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International Trade and Income Inequality: A Comparative Analysis of Developed and Developing Countries

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Abstract

This thesis analyzes the relationship between international trade and income inequality, focusing on how engagement in global trade affects income distribution. It will start by exploring key international trade theories, including the Ricardian model, the Specific Factors model, the Heckscher-Ohlin model, and New Trade Theories, as a theoretical foundation for our analysis, examining their strengths and weaknesses in evaluating real-world events.

Using two case studies, we will examine the impact of trade agreements and globalization on different economies. First, we will assess the effects of NAFTA on the U.S. and Mexico. Second, we will compare the impact of the "China Shock" on the U.S. with the "Grain Invasion" in Argentina. These cases highlight the differing dynamics between developed and developing countries, casting light on the distributional consequences of trade liberalization.

A key focus will be identifying the winners and losers of international trade, analyzing how trade benefits some groups while disadvantaging others.

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CHAPTER 1

Introduction

1.1 Overview

The relationship between international trade and income inequality has become one of the most debated issues in contemporary economic research. While globalization has delivered undeniable gains in terms of efficiency, consumer choice, and aggregate income, it has also exposed economies to new forms of distributional conflict and labor market dislocation. This thesis aims to investigate how engagement in global trade affects the distribution of income within countries, with particular attention to who gains, who loses, and why.

The decision to focus on this topic stems from a growing awareness of the asymmetric impacts of globalization, especially in light of recent political and economic tensions surrounding trade agreements. The idea that "everyone wins from trade" has come under increasing scrutiny as empirical evidence reveals that the benefits and costs of trade liberalization are often unequally distributed across regions, sectors, and population groups.

The central hypothesis of this thesis is that international trade produces both aggregate gains and distributional distortions, and that the degree and nature of inequality generated by trade depend on country-specific factors such as labor market institutions, economic structure, and level of development. Rather than analyzing the aggregate statistics, the thesis examines how specific trade shocks affected different segments of society in different national contexts.

To test this hypothesis, I adopt both a theoretical and empirical approach. First, I examine the main international trade models, Ricardian, Specific Factors, Heckscher-Ohlin, and New Trade Theories, and evaluate their strengths and limitations in explaining real-world outcomes. These frameworks help us understand the mechanisms through which trade influences income distribution and identify the paths through which economies respond and adapt.

Second, I apply these theoretical insights to two major case study chapters. One analyzes the effects of the North American Free Trade Agreement (NAFTA) on labor markets in both the United States and Mexico. The other compares the "China Shock" in the United States with the "Grain Invasion" in Argentina. These cases are chosen to highlight variation across time, space, and institutional context. They allow us to contrast the experiences of high and middle income countries, as well as to observe how different trade regimes interact with domestic policy environments.

This research is based on a variety of real-world studies, drawing from fields like labor, regional, and development economics. It pays attention to how researchers identify the actual effects of trade, using methods such as comparisons over time, separating regions by trade exposure, and tools that help isolate cause and effect.

This thesis argues that the relationship between trade and income distribution is highly context-dependent. While trade liberalization can lead to aggregate efficiency gains, its distributional effects vary widely depending on the structure of the economy, labor market flexibility, and institutional capacity. The case studies examined reveal that in developed countries, trade openness tends to deepen existing inequalities unless accompanied by robust redistributive policies. In contrast, the experience of developing countries is shaped by path dependencies and structural constraints, which can limit the potential for equitable gains.

1.2 Structure

The thesis is structured as follows:

- **Chapter 2** presents the classical theoretical models of international trade, including the Ricardian model, the Specific Factors model, and the Heckscher-Ohlin

framework. It focuses on how each model explains the distributional effects of trade, highlights the assumptions of each model, evaluating their strengths in simplifying complex dynamics and their limitations in capturing real-world outcomes.

- **Chapter 3** focuses on the evolution of New Trade Theories and critically evaluates their strengths and weaknesses in explaining real-world trade dynamics and distributional outcomes. It explores how these models extend beyond classical frameworks by incorporating firm heterogeneity, imperfect competition, and economies of scale, offering a more nuanced understanding of global trade patterns.

- **Chapter 4** investigates the China Shock and the Grain Invasion as historical case studies of large-scale trade shocks, emphasizing their long-term consequences on labor markets and income distribution. It analyzes how sudden increases in trade exposure reshaped employment patterns, regional economies, and social outcomes in both developed (United States) and developing (Argentina) contexts. Particular attention is paid to the empirical strategies used to identify causal effects, the role of institutions in mediating outcomes, and the extent to which these cases align with or challenge predictions from trade theory.

- **Chapter 5** analyzes NAFTA's differential effects on the U.S. and Mexican labor markets, focusing on how trade liberalization produced asymmetric outcomes across countries, sectors, and skill levels. It explores how institutional differences—including labor protections, industrial structure, and regional disparities—shaped each country's capacity to adjust to increased trade integration. Drawing on empirical evidence, the chapter examines both the dislocations and opportunities generated by NAFTA, highlighting the uneven distribution of trade gains and the broader implications for economic development in advanced and emerging economies.

- **Chapter 6** offers concluding reflections, discussing policy implications and limitations of existing trade models in addressing inequality.

By combining theory, data, and historical evidence, this thesis aims to contribute to a more nuanced understanding of how globalization redistributes economic opportunities, and how trade policy might be designed to mitigate its inequitable effects.

CHAPTER 2

Classical Trade Models & Empirical Evidence

Classical trade theories provide the foundational framework for understanding international trade and its effects on income distribution, production, and specialization. Among the most influential models are the Ricardian Model, the Specific Factors Model, and the Heckscher-Ohlin Model. These theories attempt to explain why nations engage in trade and how it impacts economic efficiency and income distribution. While each model has its own assumptions and implications, their validity is often tested through empirical evidence. This section explores these models in detail and assesses their effectiveness in explaining real-world trade patterns.

2.1 The Ricardian model

The Ricardian Model, developed by David Ricardo in 1817, posits that trade arises due to differences in labor productivity between countries. It is built upon the concept of absolute and comparative advantage and labour is the only factor of production. A country is said to have absolute advantage in a good if it can produce this good using overall fewer resources; while a country is said to have comparative advantage if it has the lowest opportunity cost in producing that good.

For example: let's consider two countries, country A and country B, and these can produce the same two goods each, wine and cloth.

Country A produces 1 unit of cloth and 2 units of wine in one hour, while country B produces 3 units of cloth and 4 units of wine in the same time frame.
Then country B has absolute advantage in the production of both goods, as it can produce a bigger quantity of both in the same amount of time; but when we talk about comparative advantage, Country B has a lower opportunity cost in the production of wine ($\frac{2}{1} > \frac{4}{3}$) and Country A has lower opportunity cost in the production of cloth ($\frac{1}{2} < \frac{3}{4}$). So we can say country A has comparative advantage in the production of cloth while country B has comparative advantage in the production of wine.

The model assumes a world where labor is the only factor of production, it can move freely across industries but not across countries and returns to scale are constant. In this model countries fully specialize in the production of goods in which they have a comparative advantage. This means that each nation will focus on producing and exporting goods that it can produce at a lower opportunity cost relative to other countries. The fundamental takeaway from the Ricardian Model is that even if one country is less efficient than another in producing all goods, trade can still be mutually beneficial (Ricardo, 1817).

Despite its simplicity, the Ricardian Model has received substantial empirical support across various contexts. One of the earliest empirical validations came from MacDougall (1951), who analyzed trade between the United Kingdom and the United States. By comparing labor productivity and wage data across industries, he showed that each country tended to export goods in which it had higher productivity relative to wages, consistently with the Ricardian notion of comparative advantage. Though the fit was not perfect across all industries, the results provided early quantitative backing for the theory.

Further evidence was offered by Yoon (2011), who revisited and corrected the influential study by Balassa (1963). Balassa had attempted to demonstrate that productivity differences, rather than wage differences alone, determined export patterns between the U.S. and the U.K. Yoon corrected computational errors in the original analysis and reaffirmed Balassa's core conclusion: comparative advantage based on relative labor productivity remains a crucial predictor of trade patterns, lending further support to the Ricardian framework.

A more direct empirical validation came from Bernhofen and Brown (2004), who used Japan's mid-19th-century transition from autarky to free trade as a natural experiment. By

comparing pre-trade relative prices with post-trade export behavior, they demonstrated that Japan consistently exported goods for which its autarky prices were relatively lower, providing a clean, exogenous test of the law of comparative advantage. This study was particularly notable for avoiding many of the typical endogeneity and measurement challenges in empirical trade research.

