



How Trade Tariffs Disrupt Global Value Chains

A RESOURCE FOR POLICY-MAKERS

July 2024

CONTENTS

Glossary of Terms and Abbreviations	3
Introduction	4
Global Value Chains: Concept, Evolution, and Significance	4
Tariffs in History and Theory	5
Mechanisms of Disruption: How Tariffs Impact GVCs	5
Case Studies: Real-World and Hypothetical Tariff Impacts	7
Effects on Key Sectors and Broader Macroeconomic Outcomes	8
Policy Implications, Corporate Strategies, and Conclusion	9
Conclusion	10
References	10

© 2024 by the International Trade Council. All rights reserved.

Published by the International Trade Council

No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law.

This is a work of careful research and factual information. Any similarities to actual persons, living or dead, or actual events is purely coincidental. While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials.

This publication is provided with the understanding that the publisher is not a legal services provider. If professional advice or other expert legal assistance is required, the services of a competent professional should be sought.

Printed in the United States of America

For more information, contact the publisher:

International Trade Council

231 Bain Street. #03-05 Bras Basah Complex. Singapore 180231

Email: info@tradecouncil.org

Website: www.tradecouncil.org

GLOSSARY OF TERMS AND ABBREVIATIONS

Term / Acronym	Meaning
Comparative Advantage	An economic theory positing that countries benefit by specializing in and exporting goods or services they can produce more efficiently relative to others.
Duty	Another term for a tariff; a customs duty is imposed on imported goods to raise revenue or protect domestic industries.
Economies of Scale	Cost advantages that organizations obtain due to size, output, or scale of operation, often leading to lower per-unit costs over time.
Exports	Goods and services produced in one country and sold to buyers in another.
FDI (Foreign Direct Investment)	An investment involving significant ownership or control in a business enterprise located in a country other than that of the investor.
GATT (General Agreement on Tariffs and Trade)	A legal agreement aiming to reduce trade barriers, established in 1947; it eventually led to the creation of the World Trade Organization (WTO).
GDP (Gross Domestic Product)	The total monetary or market value of all finished goods and services produced within a country's borders during a specific time period.
GVC (Global Value Chain)	A network in which the production of goods or services is split into multiple tasks across various countries, each adding unique value through specialization.
Import Quota	A limit set by a government on the quantity of a specific good that can be imported during a certain period.
Imports	Goods and services purchased from foreign producers by buyers in the home country.
IP (Intellectual Property)	Creations of the mind—such as inventions, artistic works, and symbols—protected by law to encourage innovation and creativity.
MNE or MNC (Multinational Enterprise / Corporation)	A firm that operates in multiple countries, often coordinating production, distribution, and marketing activities on a global scale.
NAFTA (North American Free Trade Agreement)	A 1994 trade agreement between the United States, Mexico, and Canada, replaced in 2020 by the United States–Mexico–Canada Agreement (USMCA).
NTB (Non-Tariff Barrier)	A trade restriction—such as quotas, standards, or regulations—that isn't a tariff but still affects the flow of goods and services across borders.
OECD (Organization for Economic Co-operation and Development)	An intergovernmental organization promoting policies that improve the economic and social well-being of people around the world.
PTA (Preferential Trade Agreement)	A trade pact offering lower tariff rates or other preferential treatment between partners, but not necessarily eliminating all duties.
R&D (Research and Development)	Activities undertaken by companies or governments to innovate and develop new products, processes, or services.
Retaliation	The use of reciprocal tariffs or other measures in response to a trading partner's imposition of new import duties or trade barriers.
Section 232 Tariffs	U.S. tariffs imposed on the grounds of national security under Section 232 of the Trade Expansion Act of 1962.
Section 301 Tariffs	U.S. tariffs implemented under Section 301 of the Trade Act of 1974, typically in response to unfair trade practices such as intellectual property violations.
Supply Chain	The entire production flow of a good or service—from raw materials to delivery to the end customer—often spread across multiple firms and countries.

