Universität Zürich[UZH]

Topic 8 – Trade, Growth, and Development

Prof. Ralph Ossa

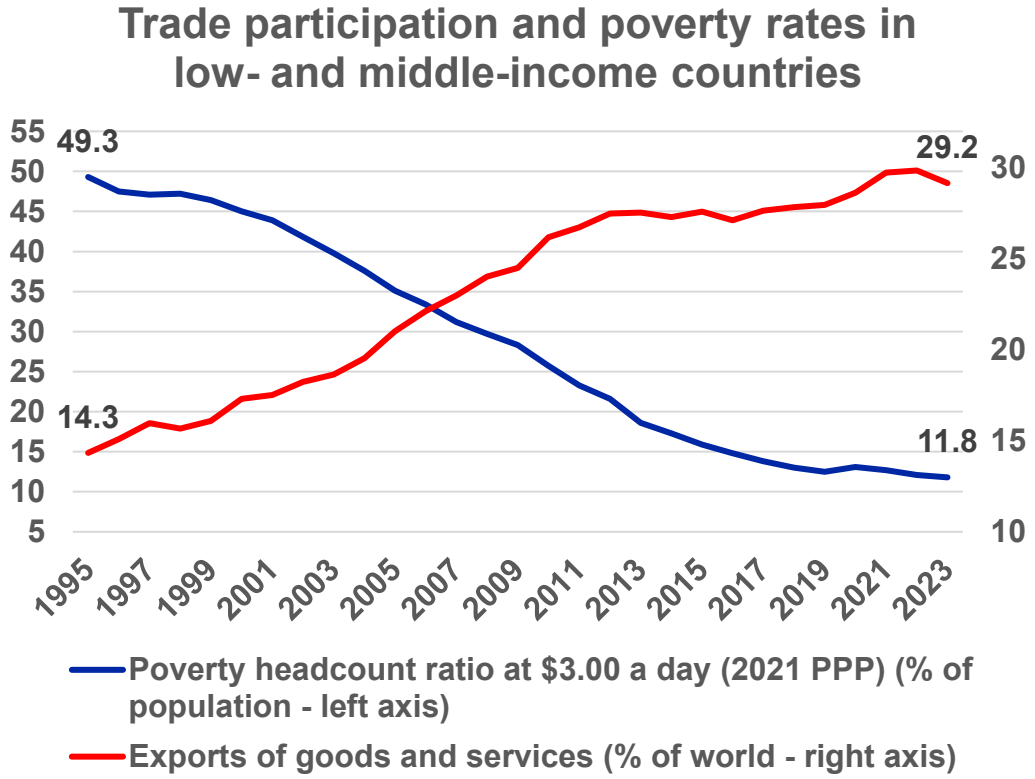
Three waves of export-led growth since 1945

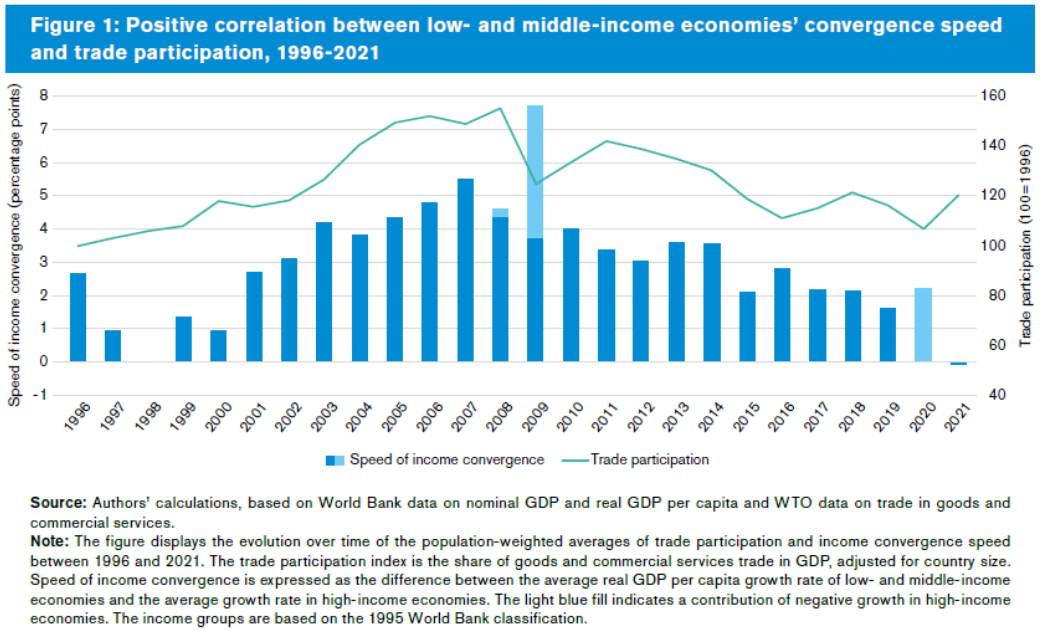
- **Wave 1 - Post-war Pioneers (1950s–1970s)**: Japan and West Germany rebuilt their manufacturing bases after World War II and became major exporters of steel, machinery, chemicals, and automobiles.

