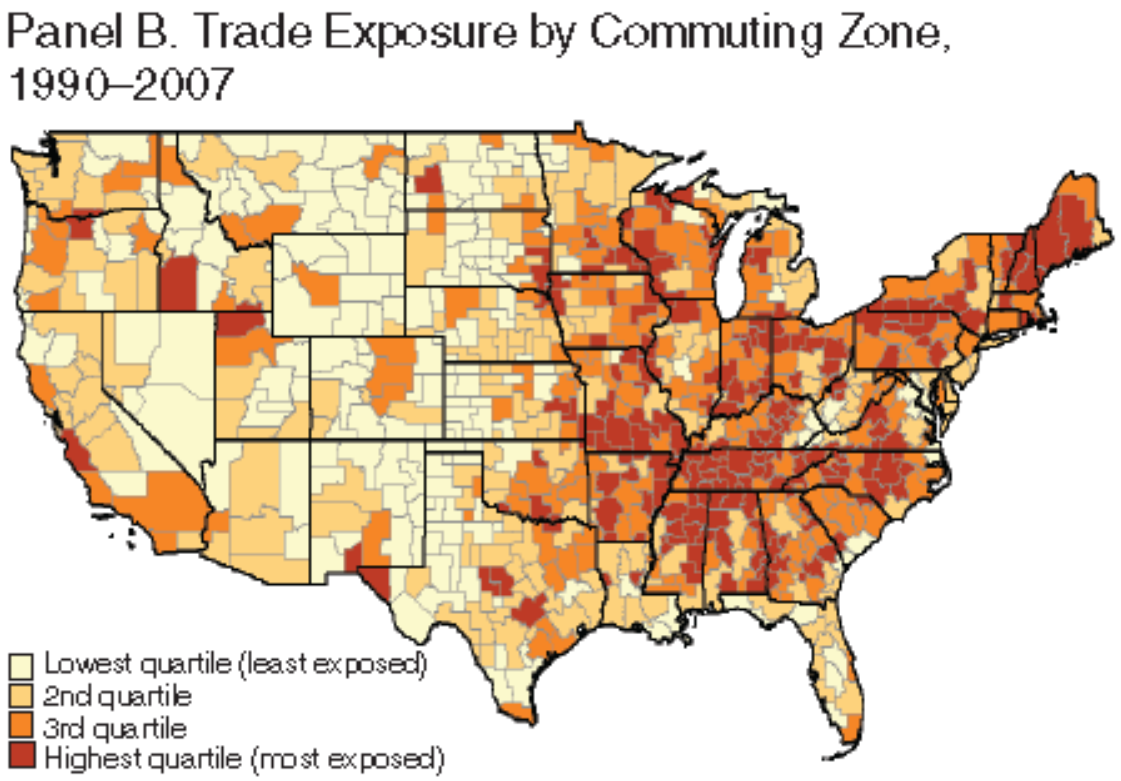
- Autor et al (2013) consider US local labor markets as defined by commuting zones. They differ in their exposure to import competition from China because of

  1. Regional variation in the employment share of manufacturing (25% of the variation)

  2. Regional variation in within-manufacturing specialization (75% of the variation)

- As one would expect, the traditional manufacturing regions of the US appear among the most exposed commuting zones. This includes substantial parts of the Northeast and South-Central US, where labor-intensive manufacturing industries such as furniture, rubber products, toys, apparel, footwear, and leather goods are concentrated

Large variation in exposure of US local labor markets (contd.)



Source: Autor et al (2013)

Autor et al (2013)'s identification strategy

- To identify the effects of Chinese import competition on US local labor markets, Autor et al (2013) use a **differences-in-differences** strategy

- This simply means that they are comparing two differences, namely the change in labor market conditions before and after the China shock in regions which were most and least affected by Chinese import competition

- The main advantage is that this controls for other contemporaneous shocks to US labor markets as long as they are uncorrelated with the China shock

- The main disadvantage is that it only measures the relative effect of the China shock on the most affected versus the least affected industries and not on its absolute effect

Autor et al (2013)'s main results

Table 4: Import Competition and Outcomes in U.S. Local Labor Markets, 1990 - 2007

A. Δ Fraction of Working Age Population in Manufacturing, Unemployment, NILF

Employed in Manufacturing (1)	Employed in Non-Manufacturing (2)	Unemployed (3)	Not in Labor Force (4)
-0.60***	-0.18	0.22***	0.55***
(0.10)	(0.14)	(0.06)	(0.15)