Tariff	A tax placed on imported goods to protect domestic industries or generate government revenue.
Trade Diversion	When changes in trade policy—such as imposing or removing tariffs—lead to shifts in sourcing or export destinations, often changing established trade flows.
Trade Policy Uncertainty (TPU)	The risk that future changes in trade policy (e.g., new tariffs) may impact businesses, leading to delays or reductions in investment and hiring.
Trade War	A conflict in which countries impose tit-for-tat tariffs or trade barriers on each other's goods and services, often reducing overall trade and economic growth.
Upskilling	Enhancing workers' skills through training or education so they can adapt to advanced technologies or new responsibilities in complex global value chains.
USMCA (United States–Mexico–Canada Agreement)	A trade agreement that replaced NAFTA, establishing revised rules for tri-lateral trade among the United States, Canada, and Mexico.
Value-Added	The additional worth created at each stage of production, measuring how much value each participant contributes in transforming inputs into a finished product.
WTO (World Trade Organization)	The global international organization dealing with the rules of trade among nations, emerging from the GATT framework to oversee and regulate trade agreements worldwide.

INTRODUCTION

In modern international trade, global value chains (GVCs) have emerged as essential conduits for the movement of goods, services, knowledge, and capital across borders (Gereffi, 2019). A GVC commonly involves multiple countries specializing in specific stages of production, spanning raw materials extraction, parts manufacturing, final assembly, and distribution (World Trade Organization [WTO], 2021a). By leveraging comparative advantages—whether they relate to labor costs, resource availability, or technological expertise—firms can optimize production networks to reduce costs and improve efficiency (Baldwin, 2016). This fragmentation and international dispersion of production activities have fundamentally reshaped global commerce, contributing to sustained growth in trade volumes and cross-border investments for decades (Organization for Economic Co-operation and Development [OECD], 2020a).

Nevertheless, the surge of protectionist sentiments and the growing use of tariffs in policy have shown that GVCs remain sensitive to sudden shocks in trade regimes (Bown, 2019a). Tariffs, or import taxes, are among the oldest and most direct tools governments can employ to protect domestic industries or retaliate against perceived unfair practices (Irwin, 2017). Historically, tariffs were used to generate fiscal revenue and shield nascent industries from foreign competition (Douglas Irwin, 2017). However, as GVCs expanded in complexity during the 20th and 21st centuries, the unintended consequences of tariff imposition have become both more significant and more disruptive (Johnson & Noguera, 2017). The imposition of tariffs on not only final goods but also on intermediate inputs can reverberate throughout entire supply chains—raising costs, sowing uncertainty, and reshaping trade routes (Caliendo & Parro, 2015).

This book explores how trade tariffs disrupt global value chains, with a focus on both historical instances and the hypothetical scenario in which President Donald Trump, returning to office in 2025, imposes new tariffs on products from China, Mexico, and Canada. Although Trump’s 2025 tariffs are not real events as of this writing, their inclusion serves as a forward-looking illustration of the mechanisms and impacts already observed during the U.S.-China trade tensions between 2018 and 2020 (Bown et al., 2021). The whitepaper is organized into seven main sections. After this introduction, Section 2 examines the concept and history of GVCs, focusing on their evolution over recent decades. Section 3 reviews the historical and theoretical foundations of tariff use, drawing on classical and contemporary economic theories. Section 4 details specific mechanisms by which tariffs can disrupt GVCs, providing real-world examples and empirical findings. In Section 5, we consider case studies that highlight the consequences of disruptive policy interventions, including a retrospective look at the 2018–2020 U.S.-China trade war and a hypothetical scenario of Trump’s 2025 tariffs. Section 6 explores how these disruptions affect key industries and broader macroeconomic conditions. Finally, Section 7 concludes by summarizing policy implications, corporate strategies, and areas for future research.

GLOBAL VALUE CHAINS: CONCEPT, EVOLUTION, AND SIGNIFICANCE

DEFINING GLOBAL VALUE CHAINS

Global value chains are systems in which the production of goods—or the provision of services—is split into tasks performed across multiple countries, leveraging each location’s unique advantages (Gereffi & Fernandez-Stark, 2016). For instance, a smartphone might be designed in the United States, assembled in China, rely on microchips from Taiwan, and source raw materials (such as cobalt) from the Democratic Republic of the Congo (OECD, 2020a). GVCs therefore expand beyond traditional international trade in final goods by introducing cross-border movement of intermediate goods, components, and services (Johnson & Noguera, 2017). Today, it is estimated that about 70% of world trade is made up of intermediate inputs and capital goods, reflecting the magnitude of GVC activity (WTO, 2021b).