On the theoretical front, the Ricardian model was significantly extended by Dornbusch, Fischer, and Samuelson (1977). Their version introduced a continuum of goods and multiple countries, allowing for partial specialization, a more realistic portrayal of global trade. Rather than assuming countries specialize entirely in the production of a single good, this model showed that trade can occur along a spectrum of comparative advantage, with countries exporting goods where their relative productivity is strongest. It also offered insights into why even less productive countries can still engage in mutually beneficial trade.

However, the Ricardian framework also has well-documented limitations. A major shortcoming is its inability to account for intra-industry trade, where countries simultaneously export and import similar types of goods, such as cars or electronics (Krugman et al., 2017). This phenomenon is especially prevalent among advanced economies and is better explained by newer models that incorporate increasing returns to scale and consumer preferences for variety, as seen in New Trade Theory. These considerations suggest that while comparative advantage remains a fundamental explanation for trade flows, it must be complemented by other theoretical tools to fully capture the complexity of modern international trade.

2.2 The Specific Factors Model

An important extension of the Ricardian framework, the Specific Factors Model introduces multiple inputs into production—typically labor, capital, and land—and emphasizes the distinction between mobile and immobile factors of production. In this setting, labor is generally treated as mobile across sectors, as workers may eventually acquire new skills or relocate, while capital and land are considered sector-specific and thus immobile in the short run. For example, capital invested in steel manufacturing equipment cannot easily be converted for use in agriculture, and agricultural land has limited use outside its designated sector (Jones, 1971). These rigidities introduce the possibility that trade, even if beneficial in

aggregate, can have divergent effects across income groups, generating winners and losers within the same country.

Specifically, trade liberalization tends to benefit owners of factors specific to export oriented industries, which expand with access to foreign markets. Conversely, those tied to import industries may experience losses due to increased international competition.

This introduces a powerful explanation for the distributional tensions observed during episodes of trade reform, particularly in developing economies where labor and capital mobility are limited.

One of the clearest real-world examples of the Specific Factors Model in action comes from India's trade liberalization in 1991, studied by Topalova (2007). During this time, India cut import tariffs sharply, especially on manufactured goods. Topalova compared different districts based on how exposed they were to this policy change. She found that districts more affected by trade liberalization saw slower reductions in poverty and little improvement in wages, especially for low-skilled workers. These negative effects lasted for years, informal labor and small-scale producers in import-competing sectors lacked the capital or access to training necessary to transition into expanding industries. Many small businesses and informal workers, particularly in industries that now had to compete with cheaper imports, lacked the resources or skills to switch to other sectors. This is exactly the kind of outcome predicted by the Specific Factors Model.

Further empirical support for the model's predictions comes from Chile's experience with trade liberalization in the 1980s, documented by Pavcnik (2002). Chile's unilateral reduction of import tariffs created intense competitive pressure on domestic producers, particularly in traditional import-competing sectors like textiles and footwear. Pavcnik found that this led to a significant reallocation of resources: less productive firms in protected sectors either downsized or exited the market, while more efficient, often export-oriented firms expanded. This process raised aggregate productivity, but also resulted in widespread job losses and labor displacement in the short run. Workers tied to specific firms or regions lacked the means to transition easily, and employment opportunities in expanding sectors were often geographically or skill-wise inaccessible.

Together, these case studies highlight the Specific Factors Model's relevance in explaining the unequal effects of trade liberalization across time, space, and economic structures. The

model assumes full employment and fixed factor specificity, which captures the short- to medium-run dislocations that have real and lasting impacts on workers and firms. They also point to the necessity of complementary policies, such as retraining programs, mobility subsidies, and active labor market strategies, to ensure that the aggregate gains from trade can be more evenly shared across society.

Despite its valuable insights, the Specific Factors Model has several notable limitations that constrain its applicability, particularly over the long term. First, its focus is explicitly short-run, relying on the assumption that some factors, typically capital and land, are immobile between sectors. While this simplifies the analysis, it does not accurately capture medium to long-run adjustments, during which factors can reallocate, though with costs and delays. Furthermore, the model treats labor as fully mobile across sectors, an assumption that often fails in reality due to regional, institutional, or skills-related rigidities. The model also excludes technological change and dynamic investment behavior, offering a static and limiting view of trade. As such, while the Specific Factors Model remains a useful tool for understanding the immediate distributional effects of trade liberalization, it must be complemented by more dynamic frameworks to fully capture the nuanced impacts of globalization.

2.3 The Heckscher-Ohlin Model

Building on the foundations of earlier trade models, the Heckscher-Ohlin (H-O) Model, developed by Eli Heckscher and Bertil Ohlin in the early 20th century, introduces factor endowments as the primary determinant of trade patterns. According to this model, countries are endowed with different proportions of labor and capital, which influences the types of goods they produce and export. The model asserts that countries will export goods that are intensive in their abundant factors and import goods that are intensive in their scarce factors (Ohlin, 1933).

For example: let’s consider two countries, country A and country B and let's assume that the first one is labour-abundant and the latter one is capital-abundant. Because country A is capital-scarce, it will focus its production and thus its imports on a good that is labour-intensive, like crops. Following the same train of thought, because country B is labour-scarce, it will focus its production and export on capital intensive goods, like cars.

The Stolper-Samuelson Theorem, a key implication of the model, predicts that trade benefits the abundant factor while harming the scarce factor. This is supported by Feenstra and Hanson (1996), who found that trade with developing countries contributed to wage inequality in developed economies by increasing demand for skilled labor.

One of the Heckscher-Ohlin (H-O) Model's most striking theoretical predictions is the Factor Price Equalization Theorem, which posits that, under free trade, the prices of production factors—such as wages for labor and returns on capital—should converge across countries. However, empirical findings have cast significant doubt on the model's predictive power. The most well-known contradiction is the Leontief Paradox (1953), in which Wassily Leontief analyzed U.S. trade patterns and found that American exports were relatively more labor-intensive than its imports. This result was surprising, as the U.S. was widely considered to be capital-abundant, and according to the H-O model, should have been exporting capital-intensive goods. This paradox sparked a wave of reevaluation of factor-based trade theories and remains one of the earliest and most enduring empirical challenges to the model.

Further studies yielded mixed support for the model. Katz and Murphy (1992) examined the rising wage inequality in the U.S. during the 1980s and linked it in part to increased trade with developing countries, which tend to be labor-abundant. According to their findings, trade exposure increased the relative demand for skilled labor in the U.S., raising its wages compared to unskilled labor. This outcome is partially consistent with the H-O model's framework, which predicts that countries will specialize in and export goods that use their abundant factors intensively. However, the model does not explicitly predict growing within-country inequality, which became a central concern in many advanced economies during the era of globalization.

Similarly, Goldberg and Pavcnik (2007) examined Latin American economies, especially Chile and Colombia, following trade liberalization and found that it led to widening wage gaps, particularly in sectors exposed to international competition. Capital-intensive and export-oriented industries benefited, while unskilled and informal workers in import-competing sectors experienced income losses and reduced job stability. These findings support the idea that trade affects factor returns differently depending on the sector, but challenge the assumption that gains from trade are evenly distributed within countries.

A broader critique comes from Bowen, Leamer, and Sveikauskas (1987), who tested the H-O model across 27 countries using global data on factor endowments and trade flows. They found only weak correlations between countries' endowment profiles and their actual trade patterns, suggesting that factor proportions alone cannot account for global trade structures. This result pointed to the importance of explanation of trade not based on factor endowments, such as economies of scale, technology, and consumer preferences.

Additionally, the model struggles to explain intra-industry trade, where countries with similar factor endowments simultaneously import and export similar types of goods. This phenomenon became a major focus of New Trade Theory, particularly in the work of Krugman (1979), who introduced models incorporating imperfect competition and increasing returns to scale, offering more realistic explanations for modern trade patterns between similar economies.

2.4 Comparison and Limitations

Each of the classical trade models offers unique insights but also comes with notable limitations. The Ricardian Model effectively explains comparative advantage but ignores factor mobility and income distribution. The Specific Factors Model addresses income distribution but assumes rigid factor immobility. Meanwhile, the Heckscher-Ohlin Model provides a more flexible explanation based on factor endowments but has faced significant empirical challenges.

While classical trade models provide essential insights into why countries trade, empirical evidence suggests they are too simplistic to fully explain modern real-world trade patterns. The Ricardian Model remains valuable for understanding comparative advantage, but its assumptions about labor as the sole factor of production limit its applicability. The Specific Factors Model introduces important distributional considerations but may overstate the rigidity of capital and labor. The Heckscher-Ohlin Model offers a broader framework based on factor endowments, yet it struggles to match empirical data and ignores technological differences.