- **Wave 2 – Asian Tigers (1960s–1990s)**: Korea, Taiwan, Hong Kong, and Singapore expanded manufactured exports from textiles and light industry to electronics and precision goods.

- **Wave 3 – Great Convergence (mid-1990s onward)**: China, along with economies across Southeast Asia and Central and Eastern Europe, integrated into global value chains and expanded manufacturing and services exports.

Trade integration and the Great Convergence went hand in hand





Source: World Trade Report 2024

Inward looking growth strategies: brief successes, lasting stagnation

- **Latin America (1950s–1980s):** Argentina, Brazil, Mexico, Chile pursued import-substitution industrialization with high tariffs, import licensing, and state-owned firms. Initial industrial expansion soon gave way to inefficiency, small domestic markets, and eventual stagnation by the 1980s.

- **India (1950s–1980s)**: Adopted a tightly regulated “license-raj” system of import controls and industrial planning. Industrialization progressed slowly, but productivity remained low until trade and industrial reforms began in 1991.

- **Sub-Saharan Africa (1960s–1980s):** Countries such as Ghana, Tanzania, and Zambia followed state-led, inward-oriented industrialization. Early manufacturing growth quickly plateaued as protected firms stayed uncompetitive and domestic markets too narrow.

The trade and growth puzzle

– In light of this evidence, most economists now agree that trade integration is essential for sustained growth and development.

– Yet, two questions remain:

1. **The scale of trade-led miracles**: The static gains from trade quantified in Topic 3 are far too small to explain them. For example, Korea's static real income gain from trade is estimated at only 11 %, yet its GDP per capita rose more than thirty-fold since 1960.
2. **The limits of openness**: Trade integration alone has not guaranteed rapid growth. Latin America, for instance, has remained highly open yet experienced modest and volatile growth over recent decades.

– **So, how does trade generate growth — and why only in some places?**

Overview of the lecture

- In this lecture, we move beyond the static gains from trade discussed earlier, drawing on the WTO World Trade Report 2024 and recent survey articles.

- **Dynamic gains from trade**: How trade fosters innovation and long-run growth — based on Akcigit & Melitz (2022) and Shu & Steinwender (2019).

- **Trade and distortions**: How weak institutions, market frictions, and firm-level distortions shape the impact of liberalization — following Atkin & Khandelwal (2020).

- **Future of trade-led development**: Why past export-led growth models may be harder to replicate today — from Goldberg & Ruta (2025).

Trade and innovation - Channels

Akcigit and Melitz (2022) emphasize two broad channels through which trade can affect innovation — and thus the growth rate, rather than just the level, of real income:

1. **Incentive channel**: Exposure to international markets changes firms' incentives to innovate

2. **Diffusion channel**: Participation in international markets facilitates the diffusion of knowledge

Trade and innovation - Incentive channel

Table 1
A Categorization of Trade Shocks

Target Market		*Direction*: Increased Competition in Domestic Market	*Direction*: Increased Access to Foreign Market
	Output Market	**Import competition**	**Export opportunities**
	Input Market	**Foreign input competition**	**Access to imported intermediates**

Source: Shu and Steinwender (2019)

Trade and innovation - Incentive channel – Import competition

- From a theoretical perspective, the effect of import competition on innovation is ambiguous—mirroring the broader relationship between competition and innovation.

- On the one hand, import competition reduces the rents from innovating, weakening innovation incentives (“**Schumpeterian effect”**).

- On the other hand, import competition reduces the rents without innovating, strengthening innovation incentives (**escape-competition effect**).