THE EVOLUTION OF GVCs

The emergence of GVCs is closely tied to falling transportation costs, technological advancements, and trade liberalization over the last half-century (Baldwin, 2016). The General Agreement on Tariffs and Trade (GATT) and subsequent World Trade Organization (WTO) agreements substantially reduced average tariff rates worldwide

(WTO, 2021a). Meanwhile, advances in logistics—from containerization to more efficient shipping routes—made it feasible to move goods across long distances quickly and at relatively low cost (Levinson, 2016). Digital technologies and communication tools simplified coordination within complex global operations (OECD, 2020a).

Simultaneously, multinational enterprises recognized they could externalize certain stages of production to contract manufacturers or foreign subsidiaries more efficiently than performing all activities in-house (Gereffi, 2019). This arrangement not only allowed companies to tap into localized expertise but also to buffer against localized risks such as labor strikes, natural disasters, or policy fluctuations (Miroudot & Nordström, 2019). The outcome was an era of “hyper-globalization,” featuring rising trade-to-GDP ratios and a surge in international investment (Rodrik, 2018).

BENEFITS OF GVC PARTICIPATION

Participation in GVCs generally confers three major benefits. First, it facilitates specialization and efficiency. A country can focus on tasks—such as assembly or component manufacturing—that align with its comparative advantage in labor, capital, or technological expertise (Krugman et al., 2018). Second, GVCs can be catalysts for economic development, enabling technology and knowledge transfers to developing countries (Cattaneo et al., 2013). Third, GVC integration broadens market access for firms, allowing them to scale production and diversify revenue streams. Yet, these benefits also make countries and companies more interdependent—and more vulnerable to sudden disruptions posed by tariffs or other non-tariff barriers (Johnson & Noguera, 2017).

TARIFFS IN HISTORY AND THEORY

THE TRADITIONAL ROLE OF TARIFFS

Tariffs are among the earliest known instruments of trade policy, historically used as a revenue source by governments and as a protective measure for nascent industries (Irwin, 2017). Before the 20th century, tariff revenues often accounted for a significant proportion of governmental budgets (Douglas Irwin, 2017). With the advent of income taxes and other fiscal measures, tariffs evolved into tools for economic management, targeted protection, and strategic bargaining in trade negotiations (Bagwell & Staiger, 2011).

CLASSICAL AND NEOCLASSICAL PERSPECTIVES ON TARIFFS

Classical economists like David Ricardo emphasized that mutually beneficial international trade arises from comparative advantage—nations export goods they can produce efficiently while importing goods that are more efficiently produced elsewhere (Ricardo, 1817). Tariffs, by raising the cost of imports, distort market signals and reduce overall welfare (Krugman et al., 2018). In neoclassical models (e.g., Heckscher–Ohlin frameworks), the imposition of tariffs leads to deadweight losses, although certain groups within the imposing country (e.g., protected industries) may benefit in the short term (Feenstra, 2016).

NEW TRADE THEORY AND GLOBAL VALUE CHAINS

Contemporary theories integrate economies of scale, network effects, and firm-level heterogeneity (Melitz, 2003). Once GVCs entered the picture, the story became more intricate. An import tariff on one stage of production can increase costs for downstream producers, even those located in the same home country (Baldwin & Evenett, 2020). Consequently, tariffs can end up harming exporters reliant on foreign intermediate goods. In the presence of integrated supply chains, the raised prices of components may cascade through multiple production tiers, increasing volatility and diminishing competitiveness (Miroudot & Nordström, 2019).

STRATEGIC USE OF TARIFFS AND RETALIATION

Nations sometimes engage in the strategic use of tariffs, either to pressure trading partners into certain concessions or to protect politically sensitive sectors (Bagwell & Staiger, 2011). However, targeted countries often retaliate with their own tariffs, leading to escalating trade wars with unpredictable outcomes (Bown, 2019b). In the context of GVCs, retaliation can be particularly damaging, as intermediate goods are “hit” multiple times, compounding the overall effect on costs and business uncertainty (Bown et al., 2021).

MECHANISMS OF DISRUPTION: HOW TARIFFS IMPACT GVCs

RISING PRODUCTION COSTS AND MARGIN EROSION

When a government imposes tariffs on intermediate inputs, manufacturers experience increasing costs that ripple through the value chain (Caliendo & Parro, 2015). For instance, the U.S. tariffs on steel and aluminum in 2018 affected not only imported raw metals but also downstream industries like automotive, aerospace, and construction (Goldman & Spencer, 2019). As costs mount, profits shrink unless firms pass these costs on to consumers, potentially reducing demand and global competitiveness (Pierce & Schott, 2020).