Most of these challenges arise because of the historic period in which they were formulated. They were ideated mostly during the first wave of globalization covering the period between the end of the 19th century and the start of the 20th century.
So they are better able to describe trade patterns belonging to that historical period, when countries mainly traded inter-industry goods, meaning goods radically different from one another, that better reflected the technologies and the natural endowments of each country.
Not to mention that so far with classical trade theories we have always assumed free trade, which means that we are not considering any cost countries may incur when training goods.
Here is a brief overview of the main costs and negative externalities usually associated with international trade.
An obvious one is of course transportation cost, moving goods across borders involves shipping, insurance and handling costs; the bulkiest and the most fragile goods have a higher transportation cost than more standard goods.
There are also tariffs and import duties adding up to the expenses; they are meant to protect domestic industries and products, but they make goods more expensive for customers and businesses.
Some countries might have some other non-tariff barriers; quotas, licensing requirements and standards that add cost to and restrict trade.
International trade also intrinsically carries some exchange rate risk; fluctuations in currency values can affect the cost of trade and a business can lose money if the exchange rate moves against them.
Also, trade inevitably leads to an increase in carbon emission from shipping and production.
Having discussed all the gaps in classical trade theories, they are why new modern trade theories arose.

Additionally, by not incorporating forward-looking expectations, intertemporal decisions, or external economies of scale, it overlooks key drivers of modern trade patterns. These simplifications, while analytically useful, reduce the model's policy relevance in complex, evolving economies.

In conclusion, classical trade models such as the Ricardian, Specific Factors, and Heckscher-Ohlin frameworks offer foundational insights into the mechanisms of comparative advantage and factor allocation. These models predict that trade liberalization should benefit

a country's abundant factor while harming the scarce one, often leading to distributional tensions within nations. While elegant in logic, their assumptions, such as perfect mobility of factors or full employment, limit their real-world applicability. Nonetheless, they remain crucial tools for understanding the first-order effects of trade and continue to inform debates about globalization and income inequality. The subsequent chapters build on this foundation by introducing more complex models and assessing empirical case studies.

CHAPTER 3

New Trade Models & Empirical Evidence

Traditional trade theories offered foundational insights into comparative advantage and the role of factor endowments in shaping international trade. However, these models fail to account for many real-world trade phenomena, such as intra-industry trade, the rise of trade between similar economies, and the influence of firm-level dynamics. As trade between industrialized nations increased in the post-war period, and as multinational firms became more central in global trade flows, economists began to seek alternative frameworks. This gave rise to what is now known as New Trade Theory (NTT), which integrates concepts like economies of scale, product differentiation, and imperfect competition.

3.1 Krugman Model

The earliest and most influential contributions to NTT came from Paul Krugman (1979), who introduced models that incorporated increasing returns to scale and monopolistic competition. These models explained why countries with similar factor endowments and technologies would engage in mutually beneficial trade by specializing in different varieties of similar goods. Unlike classical models that emphasize supply-side differences, Krugman's framework also considered consumer preferences for variety, laying the foundation for a more demand-side oriented theory.

In Krugman's model, each firm is identical in terms of endowments and technology but produces a unique, differentiated variety of a product. Trade occurs not because of comparative advantage but due to product differentiation and the desire for variety. These products are not perfect substitutes, but consumers derive utility from consuming multiple varieties, a concept formalized through Constant Elasticity of Substitution (CES) preferences. As each firm produces a unique variety of a good, it operates under monopolistic competition. This structure contrasts with the perfect competition assumed in earlier models.

Under monopolistic competition, firms have market power: they set prices above marginal cost due to product differentiation.

Under this framework, firms face increasing returns to scale: they must incur a fixed cost and a constant marginal cost. At the same time, internal economies of scale incentivize firms to expand output and sell internationally, as average costs decline with increased production. Trade enables firms to sell to a larger market, spreading the fixed cost over more units and reducing average cost. This explains the observed pattern of intra-industry trade: countries both import and export similar types of goods, such as different brands of cars or electronics.

Firms also face a downward-sloping demand curve and set prices as a markup over marginal cost, which depends on the elasticity of demand.

Further theoretical development came with Helpman and Krugman (1985), who expanded on the role of product differentiation and the implications of imperfect competition. These models demonstrated that trade could emerge even in the absence of comparative advantage due to internal economies of scale, where larger firms produce at lower average costs.

NTT evolved to incorporate a broader range of theoretical contributions. One significant extension was the concept of external economies of scale, introduced by Krugman (1991), which highlighted how industry concentration and geographic clustering (e.g., Silicon Valley) can reinforce comparative advantage through learning and network effects. These models explain how certain regions become dominant in particular industries, regardless of initial factor endowments.

3.2 Other Contributions To NTT

Another important perspective comes from Vernon's Product Cycle Theory (1966), which argues that new products are initially produced and exported by advanced countries but eventually shift to developing countries as technologies mature and cost advantages change.

Similarly, Linder's Hypothesis emphasized that countries with similar income levels and consumer preferences are more likely to trade with each other, offering an early demand-side explanation for intra-industry trade.

Theories of cumulative causation and path dependence, associated with economists like Myrdal and Kaldor, add dynamism to NTT. They suggest that initial advantages in productivity or infrastructure can evolve into lasting trade advantages through self-reinforcing mechanisms.

3.3 Meliz Model

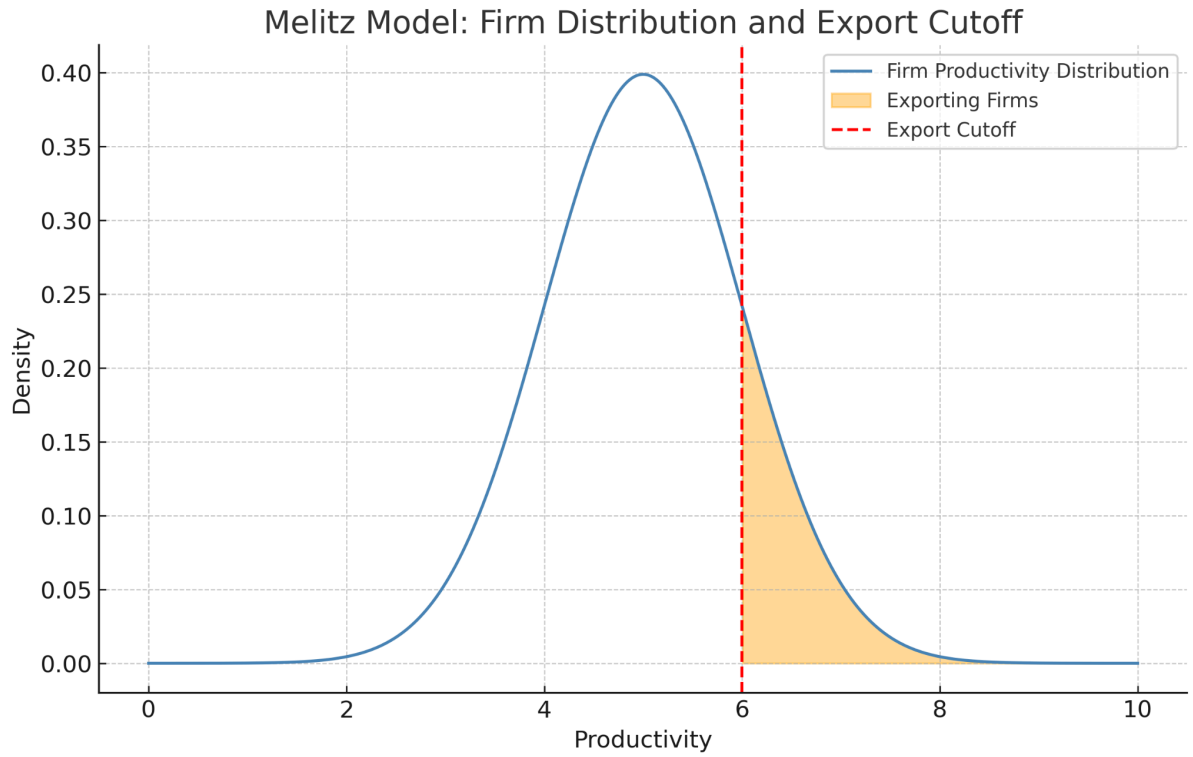
A further refinement came with the Melitz Model (2003), which introduced firm-level heterogeneity into the framework. Unlike earlier NTT models that treated firms as symmetric so aggregate behavior can be analyzed by focusing on a "representative firm", Melitz showed that trade liberalization leads only the most productive firms to enter export markets. Less efficient firms either remain domestically oriented or exit the market. This model helped explain why, in practice, only a subset of firms in any industry engages in international trade. Moreover, it provided a stronger foundation for understanding resource reallocation, productivity gains, and firm-level responses to globalization.