B. Δ Log Population, Log Wages, Annual Wage and Transfer Income

Δ Log CZ Population (log pts) (5)	Δ Avg Log Weekly Wage (log pts) (6)	Δ Annual Wage/Salary Inc per Adult (US$) (7)	Δ Transfers per Capita (US$) (8)
-0.05	-0.76***	-549.3***	57.7***
(0.75)	(0.25)	(169.4)	(18.4)

N=1444 (722 commuting zones x 2 time periods 1990-2000 and 2000-2007). Employment, population and income data is based on U.S. Census and American Community Survey data, while transfer payments are based on BEA Regional Economic Accounts. All regressions control for the start of period percentage of employment in manufacturing, college-educated population, foreign-born population, employment among women, employment in routine occupations, average offshorability index of occupations, and Census division and time dummies. Models are weighted by start of period commuting zone share of national population. Robust standard errors in parentheses are clustered on state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Autor et al (2016)

Autor et al (2013)'s main results (contd.)

- This table shows the results of comparing commuting zones with a $1,000 per-worker difference in additional import exposure

- The interpretation is that the fraction of the working age population employed in manufacturing fell by -0.60 percentage points more in the more exposed commuting zone and so on

- Notice that the faster fall in manufacturing and non-manufacturing employment corresponds roughly to the faster rise in unemployment and labor force non-participation

- Notice also that wages fall faster and transfer payments grow faster in the more exposed region but there are no differences in the population growth rates

Aggregate effects on jobs and polarization

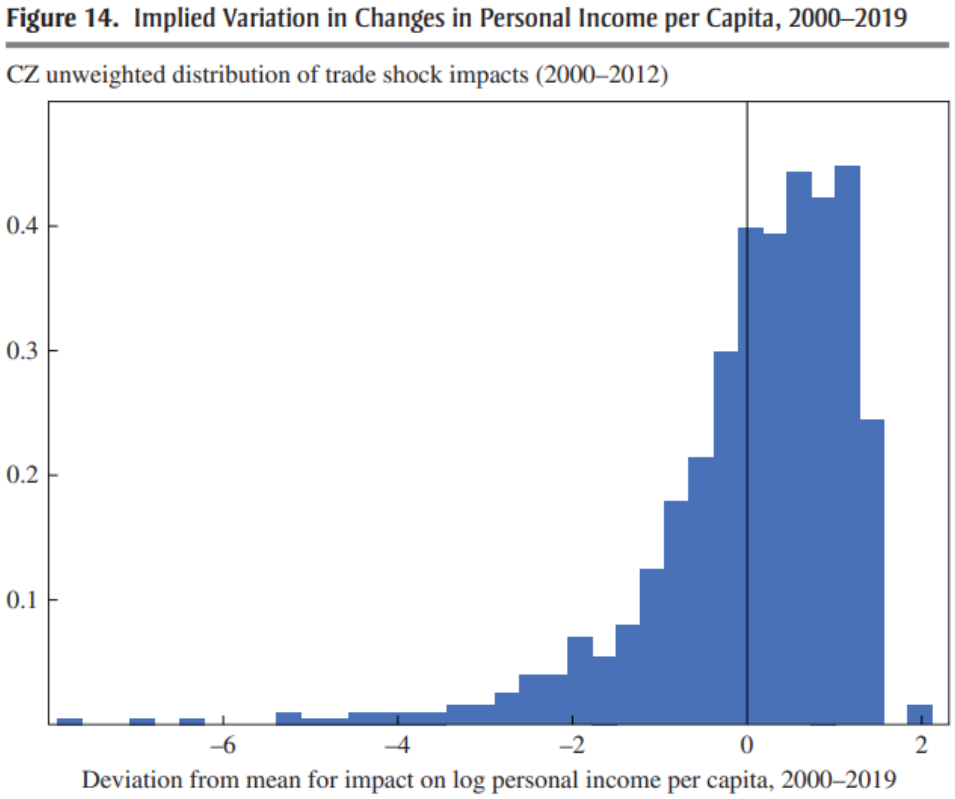
- Acemoglu et al. (2016) move beyond differences-in-differences and estimate the total effect of the China shock on US employment

- They find that Chinese import competition eliminated 2.0–2.4 million jobs between 1999 and 2011, about half of them in manufacturing

- Caliendo (2023) reports later general-equilibrium estimates of ~550,000 net manufacturing job losses between 2000 and 2007 – broadly consistent with earlier findings

- While these numbers are small relative to the US labor force of over 150 million, there is robust evidence that they contributed to political polarization (Autor et al. 2020)