- The Schumpeterian effect tends to dominate for laggards far from the technological frontier, while the escape-competition effect tends to dominate for firms close to the frontier.

Trade and innovation - Incentive channel – Import competition

- The evidence surveyed by Shu and Steinwender (2019) supports both the escape-competition and Schumpeterian effects, depending on firms' proximity to the technological frontier.

- In **developing economies**, trade liberalization generally raised productivity and innovation, especially among large and technologically advanced firms.

- In **Europe**, effects are positive but weaker, with some evidence of an inverted-U relationship between competition and innovation.

- In **North America**, results are mixed—import competition spurred innovation at frontier firms but reduced it at weaker firms.

Trade and innovation - Incentive channel – Bloom et al (2016)

- **Bloom et al (2016)** examine over 500,000 firms in 12 European countries (1996–2007) as imports from China surged after its WTO accession.

- Main findings:
  - Import competition from China accounted for ≈14 % of Europe's technological upgrading (2000–2007).
  - Firms in more exposed industries increased patents (+13.9 %), IT use (+13.5 %), and productivity (+13.5 %) per worker.
  - Low-tech firms faced job losses and higher exit rates, but high-tech firms expanded employment and output.

- Takeaway: Import competition from China spurred technological upgrading and innovation across Europe—evidence of the escape-competition effect operating at scale.

Trade and innovation - Incentive channel – Export opportunities

- Export opportunities expand firms' potential market size, increasing the returns to innovation (**"market-size effect"**).

- Most studies find positive effects of export access on productivity and innovation, especially for initially productive and technologically advanced firms.

- Some evidence of negative effects for non-exporters and laggard firms, consistent with stronger competition due to entry reducing innovation incentives.

- A complementary mechanism, learning-by-exporting, shows that interacting with foreign buyers—particularly in advanced markets—enhances knowledge transfer and innovation.

Trade and innovation - Incentive channel – Bustos (2011)

- **Bustos (2011)** studies Argentine manufacturing firms during the creation of Mercosur, which reduced Brazil's tariffs on Argentine exports from 29% to zero (1991–1995).

- Main findings:
  - Exporting firms increased investment in new technologies by about 25% and introduced more product and process innovations.
  - Effects were strongest for medium-sized, upper-middle-productivity firms—those most likely to become new exporters.
  - Both new and continuing exporters upgraded technology as export revenues rose.

- Takeaway: Expanded export opportunities spurred technology adoption and innovation by raising firms' expected returns—evidence of the market-size effect operating through higher export revenues.

Trade and innovation - Incentive channel – Atkin et al (2017)

- **Atkin et al (2017)** ran a randomized experiment with small rug manufacturers in Egypt to test whether exporting raises productivity.

- Main findings:
  - Firms randomly given export orders earned 16–26% higher profits and produced higher-quality rugs across nearly all attributes, scoring 0.8 SD higher in blind lab tests.
  - Specification-adjusted productivity rose by 14–31%, showing genuine efficiency gains driven by learning from foreign buyers through feedback on quality, design, and production.

- Takeaway: Export exposure led firms to upgrade efficiency and quality, providing clear causal evidence of learning-by-exporting.

Trade and innovation - Incentive channel – Imported intermediates

- Access to imported intermediates exposes firms to foreign technologies and higher-quality inputs, facilitating learning and productivity gains (**“learning-by-importing”**).

- Empirical evidence across many countries shows strong positive effects of input liberalization on firm productivity, product quality, and innovation.

- Effects are larger for firms that use imported inputs intensively or operate in sectors close to the technological frontier.

- Examples include Indonesia, India, Chile, Hungary, and China, where reductions in input tariffs led to significant R&D increases, quality upgrading, and TFP growth.

Trade and innovation - Incentive channel – Amiti & Konings (2007)

- **Amiti & Konings (2007)** study Indonesian manufacturing firms during the 1990s trade liberalization, when tariffs on imported intermediates and final goods were sharply reduced.

- Main findings:
  - A 10-percentage-point cut in input tariffs raised firm productivity by ≈12 % on average.
  - Gains were strongest for importers of intermediates and negligible for non-importers.
  - The productivity effect of input liberalization was more than twice as large as that of reducing output tariffs.
  - Mechanism: access to cheaper and higher-quality inputs enabled firms to upgrade technology and learn from foreign suppliers — classic learning-by-importing.