Each firm draws its productivity level from a distribution. Profits, revenues, and survival depend on where the firm falls on this distribution. Trade liberalization increases competition, raising the cutoff productivity level required to survive. This results in reallocation effects: less productive firms shrink or exit, while more productive firms expand and enter export markets. These dynamics generate aggregate gains from trade through higher average productivity, even if some firms lose.

Under this framework firms face a fixed cost to operate and an additional fixed cost to export. Trade leads to selection effects, as only the most efficient firms export, welfare gains from both lower prices and greater variety and productivity gains due to market reallocation

Graph A below illustrates a hypothetical productivity distribution of firms. Only firms to the right of the cutoff productivity engage in exporting. These firms are larger, more efficient, and contribute disproportionately to aggregate trade volume.

This model not only reconciles firm-level trade patterns observed in the data, such as the skewed export participation, but also better captures the inequality effects and adjustment costs associated with globalization, providing a bridge between NTT and real-world firm behavior.



Graph A – Firm Productivity Distribution and Export Cutoff

Author's elaboration based on Melitz (2003).

3.4 Strengths and weaknesses of New Trade Theory

One of the greatest strengths of New Trade Theory (NTT) is its ability to explain patterns of international trade that cannot be accounted for by classical or neoclassical models, particularly intra-industry trade and trade between countries with similar factor endowments. In the traditional Ricardian and Heckscher-Ohlin frameworks, trade arises due to

technological differences or variations in factor abundance, and thus typically predicts inter-industry trade. NTT, by contrast, incorporates product differentiation and increasing returns to scale, allowing it to capture the empirical reality that similar countries often engage in substantial trade of similar but differentiated goods, such as German and Japanese automobile exports.

A key theoretical innovation of NTT is the assumption of monopolistic competition. This market structure allows firms to have market power over their particular variety of a good, setting prices above marginal cost while competing with close substitutes. It enables the modeling of consumer preferences for variety, typically formalized through Constant Elasticity of Substitution (CES) utility functions. Consumers benefit from access to more varieties of goods, and trade increases this access, leading to gains from trade even in the absence of comparative advantage.

Another central strength lies in the treatment of economies of scale. NTT shows that firms can reduce average costs by expanding production, which provides a strong incentive to trade in foreign markets. This aligns well with empirical evidence that trade liberalization often results in firm growth and cost-efficiency improvements.

NTT also supports arguments for strategic industrial policy. By suggesting that countries can achieve long-term competitive advantages in industries with increasing returns and learning-by-doing, the theory provides an economic rationale for state intervention, particularly in early-stage or high-tech sectors such as aerospace, renewable energy, and semiconductors.

The development of the Melitz model (2003) further enhanced the theory's empirical relevance. By incorporating firm-level heterogeneity, it explained why only the most productive firms engage in exporting and how trade leads to a reallocation of resources toward more efficient producers. This model accounts for real-world observations such as the high productivity and wage premiums of exporting firms, offering a nuanced understanding of how trade affects firm behavior, wage and aggregate productivity.

Together, these features make NTT a powerful framework for analyzing modern trade patterns, providing both theoretical elegance and empirical credibility.

Despite its strengths, New Trade Theory (NTT) has attracted criticism for several limitations, both theoretical and empirical. One major critique of early NTT models, such as Krugman's 1979 formulation, is their reliance on extremely simple assumptions, including firm symmetry and identical countries. These simplifications, while analytically convenient, reduce the models' ability to make specific or testable predictions about trade flows, price levels, and welfare impacts.

Another theoretical limitation lies in the treatment of firms as symmetric entities. In these models, all firms have identical cost structures and behavior, which contrasts sharply with empirical evidence showing that firms differ widely in productivity, size, and market strategy. Although the Melitz model introduced heterogeneity, it still abstracts from several real-world frictions, such as financing and regulatory constraints and managerial capabilities.

NTT's embrace of strategic trade policy has also been controversial. While the theory can justify government intervention to support industries with increasing returns to scale, critics argue that such policies are prone to interest group influence, inefficiency, and trade tensions with partner countries. Empirically, identifying industries that truly benefit from scale effects ex ante is extremely difficult, and past attempts at industrial policy have had mixed results.

Additionally, NTT is limited in addressing the distributional effects of trade, a central issue in current political debates about globalization. While it explains aggregate welfare gains through lower prices and increased variety, it does not address who wins and who loses. For instance, trade liberalization can harm workers in import-competing industries, lead to regional job losses, and contribute to wage inequality, phenomena explained in classical models that early NTT models overlook. Although the Melitz framework captures reallocation effects and firm exit, it assumes frictionless labor markets and abstracts from social adjustment costs.

Another empirical concern is that NTT often lacks quantitative precision. Many models generate qualitative predictions, like, "trade increases variety" or "only the most productive firms export", but do not always yield tight numerical estimates for welfare or income effects. This has led to challenges in using NTT as a tool for applied policy analysis.

In conclusion, while NTT significantly expanded the explanatory power of trade models and represents a major advancement in trade theory, it should be seen as part of a broader toolkit. Its greatest contributions lie in explaining trade between similar countries, the role of product differentiation, and the mechanics of firm behavior under scale economies. However, its limitations, especially in terms of distribution, policy application, and micro-level frictions, suggest the need for continued refinement and complementary models.

New Trade Theories refine and extend the classical frameworks by incorporating more realistic features of modern economies, such as firm heterogeneity, increasing returns to scale, and imperfect competition. Models like Krugman (1979) and Melitz (2003) help explain intra-industry trade, market concentration, and productivity gains through selection effects. However, while these theories offer better tools to explain trade patterns in developed economies, they often assume frictionless adjustment and underplay distributional consequences. Their empirical validation has been strong in explaining firm-level outcomes, such as wage premiums and export productivity, but less so in capturing the long-term social costs of labor displacement. Ultimately, this chapter highlights both the strengths and the limits of contemporary trade models, pointing to the need for frameworks that better reflect the frictions, institutions, and inequalities observed in real-world trade outcomes.

CHAPTER 4

The China Shock and the Grain Invasion

4.1 Case Study: China Shock in the United States

The “China Shock” refers to the surge in Chinese exports that followed the country’s deep integration into the global economy, particularly after its accession to the World Trade Organization (WTO) in 2001. This integration was the culmination of decades of economic reform. Starting in 1978, under Deng Xiaoping, China shifted from a centrally planned economy to a more market-oriented system. Key reforms included opening Special Economic Zones, liberalizing prices, encouraging foreign direct investment, and restructuring state-owned enterprises. As a result, China rapidly became a major global manufacturing hub, offering low-cost labor and increasing productivity. Before analyzing the disruptive effects, it is important to note that China’s integration into the global economy also generated

substantial efficiency gains and consumer benefits. WTO accession in 2001 accelerated China's participation in global value chains, contributing to lower prices for manufactured goods and expanding the variety of products available to U.S. consumers (Autor, Dorn & Hanson, 2013). At a global level, China's export growth boosted aggregate productivity, encouraged innovation, and fostered deeper international integration (Pierce & Schott, 2016). However, this sharp rise in import competition disrupted several U.S. manufacturing sectors, fueling what became known as the China Shock.

4.1.1 The Scope of the Shock

Between the early 1990s and 2007, Chinese exports to the United States increased more than tenfold, rising from approximately $30 billion to over $330 billion. This growth was driven by a combination of low production costs, state support, and improved integration into global value chains. The influx of competitively priced Chinese goods exerted significant pressure on domestic producers in the U.S., particularly in industries such as textiles, apparel, electronics, and furniture.

The regions most exposed to this shift, those with high pre-existing concentrations of import-competing industries, experienced huge economic impacts. Studies measuring the change in import penetration at the local level found that these regions suffered sharp declines in manufacturing employment and wage growth, with limited signs of recovery over the subsequent decade (Autor et al., 2013).

4.1.2 Labor Market Dislocation

The employment consequences of rising import competition proved to be both severe and persistent. Areas with greater exposure to Chinese imports saw significant losses not only in manufacturing jobs directly affected by the shock but also in non-tradable sectors dependent on the health of the local economy, such as construction, education, and retail. Displaced

workers, especially those without college degrees, were often unable to find comparable jobs and experienced long-term declines in earnings.

Contrary to predictions from standard trade models, many workers did not relocate or transition into new industries as a result of barriers to labor mobility like: home ownership, social ties, skill mismatches, and declining expectations. We saw a limited adjustment of the economic agents. As a result, the shock's effects were not absorbed uniformly but became concentrated in economically vulnerable communities (Autor et al., 2016).