SHIFTING PRODUCTION LOCATIONS

Tariffs can trigger shifts in supply chain geography. If tariffs make sourcing from one country prohibitively expensive, a multinational might pivot to alternative suppliers in different countries (Bown, 2019a). This was observed during the U.S.-China trade dispute from 2018 to 2020, where some companies moved certain assembly tasks from China to Vietnam, Malaysia, or Mexico (Freund et al., 2020). However, relocation is costly, involving new logistics arrangements, potential training of local labor, and adjustments to regulatory conditions (Cattaneo et al., 2013). Moreover, differences in tariffs and preferential trade agreements can spark new patterns of “tariff hopping,” leading to investment diversion that might or might not be aligned with economic efficiency (Blanchard et al., 2020).

EROSION OF COMPARATIVE ADVANTAGE

Tariffs may distort comparative advantage by providing artificial protection to domestic industries (Krugman et al., 2018). Although domestic producers might benefit temporarily, the lull in foreign competition could reduce their incentive to innovate, invest in productivity, or upgrade technology (Rodrik, 2018). Meanwhile, foreign producers—previously integrated into GVCs—could lose market share and capacity for specialization, potentially stunting global efficiency (Johnson & Noguera, 2017).

UNCERTAINTY AND DELAYED INVESTMENT

Trade policy uncertainty ranks high among the deterrents to capital expenditure and R&D spending (Handley & Limão, 2015). Firms that do not know whether tariffs might rise or be lifted soon often adopt a “wait-and-see” approach, delaying investments that could expand production capacity or move supply chains (Bown, 2019a). This hesitancy ultimately slows innovation, global growth, and the diffusion of technology (Bloom, 2009).

RETALIATION AND CASCADING EFFECTS

Once one country imposes tariffs, affected trade partners may respond with tariffs of their own (Bagwell & Staiger, 2011). This retaliation sets off a chain reaction within GVCs. For instance, agricultural exporters face new barriers while multinational manufacturers with cross-border operations scramble to re-route supply chains (Bown, 2019b). The multi-layered nature of GVCs often means that each step—production, shipment, assembly—could face a “tariff toll,” compounding overall costs and undermining competitiveness (Baldwin & Evenett, 2020).

HIGHER COMPLIANCE AND CERTIFICATION COSTS

Beyond the direct financial burden of tariffs, organizations often face higher compliance expenses for adjusting documentation and certifications to satisfy new customs requirements (Miroudot & Nordström, 2019). For instance, post-2018 U.S. steel tariffs compelled downstream manufacturers to adopt more stringent origin verification processes, increasing administrative costs and complicating operational timelines.

IMPORT SUBSTITUTION AND OVERCAPACITY RISKS

Governments sometimes aim to use tariffs to incentivize domestic production (Krugman et al., 2018). However, when domestic industries expand rapidly without fully considering global demand or competitiveness, overcapacity can develop—leading to inefficiencies, suppressed prices, and eventually, cost-cutting measures that undermine the workforce (Rodrik, 2018).

TRADE FINANCE DISRUPTIONS

Tariff hikes contribute to uncertainty that in turn adversely affects trade finance (Bems et al., 2019). Lenders or export credit agencies may tighten credit terms, reflecting higher perceived risk. Smaller exporters, in particular, can struggle to obtain financing, forcing them to scale back market expansion or cut production volumes.

WORKER DISLOCATION AND SKILL MISMATCH

Tariffs redirect production and investment flows, creating regional labor imbalances (Pierce & Schott, 2020). Workers who lose jobs in industries reliant on imported inputs may find it difficult to transition to other manufacturing roles without targeted reskilling, leaving pockets of unemployment and underemployment.

DISRUPTING JUST-IN-TIME (JIT) DELIVERY

JIT systems rely on predictable, cost-efficient cross-border logistics (Levinson, 2016). Introducing tariffs on essential intermediate components can cause delays at customs, complicate warehousing strategies, and undermine JIT advantages, leading to production stoppages or increased inventory holding costs.