- Takeaway: Reducing input tariffs boosted productivity and innovation by integrating firms into global supply chains — evidence that importing is a key channel for technology diffusion.

Trade and innovation - Incentive channel – Foreign input competition

- Foreign input competition occurs when domestic firms and foreign buyers rely on the same local suppliers for intermediate inputs.

- This can generate positive spillovers: higher foreign demand encourages suppliers to upgrade quality and efficiency, which benefits domestic firms sourcing from them.

- Evidence is limited—one paper finds that in Bangladesh's garment sector, shared suppliers with foreign buyers led to improved product quality and greater product scope among domestic firms.

- Potential downside: stronger foreign demand may also raise input prices and reduce input access for domestic firms.

Trade and innovation - Incentive channel – Firm selection revisited

- In the previous lecture, we argued that exporters are more productive because only high-productivity firms can cover the fixed costs of exporting—evidence of selection.

- Now we added that exporting itself can raise productivity by expanding market size and strengthening innovation incentives.

- Productive firms self-select into exporting, and exporting then boosts innovation and productivity—a feedback loop between trade and innovation.

- In short: productivity mainly drives exporting at entry, but trade reinforces innovation and growth once firms export.

Trade and innovation – Diffusion channel

- Beyond firm-level innovation, trade helps spread ideas and technologies across and within countries, boosting productivity and supporting income convergence.

- Key macro models:
  - Grossman & Helpman (1991) – trade-embodied knowledge spillovers.
  - Sampson (2016) – learning from tougher selection.
  - Buera & Oberfield (2020) – global diffusion of ideas.

Trade and innovation – Diffusion channel – Grossman & Helpman (1991)

- The most direct mechanism is that knowledge generated in one country may be used to facilitate research in another country

- It builds on the influential idea of Romer (1990) that the growth of knowledge is cumulative in the sense that new knowledge builds on past knowledge in a non-rival way

- Grossman and Helpman (1991) formalize it by allowing for international knowledge spillovers in the Romer (1990) model

- Their main finding is that knowledge spillovers tend to accelerate growth in all countries, just as one would expect

Trade and innovation – Diffusion channel – Sampson (2016)

- Trade liberalization toughens selection, as increased competition forces out less productive firms and ensures that only the most efficient survive in open markets.

- Entrants learn from these surviving firms, adopting better technologies and business practices, which raises the average productivity of subsequent cohorts of firms.

- The model delivers endogenous, sustained productivity growth—knowledge keeps diffusing through the population of firms even without scale effects or continuous innovation.

- Quantitatively, trade raises the long-run U.S. growth rate by about 11% relative to autarky, roughly tripling the welfare gains from trade compared to static models.

Trade and innovation – Diffusion channel – Buera & Oberfield (2020)

- Develop a multi-country model in which productivity grows through the diffusion of ideas across firms and borders, transmitted through trade in intermediate goods.

- In their quantitative simulations, declining trade costs since the 1960s account for about one-quarter of global TFP growth, magnifying knowledge flows worldwide.

- The model also reproduces global catch-up patterns, explaining roughly one-third of the observed narrowing of productivity gaps between high- and low-income economies.

- Key insight: Openness to trade accelerates the international diffusion of ideas, helping economies converge in productivity levels—even though it does not permanently raise the long-run growth rate.

Trade and innovation – Diffusion channel – World Trade Report 2024

- The WTO's World Trade Report 2024 presents simulation results using a version of the WTO Global Trade Model with knowledge diffusion, building on Buera and Oberfield (2020).

- They find that about one-third of the Great Convergence since 1995 can be explained by reductions in trade costs.

- They also find that 40–60% of these gains stem from knowledge diffusion through trade in intermediate goods.

- Key insight: Trade openness spreads ideas across borders, making diffusion a major driver of global income convergence.

Trade and distortions - Overview

– Atkin and Khandelwal (2020) emphasize three types of distortions that are pervasive in developing economies and shape the impact of trade liberalization:

1. **Weak institutions**: Corruption, weak rule of law, and poor contract enforcement limit effective openness.
2. **Market-level distortions**: Frictions in labor, credit, input, and domestic trade markets constrain adjustment and productivity gains.
3. **Firm-level distortions**: Informality, state ownership, and political connections distort resource allocation and can amplify or dampen the effects of trade.