Welfare effects positive in a majority of local labor markets



Source: Autor et al (2021)

- Autor et al (2021) take a holistic view, looking at the effects of the China shock on personal income per capita
- This combines the potentially harmful effects of imports on wages with the typically positive effects of imports on consumer prices
- They find that the welfare effect of the China shock was net-positive in a majority of local labor markets

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Trade and jobs

- While trade economists emphasize the effects of trade on real incomes, much of the public discussion revolves around jobs

- In our models, trade creates and destroys jobs in certain industries, but we have assumed that aggregate unemployment remains fixed

- We will now briefly explore how reasonable this assumption is in the long-run and in the short-run by looking at the emerging literature on trade and unemployment

- To date, this literature suggests that trade has no clear effect on long-run unemployment but can increase short-run unemployment in the adjustment phase

Long-run versus short-run

- As you may remember from macroeconomics, economists typically distinguish between natural and cyclical unemployment

- Natural unemployment captures the long-run trend in unemployment while cyclical unemployment captures short-run deviations from this trend

- Natural unemployment is commonly attributed to search and matching frictions (frictional unemployment) and wage rigidities (structural unemployment)

- Cyclical unemployment is usually thought to fluctuate with the business cycle, rising in recessions and falling in booms

Trade and unemployment in the long-run

- A plausible link between trade and frictional unemployment would be cross-industry variation in search and matching frictions

- Trade would then lead to a fall in frictional unemployment in countries which have a comparative advantage in low-friction industries and an increase in frictional unemployment elsewhere

- A plausible link between trade and structural unemployment would be downward wage rigidities for unskilled workers

- Trade would then increase structural unemployment in countries which would otherwise experience an increase in the skill-premium and decrease structural unemployment elsewhere

Trade and unemployment in the long-run (contd.)

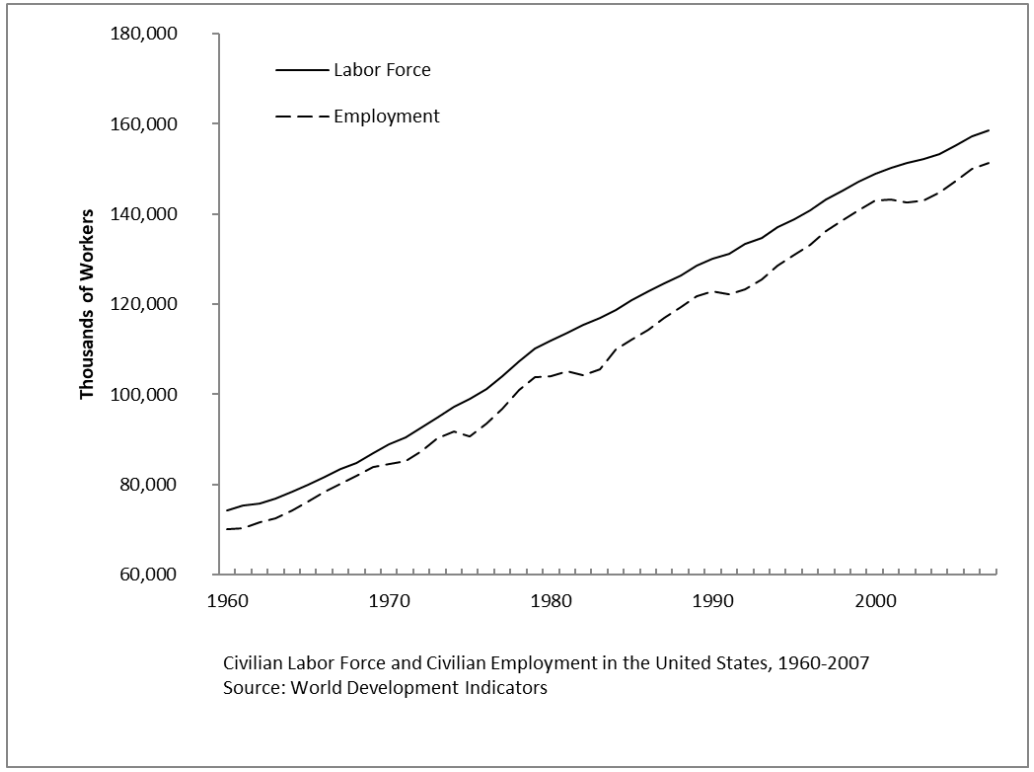
- This discussion suggests that the long-run effect of trade on unemployment is ambiguous and depends on labor market institutions

- This is also the general theme of the theoretical literature on trade and long-run unemployment which has suggested numerous additional effects