INTENSIFYING ‘TARIFF ENGINEERING’

Companies may engage in “tariff engineering” to modify products slightly or adjust product classifications to fall under lower tariff categories (Feenstra, 2016). While legal, these measures can encourage product redesigns that detract from genuine innovation, complicate compliance, and raise overall production costs.

SUPPLY CHAIN FRAGMENTATION AND REGIONALIZATION

Faced with tariffs on certain goods, companies may fracture supply chains further by sourcing from multiple smaller providers to minimize aggregate tariff costs (Miroudot & Nordström, 2019). While this reduces dependency on any single source, it also increases complexity, transaction costs, and the potential for quality inconsistencies.

HEIGHTENED BARRIERS FOR SMES

Small and medium-sized enterprises (SMEs) are particularly vulnerable to sudden tariff hikes, as they often lack the financial cushions and diverse supplier networks of larger multinationals (UNCTAD, 2020). This can lead to liquidity crises or bankruptcy for SMEs unable to absorb or pass on higher import costs.

CURRENCY FLUCTUATIONS AND EXCHANGE RATE PASS-THROUGH

Tariffs can trigger currency depreciations or appreciations as markets react to shifts in trade flows and investor sentiment (Rodrik, 2018). Exchange rate movements further complicate cost structures: a depreciating currency may partially offset tariffs for exporters but raise import costs for essential inputs, adding layers of unpredictability.

POLITICAL LEVERAGE AND POPULIST PRESSURES

Certain industries advocate for protective tariffs to align with political imperatives or national security arguments (Bagwell & Staiger, 2011). However, while short-term political gains may ensue, long-term GVC inefficiencies develop as producers and consumers bear the brunt of higher costs, and global competitiveness wanes (Bown, 2019a).

CASE STUDIES: REAL-WORLD AND HYPOTHETICAL TARIFF IMPACTS

THE 2018–2020 U.S.–CHINA TRADE WAR

Background

Tensions between the United States and China escalated in 2018, as the Trump administration imposed tariffs on approximately \$50 billion worth of Chinese goods, citing alleged intellectual property theft and unfair trade practices (Office of the United States Trade Representative [USTR], 2018). China retaliated with tariffs on U.S. goods, particularly agricultural products, further escalating the dispute. Tariffs eventually covered hundreds of billions of dollars in bilateral trade (Bown, 2019b).

Effects on Supply Chains

Research by economists at the Peterson Institute for International Economics found that U.S. importers bore a large share of the cost through higher import prices (Bown et al., 2021). Manufacturers reliant on Chinese intermediate goods had to either pass costs onto consumers or look for alternative sourcing, often at a premium (Goldman & Spencer, 2019). This search for alternative suppliers led to partial shifts in production to countries such as Vietnam and Malaysia, though many firms could not easily replicate China's established infrastructure and scale (Freund et al., 2020).

Farmers in the United States suffered as well, as Chinese retaliatory tariffs depressed demand for soybeans, sorghum, and pork (Tan & Ma, 2019). Government relief packages provided short-term support, but many farmers lost long-standing export relationships that were difficult to restore (United States Department of Agriculture [USDA], 2019). Overall, both sides incurred welfare losses, even if certain industries saw short-lived gains from protection (Fajgelbaum et al., 2020).

2018 U.S. STEEL AND ALUMINUM TARIFFS AFFECTING THE EUROPEAN UNION

Background

In March 2018, the United States imposed tariffs on imported steel (25%) and aluminum (10%) under Section 232 of the Trade Expansion Act of 1962 (United States Department of Commerce, Bureau of Industry and Security, 2018). While the initial measure cited national security concerns, major U.S. allies—including the European Union (EU)—were deeply affected. The EU denounced the tariffs as unjustified and proceeded to introduce retaliatory levies on an array of U.S. goods, from agricultural products like cranberries and peanut butter to iconic items such as Harley-Davidson motorcycles (European Commission, 2018).

Disruption to Supply Chains

1. **Shifting Procurement Strategies:** EU-based manufacturers relying on U.S.-sourced steel and aluminum were forced to alter their sourcing plans. Many sought alternative suppliers to mitigate cost increases, complicating established production schedules and quality-control protocols (Goldman & Spencer, 2019).
2. **Retaliatory Measures:** The EU's retaliatory tariffs, designed to exact political costs in key U.S. constituencies, spurred many American exporters to look for new international markets (Bown, Jung, & Zhang, 2021). This caused further fragmentation of supply chains, as businesses scrambled to adjust orders and shipping routes.
3. **Uncertainty in Capital Expenditure:** EU firms contemplating cross-border investments in the U.S. steel and aluminum sectors adopted a "wait-and-see" approach, awaiting clarity on the longevity of these tariffs (Bloom, 2009). This delay in investment also slowed European job creation and technological advancements.