– **Key insight**: The impact of trade depends critically on the domestic policy environment — without complementary reforms, liberalization can yield small, uneven, or even negative welfare effects.

Trade and distortions – Weak institutions

- Weak rule of law and limited state capacity interact with trade at multiple margins.
  - **Tariff evasion**: Under-invoicing and bribery at ports mean official tariffs overstate true protection, lowering measured tariff elasticities and making liberalization appear ineffective.
  - **Contracts**: Weak enforcement raises risks in cross-border transactions; firms rely on relationships or vertical integration, reducing trade volumes and shifting specialization toward simpler goods.
  - **Enforcement of regulations**: Limited oversight of labor and environmental rules constrains gains. Multinational buyers partly substitute for weak governments, while tariffs persist because they are easy to collect, creating fiscal losses when cut.
  - **Trade, growth, and institutional change**: Stronger institutions amplify gains from trade, and trade can itself strengthen institutions by empowering groups favoring better governance.

- **Key insight**: Weak institutions alter both the implementation and distribution of trade reforms—stronger legal and regulatory capacity magnifies the gains from openness.

Trade and distortions – Weak institutions – Sequeira (2016)

- **Sequeira (2016)** studies trade liberalization between South Africa and Mozambique, where weak enforcement and corruption shaped how tariff cuts affected trade flows.

- Main findings:
  - Bribery was pervasive: about 80% of shipments paid bribes, typically ≈ 7% of the duties saved.
  - Because firms already evaded tariffs, import volumes barely responded to liberalization (elasticity ≈ 0.1).
  - The 2008 tariff cut reduced bribe frequency by 30% and bribe amounts by 20% but had little effect on trade.

- Takeaway: When enforcement is weak, tariffs provide little real protection, so tariff cuts appear ineffective—credible institutions are needed for trade policy to bite.

Trade and distortions – Weak institutions – Antràs & Foley (2015)

- **Antràs & Foley (2015)** study cross-border transactions of a large U.S. poultry exporter, focusing on how contract enforcement affects payment terms and trade volumes.

- Main findings:
  - Importers in countries with weak rule of law were required to pay cash in advance, while buyers in well-enforced jurisdictions could buy on credit.
  - These tougher payment terms raised transaction costs and reduced trade volumes, especially for cash-constrained importers.
  - Firms used relational contracts and repeated interactions to partially offset weak legal enforcement, but such relationships limited entry of new buyers.

- Takeaway: Weak contract enforcement forces firms to rely on costly payment arrangements and relationships, shrinking trade and discouraging complex exports—stronger legal institutions lower these frictions.

Trade and distortions – Weak institutions – Harrison & Scorse (2010)

- **Harrison & Scorse (2010)** analyze how anti-sweatshop activism affected labor outcomes in Indonesia's textile, footwear, and apparel industries during the 1990s.

- Main findings:
  - Foreign-owned and exporting plants in targeted districts (e.g., Nike, Adidas, Reebok contractors) raised real wages by 10–20% relative to comparable firms; in some cases, increases reached ≈30%.
  - The wage gains came largely from higher compliance with minimum-wage laws, not from new legislation.
  - No significant employment losses were found, although profits fell and smaller exporters were more likely to exit.

- Takeaway: When government enforcement is weak, foreign buyers and activist pressure can partially substitute for regulation, improving labor standards—but these gains may not be sustainable without stronger domestic institutions.

Trade and distortions – Weak institutions – Acemoglu et al (2005)

- **Acemoglu et al (2005)** study how the rise of Atlantic trade (1500–1800) affected the long-run development of European countries.

- Main findings:
  - In countries where merchant groups already had political power (e.g., England, the Netherlands), Atlantic trade strengthened constraints on monarchs and fostered inclusive institutions that protected property rights.
  - In absolutist regimes (e.g., Spain, Portugal), trade rents were captured by the crown, reinforcing extractive institutions and limiting broader economic gains.
  - Institutional improvements in open, merchant-dominated states sparked sustained growth by encouraging investment and innovation.

- Takeaway: Trade can transform political institutions, but outcomes depend on initial power structures—openness promotes growth when it empowers groups favoring better governance.