4.1.3 Uneven Regional Impacts and Limited Recovery

One of the most distinctive features of the China Shock was the emergence of stark regional disparities in its aftermath. Manufacturing-intensive regions, particularly in the Midwest and the South, faced long-term structural challenges. These "left-behind" areas not only suffered economic losses but also social deterioration. As local labor markets weakened, rates of poverty, substance abuse, family breakdown, and political dissatisfaction rose.

The economic geography of the United States thus became increasingly polarized, with high-skill urban centers continuing to grow while many rural and industrial regions stagnated. These trends contributed to broader concerns about spatial inequality and the resilience of economically peripheral communities (Acemoglu et al., 2016).

Long term evidence shows that the adverse effects of the China Shock were not transitory. A decade or more after the peak of the import surge, the regions most exposed continued to show depressed employment-to-population ratios, lower earnings, and weaker economic indicators. Young adults in these areas were less likely to pursue higher education, and labor force participation remained low.

Rather than returning to pre-shock conditions or successfully reorienting toward new industries, many communities entered a cycle of economic and social decline. The long-term persistence of these effects reflects structural rigidities in the U.S. labor market, including declining job creation in formerly dynamic sectors and inadequate institutional support for retraining or relocation (Autor et al., 2021).

4.1.4 Methodologies, Data and Causal Inference

Empirical analyses of the China Shock rely on highly disaggregated regional and sectoral data to identify causal effects. The foundational study by Autor, Dorn, and Hanson (2016) constructs a local labor market-level measure of import exposure by combining international trade data from UN Comtrade with domestic employment data from the U.S. Census and American Community Survey. A key innovation has been the use of local labor markets, specifically, "commuting zones", as the unit of analysis to capture the geographic concentration of trade exposure.

To identify causal effects, researchers utilize an instrumental variable (IV) strategy that uses variations in China's exports to other high-income countries as an instrument for changes in U.S. import exposure. This method isolates the component of import growth driven by China's competitiveness rather than domestic U.S. demand shifts. Difference-in-differences (DiD) and event study designs are also used to compare high- and low-exposure regions over time. The high geographic granularity of the data enables the study of wage, employment, and labor force participation effects across different worker skill groups, industries, and time periods, offering strong internal validity.

Despite differences in methodology, studies consistently find large and persistent negative effects of import competition on manufacturing employment, local wages, and social outcomes. There is some disagreement about the indirect effects of the shock, specifically, whether the broader economy can offset job losses in affected industries by creating new jobs elsewhere, either in different sectors or regions. Most evidence suggests that such compensation has been limited, especially for low-skilled workers in the most affected areas.

4.1.5 Institutional and Policy Failure

The experience of the China Shock revealed critical shortcomings in the ability of U.S. economic policy to manage large-scale trade-induced shocks. While aggregate gains from trade are well-documented, the distribution of those gains was highly unequal. In theory, policy should have redistributed the benefits to compensate those who lost. In practice, trade adjustment assistance programs reached only a small share of affected workers and often provided limited support.

Labor market policies aimed at retraining, mobility, and unemployment insurance were poorly suited to the large scale and geographic concentration of the shock. Moreover, unlike

in some European countries, the U.S. lacked strong institutional mechanisms to facilitate adaptation, such as wage insurance or universal access to vocational education. As a result, many displaced workers were left with few viable pathways to recovery (Autor et al., 2016).

The political consequences were equally notable. Regions affected by the China Shock showed growing electoral support for protectionist and populist candidates, reflecting a broader disillusionment with globalization and a perception of institutional failure. Economic dislocation thus translated into political realignment, adding urgency to the debate on equitable trade policy design.

4.1.6 Implications for Trade Theory

The China Shock presents a significant challenge to conventional trade theory. The Heckscher-Ohlin model, which predicts factor-price equalization based on comparative advantage, fails to account for the magnitude and persistence of labor market disruptions. Even the Specific Factors model, which incorporates sector-specific labor immobility, does not fully capture the extent of regional dislocation and long-term income loss observed in the U.S. case.

Recent theoretical advances, such as models incorporating firm heterogeneity and market selection (e.g., Melitz-type models), offer better explanations for aggregate productivity gains. However, they typically assume smooth labor reallocation and underestimate the adjustment costs suffered by displaced workers. The China Shock underlines the need for trade models that incorporate realistic assumptions about adjustment frictions, institutional responses, and the spatial structure of the economy.

Furthermore, evidence shows that trade shocks can affect the entire economy, not just individual sectors, especially when many regions and industries are hit at once. The negative effects spread through supply chains (both to suppliers and customers), reduce local demand, and cause long-lasting damage to affected workers and communities. These broader consequences are often **much larger** than what simpler economic models' predictions, as they focus on isolated sectors (Acemoglu et al., 2016).

4.2 Case Study: The Grain Invasion and Its Impacts on Argentina's Development

4.2.1 Historical Context and Trade Integration

In the late nineteenth and early twentieth centuries, Argentina underwent a profound economic transformation, catalyzed in large part by its increasing integration into global markets. The so-called "Grain Invasion" refers to the influx of cheap cereals, especially wheat, into international trade, reshaping global agricultural patterns. Argentina was not a passive recipient of these trends; rather, it became a central actor, leveraging its comparative advantage in land-abundant agriculture to become a key exporter in this new global market configuration. This export-led growth fueled urbanization, infrastructure investment, and regional development, particularly in areas connected to ports and international trade routes.

The transformation began with a convergence of technological advancements and institutional reforms. Improvements in steamship technology dramatically lowered transatlantic shipping costs, while the expansion of Argentina’s domestic railroad network reduced internal transport barriers. These shifts connected the Argentine interior to the Atlantic ports and global markets, enabling rural regions to specialize in export-oriented cereal production. From the 1870s to 1914, Argentina's real exports increased more than fivefold, with cereals and refrigerated meats accounting for a growing share.

This period also marked the decline of Spain's colonial trade system and the rise of autonomous trade policies. Following independence in 1816 and political consolidation in the 1860s-80s, Argentina adopted liberal trade and migration policies. These policies attracted capital, labor, and investment, positioning the country to benefit from the global demand for agricultural goods.

4.2.2 Structural Transformation, GDP Growth and Migration

Trade openness induced significant structural changes in Argentina's economy. Export-oriented growth led to a shift in the labor force away from subsistence agriculture and toward more commercially viable sectors. Trade integration led to uneven regional development: regions closer to ports experienced higher urbanization rates, land prices, and economic density. These regions specialized in trade-sensitive crops such as wheat and

maize, while also witnessing a rise in non-tradable service sectors to support expanding urban populations.

The effect was not uniform. Locations further from transport hubs exhibited less transformation and benefited less from trade integration. Yet the overall pattern was clear: trade shocks reshaped both the sectoral and geographic composition of the Argentine economy.

Argentina experienced rapid GDP and welfare growth, supported by rising land values and expanding exports. According to structural estimates, reductions in transatlantic transport rates raised GDP by nearly 18% and welfare by over 7%. These changes were reinforced by the expansion of the railroad network, which increased land values and made it easier for people to move in search of work.

International immigration played a crucial role. Between 1869 and 1914, Argentina's population increased from under 2 million to nearly 8 million, fueled by European migration. Immigrants provided labor for expanding agricultural estates and urban centers, while also driving up demand for housing, services, and infrastructure. This demographic boost amplified the effects of trade by fostering domestic markets and encouraging investment.

4.2.3 Distributional Consequences and Regional Divergence

Despite aggregate gains, the Grain Invasion also had distributional consequences. The benefits of trade accrued disproportionately to landowners and urban elites. Laborers, especially in more remote regions, often faced stagnant real wages due to competition and uneven access to the export economy. Regional disparities emerged, with Buenos Aires and the surrounding export-oriented provinces experiencing rapid development, while more remote interior regions were left behind. In Argentina, structural transformation raised average incomes but also increased spatial inequality.

4.2.4 Methodologies, Data and Causal Inference

Empirical studies on the Grain Invasion rely on a variety of historical datasets, including census records, trade statistics, land values, and transportation costs.

Heblich, Redding, and Zylberberg (2024) apply modern spatial econometric techniques to a quasi-experimental setup using the construction of Argentina’s railroad network as a source

of exogenous variation. Rail access is treated as an instrumental variable for trade integration, under the logic that proximity to transport routes improves export capacity independently of local productivity. Their identification strategy leverages a shift-share design to examine how exogenous shifts in global demand for cereals interacted with local production structures. Furthermore, the analysis incorporates long-run general equilibrium effects, showing how trade exposure shaped urbanization patterns, land prices, and economic divergence across regions. This methodology allows them to infer not only short-run trade effects, but also path-dependent structural transformations over decades.