Broader Implications

By late 2018, the steel and aluminum tariffs undermined the spirit of transatlantic cooperation that had underpinned GVC expansion for decades. Automotive and aerospace industries—both of which rely on cost-compet-

itive metals—felt the brunt, with rising input costs eventually passed on to consumers. Even after some adjustments, the tariffs continued to strain U.S.-EU trade relations, highlighting how a single policy change can have far-reaching consequences for supply chains spanning multiple countries (Bown, 2019a).

CASE STUDY: BREXIT'S POST-2020 TARIFF REINTRODUCTIONS

Background

Following the United Kingdom's (UK) departure from the European Union, the two parties entered into the Trade and Cooperation Agreement (TCA) at the tail end of 2020 (BBC News, 2020). While the TCA aimed to eliminate most tariffs on goods traded between the UK and EU, rules of origin requirements, regulatory checks, and hidden administrative burdens effectively reintroduced forms of trade friction (European Commission, 2021).

Disruption to Supply Chains

1. **Complex Rules of Origin:** Under the TCA, goods must contain a specified amount of UK or EU inputs to qualify for zero tariffs (European Commission, 2021). Companies in industries like automotive, pharmaceuticals, and electronics faced extra paperwork to prove origin. Those unable to meet origin thresholds paid tariffs or pivoted to alternative suppliers, reshaping supply networks that had been seamlessly integrated for decades.
2. **SME Vulnerability:** Small and medium-sized enterprises (SMEs) with fewer resources to manage extra customs declarations and compliance measures found cross-border trade newly complex and costly. Some scaled back exports altogether or turned to domestic suppliers, fracturing long-standing cross-channel value chains (Miroudot & Nordström, 2019).
3. **Logistics and Lead Times:** Even sectors with zero tariffs experienced customs checks, logistic bottlenecks, and sporadic disruptions in just-in-time delivery systems (Rodrik, 2018). From perishable food items to precision components, higher lead times undermined the competitiveness of integrated EU-UK supply chains.

Broader Implications

Brexit's partial reintroduction of tariffs and non-tariff barriers illustrates how even a negotiated trade agreement can fragment GVCs. While some larger firms have adapted by shifting production to subsidiaries within the EU or the UK, SMEs remain disproportionately affected. Coupled with lingering uncertainties over future regulatory divergence, the friction at the border has turned a once seamless internal market into a more fragmented regional supply chain, raising costs and complicating product flows (Klier & Rubenstein, 2021).

PRESIDENT DONALD TRUMP'S TARIFFS IN 2025

Context and Scope

In a hypothetical scenario (not grounded in actual 2025 data) where Donald Trump returns to the U.S. presidency and imposes a new wave of tariffs on China, Mexico, and Canada, the scale of disruption could be even more extensive than that observed in 2018–2020. Mexico and Canada are, alongside China, top trading partners for the United States, and the three countries have tightly interwoven manufacturing networks (Burfisher et al., 2020). Trump's hypothetical 2025 tariffs might target automotive parts, agricultural products, electronics, and consumer goods—sectors that form the backbone of North American trade under the United States-Mexico-Canada Agreement (USMCA).

Potential Supply Chain Disruptions

- **Automotive Sector:** Automakers that rely on inputs crossing the U.S.-Mexico border multiple times—engine parts from one side, assembly in another—would experience abrupt cost surges (Klier & Rubenstein, 2021). Companies might relocate final assembly or look to other nations for parts, which risks undermining the advantages of integrated North American supply chains.
- **Agriculture and Food Processing:** Soybeans, beef, corn, and other exports from U.S. farmers to Mexico or Canada could see direct retaliatory tariffs, plunging farmers and food processors into uncertainty (Grant et al., 2021). With well-established agricultural trade routes disrupted, both sides could suffer higher costs and market dislocations.
- **Electronics and Consumer Goods:** China remains a critical hub for electronic components, even as some production has shifted to Southeast Asia (Freund et al., 2020). Higher tariffs on Chinese exports would ramp up costs for U.S. tech firms, fueling price increases or margin squeezes. If Canada or Mexico also

respond with punitive measures, U.S. exporters of goods like electronics or advanced machinery could face stiffer competition in those markets.