Trade and distortions – Market-level distortions

- Distortions in factor and product markets shape how economies adjust to trade reforms.
  - **Labor markets**: Limited mobility and large informal sectors slow adjustment and can trap workers in low-productivity regions (India, Brazil).
  - **Capital markets**: Credit constraints raise export-entry costs and restrict reallocation toward more productive firms (Peru).
  - **Input markets**: High input tariffs and limited access to imported intermediates depress productivity; input liberalization yields large gains (India, Indonesia, Hungary).
  - **Internal trade costs**: Poor infrastructure and market power among intermediaries reduce pass-through and limit gains in rural or remote areas.
  - **Information frictions**: High search costs, weak information flows, and poor management practices constrain learning-by-exporting.

- **Key insight**: Trade delivers larger and more inclusive gains when domestic labor, credit, and product markets function efficiently.

Trade and distortions – Market-level distortions – Topalova (2010)

- **Topalova (2010)** studies how India's 1991 trade liberalization affected poverty and wages across districts with differing initial tariff exposure.

- Main findings:
  - Districts more exposed to tariff cuts saw slower poverty reduction and smaller wage gains.
  - Labor immobility and restrictive labor laws limited workers' ability to move toward expanding sectors.
  - Over time, outcomes improved only where complementary reforms (infrastructure, education) eased mobility.

- Takeaway: Trade can leave workers trapped in low-productivity regions when mobility costs and rigid labor markets impede adjustment.

Trade and distortions – Market-level distortions – Paravisini et al. (2015)

- **Paravisini et al (2015)** study Peruvian firms during the 2008 global financial crisis, when capital-flow reversals created exogenous credit-supply shocks to banks.

- Main findings:
  - A 10% fall in credit supply reduced firms' export volumes by ≈ 2%, affecting only the intensive margin—no effect on export entry or exit.
  - Effects came through working-capital constraints: tighter credit raised variable production costs and forced firms to ship less frequently and in smaller volumes.
  - Credit shocks accounted for about 8% of Peru's export decline during the crisis; the rest reflected collapsing global demand.

- Takeaway: Access to finance is critical for trade adjustment—credit constraints directly limit export expansion by raising working-capital costs.

Trade and distortions – Market-level distortions – Atkin & Donaldson (2015)

- **Atkin & Donaldson (2015)** measure intra-national trade costs using price and transport data from Ethiopia and Nigeria, benchmarked against the United States.

- Main findings:
  - The effect of distance on prices is four to five times larger than in the U.S., and internal trade costs remain extremely high even after accounting for infrastructure.
  - Transport costs and intermediary markups absorb much of the surplus from globalization, limiting pass-through of world prices.
  - As a result, rural consumers capture only a small share of the gains from trade, while intermediaries and urban markets benefit most.

- Takeaway: Poor infrastructure and market power in distribution severely limit domestic price pass-through—remote regions remain largely excluded from globalization's gains.

Trade and distortions – Market-level distortions – Atkin et al (2017)

- **Atkin et al (2017)** study technology adoption in Pakistan's soccer-ball industry, where a new foreign-designed cutting die could reduce material waste and raise profits.

- Main findings:
  - Despite clear cost savings—cutting waste by ≈7 % and raising profits ≈1 %—only 6 of 35 firms initially adopted the new technology.
  - Worker-owner incentive misalignment and information frictions led employees to resist and misreport its benefits.
  - A small bonus to key workers (≈ one month's wage) tripled adoption, overcoming these internal barriers.

- Takeaway: Even profitable technologies may diffuse slowly when information and incentive frictions block adoption—small organizational fixes can unlock large gains.

Trade and distortions – Firm-level distortions

- Firm-specific distortions determine whether trade improves or worsens resource allocation.
  - **Informality**: The dominant form of production in developing economies; trade can either shrink or expand informal activity depending on exposure (India, Vietnam).
  - **State ownership and political connections**: State-owned or politically connected firms often capture trade rents; liberalization can correct or entrench these distortions (China, Vietnam).
  - **Business groups and family firms**: Internal capital markets substitute for weak finance but may entrench inefficiency and limit managerial upgrading.
  - **Externalities and spillovers**: Some sectors generate unpriced spillovers that governments target through trade or FDI policy.

- **Key insight**: Trade can reduce or increase misallocation depending on whether liberalization erodes or reinforces firm-level distortions.

Trade and distortions – Firm-level distortions – Khandelwal et al (2013)

- **Khandelwal et al (2013)** study how China's textile and clothing industry responded to the end of the Multi-Fiber Arrangement in 2005, which removed export quotas on apparel shipments to the United States and Europe.