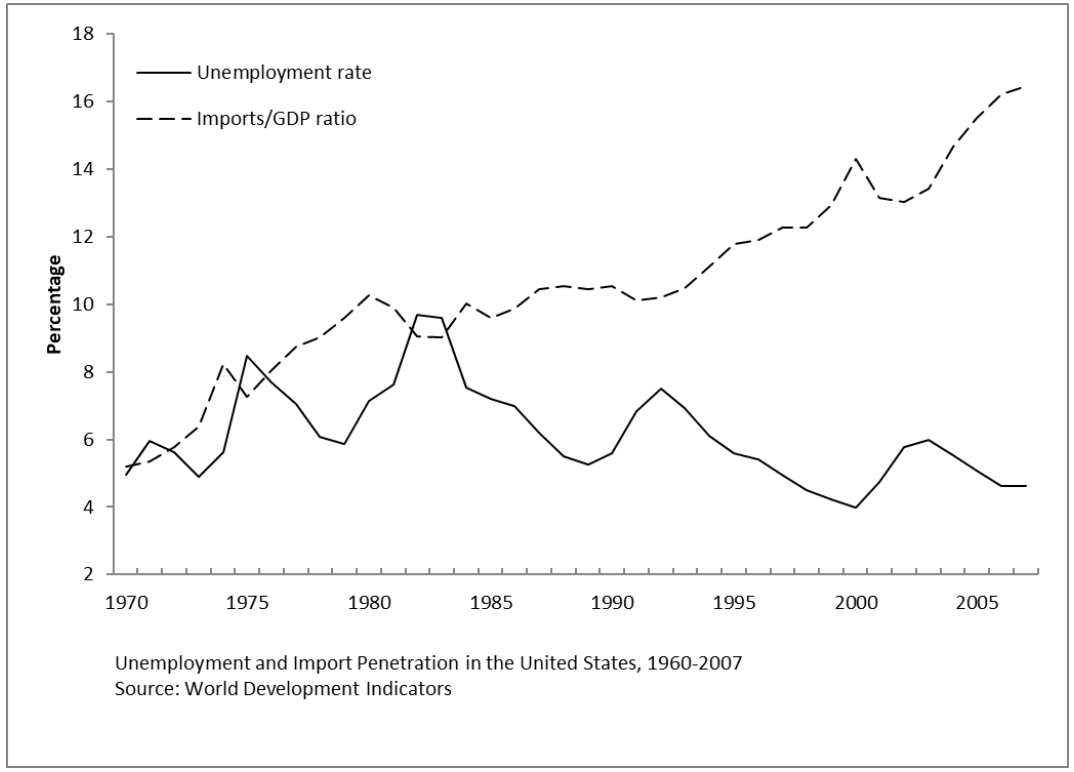
- Surprisingly, the literature has not yet produced any authoritative empirical study on trade and long-run unemployment although there are some recent attempts

- My conjecture is that trade may have contributed somewhat to structural unemployment in Europe but had little effect on long-run unemployment in the US

Trade and unemployment in the long-run (contd.)



Civilian Labor Force and Civilian Employment in the United States, 1960-2007
Source: World Development Indicators



Unemployment and Import Penetration in the United States, 1960-2007
Source: World Development Indicators

Source: World Bank

Trade and unemployment in the short-run

- While trade liberalization is unlikely to cause cyclical unemployment, adjustment frictions should contribute to higher unemployment in the short-run

- For example, some industries expand and others contract following trade liberalization and it takes time for workers to move from the import-competing to the export-oriented industries

- Recall from our discussion of the China shock earlier on that such adjustment frictions appear to be surprisingly important in the US

- In particular, Autor et al (2013) find that reductions in manufacturing employment and increases in unemployment or labor force non-participation go hand in hand

Trade and unemployment in the short-run (contd.)

- This then raises the question “how short is the short-run?”. An interesting perspective is provided by Trefler (2004) who studies the effects of the Canada-US Free Trade Agreement (CUSFTA) of 1989

- He finds that CUSFTA led to a 5% reduction in Canada’s manufacturing employment which amounts to a loss of 100,000 jobs

- However, he also argues that these job losses were temporary in nature in the sense that they were made up by job gains in other parts of manufacturing within 10 years

- Trefler (2004) again uses a differences-in-differences methodology so that his results on level effects have to be taken with a grain of salt

Trade and unemployment in the short-run (contd.)