Changes in transatlantic transportation costs are treated as exogenous shocks, and internal variation in transport access is exploited to estimate differential impacts. Instrumental variable strategies and general equilibrium modeling are used to isolate trade effects from biasing factors.

While findings consistently show strong positive effects on growth and welfare, there is variation in how inequality is interpreted. Some studies emphasize the aggregate gains from specialization and migration, while others highlight the persistence of regional disparities and underinvestment in interior provinces.

4.2.5 Concluding Reflections

The Heckscher-Ohlin framework aligns broadly with Argentina's experience, as its relative abundance of land and scarcity of labor created a comparative advantage in agricultural exports such as wheat and maize. These patterns are reflected in rising land values, regional wage differences, and increased rural-urban migration after trade liberalization. However, classical models do not fully capture the spatial heterogeneity of gains: trade benefits were largely concentrated in regions connected to export infrastructure like ports and railroads, while more remote provinces saw little structural transformation.

Moreover, while the Ricardian and Specific Factors models acknowledge short-run rigidity in factor mobility, they abstract from institutional constraints that heavily shaped Argentina's adjustment path. For instance, local elites' control over land limited broad-based distribution of gains, and internal political structures shaped regional integration in ways that economic models often ignore. Despite aggregate growth, pre-existing inequality persisted or even

widened in some areas, suggesting that classical models, although directionally correct, are insufficient to explain the full complexity of trade-induced structural change.

4.3 Comparative Conclusion: Two Trade Shocks, Different Outcomes

The China Shock and the Grain Invasion of Argentina offer contrasting yet complementary insights into the long-term effects of trade integration. In both cases, external trade shocks brought about large-scale structural transformations that reshaped the national economy. However, the nature of these transformations, their distributional consequences, and the mechanisms of adjustment differed significantly.

In the United States, import competition from China led to localized employment losses, wage declines, and enduring regional stagnation. These negative effects were amplified by labor immobility, limited institutional support, and insufficient policy response. The benefits of trade were concentrated among firms, investors, and consumers, while displaced workers were left with few viable alternatives.

Argentina's grain boom, by contrast, generated rapid economic growth through export-led development. While inequality and regional disparities persisted, labor mobility and international migration played a key role in absorbing structural shifts. The presence of a land-abundant environment and the alignment between comparative advantage and factor endowments facilitated a more flexible, if still uneven, transition.

Methodologically, both case studies relied on disaggregated regional data, instrumental variables and structural modeling to isolate the effects of trade. Across contexts, the literature reveals a consistent finding: trade generates both winners and losers, and the eventual outcomes depend critically on the presence or absence of adjustment mechanisms.

Taken together, these case studies reinforce a central insight of the broader literature on globalization and inequality: trade is not neutral. Its effects are mediated by institutions, geography, and labor market dynamics. While trade liberalization can boost aggregate welfare, it can also exacerbate inequality if left unmanaged. Understanding the specifics of

each case, how trade interacts with national structures and policy responses, is key to building a more inclusive global economy.

Importantly, the findings from both cases highlight key tensions with traditional trade models. Standard frameworks such as Heckscher-Ohlin or Ricardian comparative advantage predict aggregate efficiency gains and assume relatively smooth adjustment of factors of production. However, the China Shock showed that labor market frictions and geographic immobility can produce persistent inequality and political instability, outcomes that these models do not fully anticipate. Conversely, Argentina's experience aligns more closely with classical trade theory, as the country capitalized on its factor endowments and integrated successfully into the global economy.

This contrast partly reflects the historical context in which each shock occurred. As discussed in Chapters 2 and 3, classical models were developed during earlier phases of globalization and were well-suited to explain phenomena like the Grain Invasion, where trade patterns largely followed comparative advantage and labor was mobile. In contrast, newer trade models, featuring heterogeneous firms, market imperfections and adjustment frictions, were designed to account for the complexities of late 20th-century globalization. The alignment between theoretical predictions and empirical findings in each case underscores the importance of interpreting trade shocks through the lens of their respective historical and institutional contexts.

The China Shock and the Grain Invasion provide two contrasting yet complementary illustrations of how large trade shocks shape labor markets and regional development. While both events generated significant productivity shifts and trade reallocation, their distributional consequences diverged sharply due to structural differences in the affected economies. The China Shock highlighted the persistent dislocations experienced by U.S. workers in exposed industries and regions, revealing the inadequacy of both classical and new trade models in predicting the magnitude and duration of adjustment costs. In contrast, the Argentine case aligns more closely with the predictions of classical theories: trade liberalization led to export-oriented growth, spatial divergence favoring coastal regions, and modest inequality effects in the short term. Together, these case studies underscore the importance of

accounting for institutional capacity, factor mobility, and differences across regions when assessing the real-world impact of trade shocks.

CHAPTER 5

The Effects of NAFTA on the U.S. and Mexico

The North American Free Trade Agreement (NAFTA) was a landmark trade accord signed by the United States, Mexico, and Canada that entered into force on January 1, 1994. It marked the beginning of a new era of regional economic integration in North America. Building on the U.S.-Canada Free Trade Agreement of 1989, NAFTA sought to eliminate most tariffs on

products traded between the three countries, promote cross country investment, and create a framework based on rules for resolving trade disputes.

This chapter explores the labor market consequences of NAFTA, focusing on the divergent experiences of the United States and Mexico. It examines how the agreement reshaped employment patterns, wages, and inequality; how different regions and groups were affected; and how empirical research has attempted to disentangle NAFTA's effects from broader trends.

5.1 Historical context

NAFTA emerged from a historical context defined by the global wave of trade liberalization that followed the end of the Cold War. For the U.S., the agreement represented an opportunity to deepen economic ties with its southern neighbor while expanding the reach of American firms. For Mexico, it symbolized a strategic shift away from import substitution industrialization toward a more export oriented growth model. After a decade of macroeconomic instability and a severe debt crisis in the 1980s, Mexican policymakers viewed NAFTA as a way to anchor structural reforms, attract foreign investment, and modernize the economy.

NAFTA's ambition went beyond tariff reduction. It included provisions on intellectual property, services, public sourcing, and investor protections. Unlike earlier trade agreements under GATT (General Agreement on Tariffs and Trade), NAFTA covered a broad range of economic activities, making it a precursor to the "deep integration" agreements that would follow in subsequent decades. However, NAFTA did not include provisions for labor rights, wage harmonization, or coordinated migration policy, leaving key areas of economic adjustment to be managed domestically.

While supporters argued that NAFTA would generate widespread gains through increased trade, investment, and efficiency, critics warned that it could accelerate deindustrialization in the U.S., exacerbate inequality in Mexico, and undermine labor rights across the continent. These debates, present from the beginning, would become increasingly important in the years following the implementation of the agreement.

5.2 Trade Expansion and Labor Market Frictions

NAFTA's core objective was to eliminate trade barriers among the United States, Mexico, and Canada, while fostering economic integration through the protection of intellectual property rights, the lessening of restrictions on cross-border investment, and the establishment of legal mechanisms to resolve trade conflicts. For the United States, this promised expanded access to emerging markets and lower input costs; for Mexico, it held the promise of export led development and foreign direct investment. The agreement phased out tariffs and standardized rules of origin, enabling the formation of cross-border supply chains, especially in sectors like automotive, electronics, and textiles.

Between 1994 and the early 2000s, trade between the U.S. and Mexico surged, with U.S. exports to Mexico more than quadrupling and imports from Mexico increasing over 600%. Foreign direct investment, particularly U.S. capital flows into Mexico's export zones, also rose significantly. However, these aggregate gains masked deep asymmetries in labor market outcomes. In both countries, NAFTA reshaped employment patterns through a process of reallocation: while some regions and sectors benefited from increased competitiveness and export opportunities, others experienced deindustrialization, job losses, and wage pressure.

In the United States, the labor-intensive sectors most exposed to Mexican competition, such as textiles, apparel, electronics, and furniture, suffered considerable declines in employment. Workers displaced from these industries were often made worse off, with reemployment concentrated in lower-wage and less secure jobs. At the same time, firms in export oriented industries benefited from expanded markets and access to cheaper intermediate goods. Exporting U.S. plants were more productive, more capital-intensive, and paid wage premiums of 7% to 11% compared to non-exporters (Bernard, Jensen, and Lawrence, 1995). Yet these benefits were highly uneven, concentrated in regions already integrated into global value chains and among higher-skilled workers.