- Main findings:
  - Under the quota system, state-owned and politically connected firms held many export licenses despite low productivity.
  - The removal of quotas triggered large reallocation toward more productive private firms, sharply increasing industry efficiency.
  - Welfare gains from eliminating misallocation across ownership types were substantially larger than the static gains from removing the quota itself.

- Takeaway: Trade liberalization can dismantle politically driven misallocation, amplifying welfare gains when it erodes privileges of unproductive incumbents.

Trade and distortions – Firm-level distortions – Ilias (2006)

- **Ilias (2006)** investigates family ownership and management constraints in Pakistan's surgical-instruments industry, highlighting how weak contract enforcement shapes firm organization and growth.

- Main findings:
  - Firm size is strongly correlated with the number of brothers of the firm's founder—family ties substitute for weak legal enforcement.
  - Agency and trust constraints prevent hiring non-family managers, limiting professionalization and scale.
  - Family-based control provides reliability in low-trust environments but restricts managerial upgrading and adoption of modern business practices.

- Takeaway: When legal institutions are weak, family management substitutes for governance, but entrenched control prevents firms from scaling and modernizing, muting potential trade-driven gains.

Trade and distortions – Firm-level distortions – Barthelme et al (2025)

- **Bartelme et al. (2025)** revisit the “textbook” case for industrial policy, quantifying the aggregate welfare gains from optimally supporting sectors with increasing returns to scale.

- Main findings:
  - Manufacturing sectors exhibit modest increasing returns, with average scale elasticities around 0.2.
  - Using these estimates, the aggregate gains from a perfectly designed industrial policy—one that targets the right sectors and avoids political or fiscal distortions—are small, about 1–2 % of GDP.
  - Adding input–output linkages modestly raises the potential gains (to about 4 % of GDP), but they remain limited because only a few sectors exhibit strong spillovers.

- Takeaway: Even under ideal assumptions, industrial policy yields modest economy-wide benefits—it can fine-tune efficiency but cannot deliver transformative growth.

Trade and distortions – Policy lessons

- Atkin and Khandelwal (2020) conclude that trade reforms succeed only when domestic distortions are addressed in parallel.
  - **Strengthen institutions**: Improve customs enforcement, contract adjudication, and regulatory oversight to ensure trade policy is effectively implemented.
  - **Ease market frictions**: Complement tariff cuts with reforms that enhance labor mobility, expand credit access, and improve infrastructure.
  - **Target misallocation**: Focus liberalization and industrial reform where distortions are largest — e.g. state-owned, politically connected, or highly informal sectors.
  - **Improve data and diagnosis**: Combine administrative and firm-level evidence to capture institutional and market failures that shape trade outcomes.

- **Key insight**: In line with the theory of the second best, the welfare effects of trade depend on other distortions — without domestic reform, openness can yield smaller or even negative gains.

Goldberg & Ruta (2025): Why trade-led development worked in the past

- Access to large foreign markets expanded opportunities for scale economies, technology adoption, and sustained poverty reduction.

- Integration into global value chains enabled learning by exporting, skill and quality upgrading, and the transfer of knowledge and technology across borders.

- Commitment through trade agreements strengthened institutions, enhanced policy credibility, and anchored domestic reform.

- Together, these dynamic effects transformed trade from a source of short-term gains into a lasting engine of structural change and long-run growth.

Goldberg & Ruta (2025): Why this model is harder to replicate today

- Automation and artificial intelligence are undermining the low-skill manufacturing advantage that once powered export-led industrialization.

- The resurgence of protectionism and industrial policy in advanced economies is constraining market access and curbing technology diffusion.

- Rising geopolitical rivalry is fragmenting global trade, weakening multilateral rules, and discouraging long-term investment and knowledge sharing.

- As these preconditions for dynamic gains fade, replicating the growth miracles of the past has become far more difficult for today's developing economies.

Summary

- In this lecture, we went beyond the static gains from trade to examine how trade shapes long-run development.

- **Dynamic gains from trade**: Trade can raise growth through innovation, technology diffusion, and knowledge flows.

- **Trade and distortions**: The impact of trade depends on domestic institutions and market functioning — weak institutions and distortions can mute or even reverse the gains.

- **Future of trade-led development**: The forces that powered past export-led growth — access to rich markets and technology transfer — may be weakening amid automation, industrial policy, and geopolitical fragmentation.

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