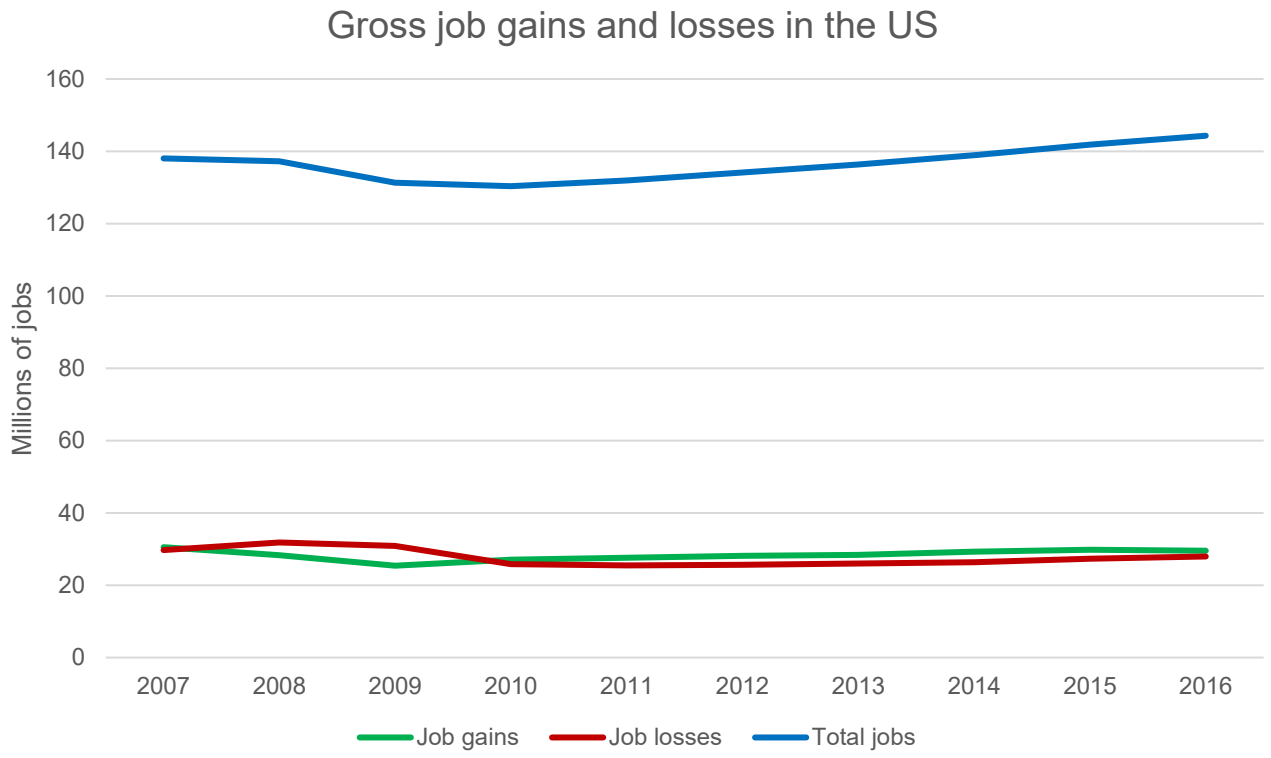
- Motivated by such evidence, some recent studies have attempted to quantify inter-sectoral mobility costs using structural models of labor and trade

- An early example is Artuc et al (2010) who use a stylized model to estimate that inter-sectoral mobility costs amount to approximately six times the average annual wage in the US

- Their estimate was then corrected downwards to approximately one to three times the average annual wage in a subsequent study by Dix-Carneiro (2014) which uses a more realistic model

- Looking at Brazil, Dix-Carneiro and Kovak (2019) document that workers exposed to import shocks often end up in the informal sector rather than moving towards export opportunities

Some context on labor market dynamics



Source: Bureau of Labor Statistics

- In all of this, it is important to keep in mind that there is substantial turnover in the labor market
- For example, approximately 20% of all jobs get created and destroyed in the US every year
- This implies that almost 30 million jobs get created and destroyed in the US every year

Conclusion

- Inequality trends are shaped primarily by technology, policy, and institutions; trade is not the main driver in the long run

- Trade's footprint is nuanced: Distributional effects don't map neatly to broad skill groups; much of the impact is "horizontal" within income brackets

- Two channels matter:
  - Workers: Import competition and export opportunities create concentrated losses/gains that depend on adjustment frictions. Aggregate job losses are modest, but local (and political) effects are sizable
  - Consumers: Most people benefit from lower prices and greater variety; gains are often larger for poorer households, though results are context-dependent

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