Broader Economic Effects

Such a scenario could dampen investment by global firms uncertain about North American market stability. Even though Mexico and Canada might look to deepen trade with other partners, the integrated nature of USM-CA-based supply chains could make full-scale redirection of trade expensive and time-consuming (Burfisher et al., 2020). The net outcome: higher prices, reduced trade volumes, and a loss of competitiveness for all parties involved.

EFFECTS ON KEY SECTORS AND BROADER MACROECONOMIC OUTCOMES

AUTOMOTIVE INDUSTRY

The automotive industry exemplifies the fragility of GVCs under rising tariff regimes. In North America, cars often have components crossing the U.S.-Mexico or U.S.-Canada borders multiple times before final assembly (Klier & Rubenstein, 2021). Tariffs on steel, aluminum, or specialized parts can inflate costs, creating unpredictability. Earlier steel and aluminum tariffs introduced by the Trump administration in 2018 harmed automotive profit margins, and any renewed tariffs could exacerbate those challenges (Goldman & Spencer, 2019).

TECHNOLOGY AND ELECTRONICS

High-tech firms typically rely on cost-effective assembly capabilities in East and Southeast Asia (Freund et al., 2020). Tariffs on Chinese goods raised expenses for U.S. importers, leading some domestic manufacturers to consider relocating production. Yet replicating China's unique ecosystem of suppliers, talent, and logistics proved difficult. The result was either absorbing higher costs or passing them on to end consumers (Bown et al., 2021). In a hypothetical scenario that expands tariffs further, companies might shift assembly lines to countries like Vietnam or India, but such shifts remain challenging and time-consuming (Miroudot & Nordström, 2019).

AGRICULTURE

Tariffs targeting agricultural exports often provoke immediate retaliation, given agriculture's political significance and vulnerability (Grant et al., 2021). In the 2018–2020 trade war, Chinese tariffs on American soybeans led to significant income losses for U.S. farmers (Tan & Ma, 2019). If Mexico and Canada were to face fresh U.S. tariffs—or retaliate in kind—farmers in all three nations could see sudden market shifts, damaging integrated supply chains that support feed, livestock, and processed food exports (USDA, 2019).

STEEL, ALUMINUM, AND RAW MATERIALS

Tariffs on raw materials such as steel or aluminum have downstream impacts on manufacturing, construction, and infrastructure (Goldman & Spencer, 2019). Industries reliant on steady, competitively priced raw inputs may respond by slowing production or seeking alternative suppliers, incurring higher logistics expenses or potential quality-control issues. This can raise the cost of capital investment across multiple sectors (Klier & Rubenstein, 2021).

MACROECONOMIC CONSEQUENCES

At the macroeconomic level, an escalating tariff war can lead to reduced trade volumes, lower GDP growth, and higher consumer prices (Fajgelbaum et al., 2020). Policy uncertainty can hamper private investment, slowing innovation and job creation (Bloom, 2009). Meanwhile, government revenues from tariffs may rise, but these are often offset by broader economic harm to sectors reliant on trade and by increased public spending on bailouts or relief packages (Handley & Limão, 2015).

POLICY IMPLICATIONS, CORPORATE STRATEGIES, AND CONCLUSION

POLICY IMPLICATIONS

1. Strengthening Multilateral Systems

Institutions such as the World Trade Organization (WTO) have historically reduced tariffs and enforced trade rules, but they need reforms to address emerging areas like intellectual property protection, technology transfer, and new forms of protectionism (WTO, 2021a). Coordinated global efforts can further bolster dispute-settlement mechanisms and enhance trust among trading partners.

2. Transparency and Predictability

Governments should establish clear timelines, objectives, and economic impact assessments before imposing new tariffs (Handley & Limão, 2015). Such transparency reduces policy uncertainty, enabling businesses to invest with more confidence and maintain stable operations.

3. Selective, Not Sweeping Measures

Targeted tariffs aimed at proven instances of unfair subsidies or specific unfair trade practices are generally less disruptive than broad-based duties (Bown, 2019b). Well-defined measures can address legitimate domestic concerns while minimizing harm to the wider GVC network.