In Mexico, the reallocation of labor into export-oriented manufacturing brought gains in northern states but dislocated traditional agriculture and small scale producers in the south. The expansion of export zones, particularly the maquiladora industry, shifted employment toward urban manufacturing hubs, even as informal employment remained widespread. Trade liberalization occurred alongside global technological shifts, complicating the attribution of labor market outcomes to NAFTA alone. Many firms that offshored production to Mexico also adopted labor-saving technologies domestically, further replacing mid-skill workers. As a result, empirical researchers have had to disentangle the effects of trade from automation

and broader globalization trends, often using sophisticated econometric tools and nearly experimental designs to isolate NAFTA-specific impacts.

5.3 NAFTA's Impact on the United States Labor Market

U.S. manufacturing employment declined notably in industries exposed to competition from Mexican producers. While some of this trend is attributable to automation and broader globalization, empirical work isolates NAFTA's role in accelerating offshoring and job polarization (Autor et al. 2014). Research by Hakobyan and McLaren (2016) uses congressional district level exposure to tariff changes to show that less educated workers in more vulnerable districts experienced significant wage declines and slower income growth. These impacts were strongest in the apparel, footwear, furniture, and plastic industries, which lost substantial employment in the decade following NAFTA's implementation.

Beyond direct employment effects, NAFTA contributed to the phenomenon of job polarization: growth in high-skill and low-skill jobs, with a hollowing out of middle-skill employment. This was particularly evident in manufacturing communities, where offshoring of intermediate tasks led to long-term dislocation and a decline in union density (Oldenski 2014). Unionized workers in declining industries often lacked the mobility or retraining necessary to adapt to the new economy.

Trade Adjustment Assistance (TAA) programs were deployed to support affected workers, but studies have shown that they reached only a fraction of the displaced labour and often failed to provide effective retraining or reemployment (Burtless et al. 2013). The fragmented and underfunded nature of TAA stands in contrast to the scale of labor market disruption caused by trade liberalization. Furthermore, workers eligible for TAA often faced long waiting periods and complex administrative hurdles, reducing the program's effectiveness.

The regional concentration of losses was another key feature. Communities in North Carolina, Michigan, and Indiana experienced persistent manufacturing decline, leading to downward pressure on local labor markets. These regional shocks contributed to broader economic damage and increasing skepticism about globalization, especially among working class voters. In many such regions, NAFTA became a symbol of broken promises and declining opportunity.

5.4 NAFTA's Effects on Mexico's Labor Market

Mexico experienced a more complex transition. On one hand, maquiladora employment expanded rapidly in the north of the country, particularly among young female workers. Export oriented manufacturing grew in textiles, electronics, and auto parts. Between 1994 and 2000, manufacturing exports as a share of GDP rose significantly, positioning Mexico as one of the most open emerging economies.

The spatial pattern of industrial growth was also highly unequal. While northern states such as Baja California, Nuevo León, and Chihuahua became hubs of foreign direct investment, southern states like Oaxaca, Chiapas, and Guerrero saw little benefit from NAFTA. These disparities deepened preexisting geographic inequalities and created two-tiered labor markets: one dynamic and integrated, the other stagnant and informal.

On the other hand, rural regions and the agricultural sector, especially small-scale corn producers, suffered heavy losses. U.S. corn exports to Mexico increased from 2 million tons in 1994 to over 10 million tons by 2008, undermining the income of Mexican farmers. Contrary to concerns raised by some advocacy groups, aggregate maize production did not collapse post-NAFTA. However, the relative price of maize declined significantly, reducing the purchasing power of poor producers (Fiess & Lederman 2004). The uneven impact on irrigated vs. rain-fed production suggests that subsistence farmers were hit hardest. These dynamics contributed to increased migration from rural to urban areas and deepened regional inequalities within Mexico.

The formal labor market failed to absorb the growing working-age population. Real wages stagnated, and the number of jobs created remained far below what was needed to meet demographic pressures. According to Lustig (2010), poverty rates declined only slightly in the post-NAFTA period, and wage inequality remained high. The informal sector grew dramatically, becoming a crucial mechanism for absorbing labor market slack (Sieppert & Rowe 2007). Informal employment grew to represent over 55% of the total workforce by the early 2000s, limiting access to social security, healthcare, and labor protections.

Moreover, despite growing productivity in the export sector, real wage growth was modest. This disconnection between productivity and compensation reflects weak labor institutions, limited collective bargaining, and a large informal economy. The gains from trade, while significant in aggregate, were not equitably shared. The increased integration of Mexican firms into global value chains did not translate into significant wage increases for most

workers. Wage growth in maquiladoras stagnated after the early 2000s, as global competition intensified and Mexico lost comparative advantage to countries like China.

5.5 Gender Inequality and Migration Responses

In Mexico, women's participation in export-oriented sectors increased, but the quality of these jobs was often poor. High turnover, low wages, and limited protections characterized many job positions in maquiladoras. Still, for many women, these jobs represented a first entry into the formal labor market. All things considered, maquiladoras increased female employment opportunities but perpetuated gendered labor market segmentation.

Women in these sectors often faced unstable contracts, few opportunities for advancement, and exposure to unsafe working conditions. At the same time, their earnings were often crucial for household survival, particularly as male employment in traditional sectors declined. The double burden of factory labor and unpaid domestic work further strained female workers, whose well-being was rarely prioritized in trade policy debates.

For men, especially those in rural or traditional sectors, migration to the United States became a key adjustment mechanism. Between 1994 and 2004, approximately 4 to 5 million Mexicans migrated to the U.S., a trend that NAFTA failed to reverse despite early promises of stemming migration through economic opportunity (Delgado-Wise & Covarrubias 2007). Migration served as a safety valve for Mexico's labor market and helped mitigate rural dislocation through reimbursements, but also reflected the agreement's failure to generate inclusive development.

In the U.S., immigration became increasingly politicized, with concerns that low-wage workers from Mexico were displacing domestic labor. However, empirical evidence on this displacement remains mixed. Migration flows reflect broader demographic and structural economic forces, but they also underscore the failure of NAFTA to provide balanced development outcomes.

NAFTA was never designed to coordinate migration policy, and its limited ability to address cross-border labor flows reveals the flaws of trade liberalization disconnected from broader economic development strategies.

5.6 Methodologies, Data and Causal Inference

Economists assessing NAFTA's effects have used a variety of methods to establish causal relationships. Hakobyan and McLaren (2016) construct an exogenous measure of NAFTA exposure by calculating the difference in pre- and post-NAFTA tariffs across industries and matching this to local employment compositions. Difference-in-differences designs compare high- and low-exposure regions over time.

On the Mexican side, researchers use household survey data, census microdata, and firm-level manufacturing data to trace wage and employment outcomes. Panel data has enabled tracking of workers across formal and informal employment, while time series methods have been used to assess price trends in key agricultural commodities like maize.

In Mexico, the evaluation of NAFTA's consequences often relies on household-level employment surveys (e.g., the ENOE) and firm-level production data. Researchers such as Verhoogen (2008) and Weisbrot et al. (2014) have applied structural decomposition techniques to assess how trade affected within-industry inequality, separating skill upgrading and market segmentation effects. A complementary strand of research employs regression discontinuity designs based on eligibility for trade preference programs to evaluate localized impacts.

Additionally, Computable General Equilibrium (CGE) models, such as those used by Burfisher, Robinson, and Thierfelder (2001), simulate macroeconomic counterfactuals under a "no-NAFTA" scenario. These models integrate intersectoral linkages, trade elasticities, and factor mobility assumptions to assess aggregate and distributional outcomes under trade liberalization. On the agricultural side, cointegration tests (Fiess & Lederman, 2004) examine whether Mexican and U.S. corn prices moved closer together post-NAFTA, serving as evidence of market integration.

Despite methodological differences, the literature broadly agrees that NAFTA's labor market effects were real, regionally concentrated, and distributionally uneven. Empirical rigor has helped isolate the effects of trade policy from those of technology, domestic policy, and global trends. The diversity of approaches, spanning microeconometrics, sectoral fragmentation and macroeconomic simulation, has allowed for triangulation of results and identification of common trends.

Across both countries, evidence converges on a few points. First, while aggregate trade volumes and foreign direct investment increased, these gains did not translate into broadly

shared labor market improvements. Second, policy frameworks on both sides of the border failed to provide sufficient cushioning or proactive adjustment measures.

Yet, the countries diverged in key ways. The U.S. absorbed the shock primarily through job displacement and rising inequality, especially in mid-skill occupations. Mexico absorbed the shock through labor informality, low wage growth, and migration. In both cases, rural and less-educated populations bore the burden of adjustment costs. Moreover, in Mexico, regional divergence intensified, with the north experiencing growth and the south experiencing stagnation. These differences reflect not only distinct institutional contexts but also varying degrees of preparation for economic restructuring.

Collectively, these studies triangulate results through multiple methodologies, increasing the reliability of findings across both developed and developing contexts.

5.7 Implications for Trade Theory

When interpreted through the lens of trade theory, the divergent outcomes reflect the frameworks discussed in Chapters 2 and 3. In theory, the Heckscher-Ohlin model predicts that trade liberalization between a labor-abundant (Mexico) and capital-abundant (U.S.) country should lead to higher wages for low-skilled workers in Mexico and a reduction in inequality there. At the same time, the model predicts that low-skilled workers in the U.S. would face wage declines, as they compete with cheaper foreign labor. However, the empirical outcomes were more nuanced.

In Mexico, wage inequality persisted, and rural poverty deepened. In the U.S., polarization and wage stagnation affected specific regions and occupations. These deviations align more closely with the insights of newer trade models (e.g., Melitz), which emphasize firm heterogeneity, adjustment costs, and imperfect labor mobility. The structural limitations in labor reallocation, especially due to geography, skill mismatches, and weak institutions, played a crucial role in shaping these outcomes.

Furthermore, it is important to contextualize NAFTA's effects historically. As with the China Shock in Chapter 4, the theoretical tools applied to evaluate trade outcomes often emerge from the very conditions they seek to explain. Classical models more neatly align with earlier

historical episodes like the Grain Invasion, while newer models better account for contemporary global integration and fragmentation.

In this sense, NAFTA occupies an intermediate position. While it was negotiated at the start of global economic expansion, its institutional framework and assumptions often did not fully keep up with the realities of economic complexity. The lessons learned from NAFTA informed later debates on trade agreements like the TPP (Trans-Pacific Partnership), and USMCA (United States–Mexico–Canada Agreement), both of which attempted, even if imperfectly, to incorporate social and labor considerations more explicitly.

5.8 Lessons from NAFTA: Integrating Trade with Domestic Institutions

NAFTA stands as a powerful example of how trade liberalization can generate mixed outcomes depending on institutional capacity, regional readiness, and labor market flexibility. In both the U.S. and Mexico, NAFTA exposed the limits of theory when faced with political and social complexity.

Ultimately, the NAFTA experience highlights the importance of integrating trade policy with comprehensive domestic policy reform. Without robust labor market institutions, educational investments, and social safety nets, the benefits of trade may remain confined to a narrow segment of the population, leaving many behind in the process.

From a theoretical perspective, the experience underlines the importance of embedding empirical trade analysis within evolving models that incorporate distributional dynamics, firm heterogeneity, and real-world constraints. As trade theory continues to develop, it must remain grounded in the institutional realities and structural constraints observed in cases like NAFTA. Understanding these factors not only helps interpret the past but also equips policymakers to design fairer, more adaptive trade policies in the future.

The analysis of NAFTA's effects on the U.S. and Mexico reveals how similar trade reforms can produce asymmetrical outcomes across countries, shaped by pre-existing institutional structures, levels of development, and labor market dynamics. In the United States, NAFTA's gains were concentrated among high-skilled workers and capital owners in globally

integrated sectors, while trade-exposed regions with less diversified economies experienced job losses, wage pressure, and insufficient policy responses. In Mexico, the agreement spurred significant export growth and sectoral transformation, particularly in manufacturing, but also reinforced regional inequalities and exposed institutional weaknesses in rural development and labor protections.

The chapter highlights how the impact of trade agreements is filtered through national conditions: wage dynamics, migration patterns, and policy tools such as Trade Adjustment Assistance all play a role in shaping who benefits and who bears the costs. Ultimately, the NAFTA case demonstrates that trade liberalization alone does not guarantee equitable growth, complementary domestic policies are essential for ensuring that the gains from globalization are broadly shared.

CHAPTER 6

CONCLUSION

This dissertation aims to analyze how international trade affects income distribution, using both theoretical models and historical case studies. The results show that trade is neither universally beneficial nor equally harmful. Its distributional effects depend not only on comparative advantage, but on domestic institutions, labor market structure, and a country's stage of development. In particular, this thesis shows that developed and developing countries are affected by trade in structurally different ways.

In developed economies like the United States, trade liberalization tends to exacerbate existing inequalities by disproportionately hurting lower-skilled workers in import-competing sectors. The China Shock revealed that these workers did not easily reallocate to growing sectors or regions, contradicting the assumptions of classical models such as Heckscher-Ohlin. Instead, rigidities in labor mobility, limited retraining programs, and the absence of robust social safety nets meant that many communities suffered permanent economic decline.

Even though trade theory predicts overall gains, these gains remained concentrated in export-oriented, high-tech, or capital-intensive sectors, primarily benefitting higher-skilled workers and urban areas. The result is a polarized labor market, with growing income gaps and rising regional inequality. The U.S. case suggests that without institutional mechanisms to redistribute the gains of trade, liberalization deepens socio-economic inequalities rather than reducing them. With the most recent trade tariffs introduced by President Donald Trump, it remains to be seen how the United States, and the global economy as a whole, will adapt to this new economic shock. Which economies and social groups will ultimately bear the greatest economic burden remains to be seen.

In contrast, the evidence from Mexico and Argentina shows that developing countries often experience fragmented and historically driven effects from trade liberalization. In Mexico, NAFTA accelerated the expansion of export-oriented industries, especially in the North, but it did not generate inclusive growth. Rural and southern regions were left behind, informal employment expanded, and wage growth stagnated. Trade, in this case, reinforced structural inequalities instead of resolving them.

Similarly, the Grain Invasion in Argentina during the first wave of globalization offers a historical parallel. While agricultural exports surged, benefits accrued mostly to landowning elites, with minimal redistribution or structural transformation. The Argentine economy became dependent on primary goods exports, leaving it vulnerable to external shocks and undermining the development of a diversified industrial base. These patterns illustrate how trade can lock developing countries into roles that limit upward mobility, especially when institutions are weak or extractive.

One of the most important insights to emerge from this analysis is that theoretical models, while analytically useful, often fall short in predicting real-world outcomes. Classical trade theory, grounded in assumptions of perfect competition, full employment, and frictionless adjustment, does not account for the persistent dislocation observed in both developed and developing countries.

Interestingly, the models tend to perform better when applied to the period and context in which they were developed: the Heckscher-Ohlin framework aligns more closely with the Argentine case in the late 19th century, while newer trade models that incorporate firm heterogeneity and market imperfections are more consistent with the dynamics of the China Shock and NAFTA.

Yet in both contexts, the presence or absence of institutional buffers, such as labor protections, education systems, and industrial policies, proved decisive. These findings confirm that trade outcomes are mediated not just by factor endowments, but by the state's ability to manage integration and to shape how its gains and losses are distributed.

Classical models like Ricardian or Heckscher-Ohlin offer clear predictions about aggregate welfare gains and factor price equalization, but they rely on assumptions, such as full employment, perfect mobility, and frictionless adjustment, that rarely hold in practice. As this thesis has shown, empirical realities such as persistent unemployment, regional immobility, and institutional weakness often result in outcomes that diverge from theoretical expectations. Models are most effective when used as interpretive tools, rather than forecasting instruments, and must be complemented by research that accounts for the structural and institutional diversity of actual real economies.

The main takeaway from this thesis is that trade liberalization is neither inherently positive nor negative; its effects depend on structural, institutional, and policy contexts. In developed countries, increased openness can generate productivity gains, lower consumer prices, and expanded export opportunities, but it can also intensify regional and income inequalities when redistributive policies and labor market support are insufficient. In developing countries, trade can act as a powerful driver of growth, modernization, and integration into

global value chains, but it may also reinforce dependency and inequality if not accompanied by inclusive growth strategies and capacity-building investments.

The analysis also highlights that a single economic shock can produce very different outcomes depending on the structural characteristics of the economies involved. While some countries or regions successfully leverage trade to foster innovation and long-term development, others face significant adjustment challenges, particularly when institutional capacities are weaker or safety nets are limited. This diversity of experiences suggests that trade itself is not the determinant of inequality; rather, it is the interaction between global integration and domestic policies that shapes distributional outcomes.

Ultimately, debates on trade and inequality cannot be resolved through theory alone. They require empirical understanding of how real economies adjust, who captures the gains, who bears the costs, and what tools governments have to influence these dynamics. The challenge for future policy is not to reverse globalization but to harness its potential more effectively by integrating trade policy with strong domestic strategies — including investment in education, retraining, innovation, regional development, and social safety nets.

Looking ahead, emerging opportunities such as green trade, digital markets, and the reorganization of global supply chains present a chance to design trade policies that are both economically efficient and socially inclusive. With the right institutional framework, globalization can become a catalyst for sustainable and equitable development rather than a source of fragmentation.

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