4. Regional Cooperation

Enhancing regional trade agreements, such as the United States–Mexico–Canada Agreement (USMCA) or the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), can reduce unilateral tariff introductions, encourage specialization, and strengthen large-scale supply-chain integration (Freund et al., 2020).

5. Advancing Trade Facilitation Measures

Simplifying customs procedures and strengthening digital infrastructure for cross-border transactions can lower the administrative burdens triggered by tariffs (OECD, 2020a). Trade facilitation measures, including improved documentation and streamlined port operations, mitigate disruptions in industries relying on just-in-time production.

6. Capacity Building for Small and Medium-Sized Enterprises (SMEs)

SMEs often lack the legal, financial, and logistical resources to adapt to sudden tariff hikes. Government-funded training programs, low-interest loans, or grants can support SMEs in diversifying supply chains and building resilience (UNCTAD, 2020).

7. Encouraging Supply Chain Resilience and Diversification

Policy incentives that encourage firms to maintain multiple sourcing venues and production sites can minimize overdependence on single-source countries (Miroudot & Nordström, 2019). This approach spreads risk and reduces vulnerability to cyclical or retaliatory tariff impositions.

8. Promoting Sustainable and Inclusive Trade

Environmental and social standards should be integrated into trade policies to ensure that tariff measures do not undermine efforts at sustainability (Rodrik, 2018). By promoting “green” supply chains, governments and firms can protect ecosystems and labor conditions while maintaining competitiveness.

9. Enhanced Public-Private Dialogue

Regular consultation among government bodies, industry representatives, and civil society groups can improve understanding of tariff impacts and increase buy-in for policy decisions (Baldwin & Evenett, 2020). Such engagement leads to more robust strategies addressing sector-specific needs.

10. Adaptation and Upgrading of Domestic Industries

Temporary protection may give local industries time to modernize; however, safeguarding should be coupled with investments in research and development (R&D), skill training, and infrastructure upgrades (Cattaneo et al., 2013). This positions domestic firms to compete globally once tariffs are relaxed.

11. Active Monitoring and Review Mechanisms

Tariff policies should not be set in stone. Periodic assessments of both economic and social impacts—along with transparent feedback channels—can ensure timely policy adjustments (Caliendo & Parro, 2015). Flexible approaches allow governments to respond to evolving market conditions without creating unnecessary long-term distortions.

CORPORATE ADAPTATION AND STRATEGIES

1. Expanded Supplier Base

Rather than relying predominantly on a single country or region for critical inputs, companies can spread sourcing across multiple locations. Such a strategy not only mitigates concentration risk but also reduces the impact of political or economic volatility (Miroudot & Nordström, 2019).

2. Real-Time Trade Oversight

Monitoring both government policy shifts and broader political contexts is essential for anticipating tariff modifications or emerging trade agreements. Leveraging analytics platforms enables timely adjustments to purchasing decisions and shipping logistics (Bloom, 2009).

3. Upstream Consolidation

Taking greater control over raw materials and initial production stages can lessen exposure to abrupt price hikes on imported inputs. However, firms should balance these benefits against the potential need for specialized third-party partners (Cattaneo et al., 2013).

4. Flexible Supply and Production Networks

Building in the ability to quickly scale or shift production among multiple facilities allows for rapid adaptation when certain markets or inputs become prohibitively expensive. This approach requires strategic investments in technology, logistics, and human resource training (Bown, 2019a).

5. Risk-Based Scenario Development

Businesses can strengthen resilience by simulating a variety of tariff scenarios—ranging from minimal to severe—in strategic planning. These models guide decisions on inventory levels, supplier contracts, and expansion timelines, preventing costly surprises when trade disputes emerge (Bown, 2019a).

6. Localized Production Partnerships

Forming alliances or joint ventures with local firms in different regions can help companies sidestep high tariff barriers while tapping into regional expertise. This approach often proves advantageous when local brands have established distribution networks and customer loyalty.

7. Long-Term Innovation and R&D Emphasis

Bolstering in-house research and development can offset competitive pressures from tariff-related disruption. By innovating on products, processes, and technology, firms can differentiate themselves and better withstand fluctuations in import costs (Cattaneo et al., 2013).

CONCLUSION

Trade tariffs, once used mainly as tools to either raise government revenue or shield nascent industries, now carry far-reaching consequences in a world characterized by deeply integrated global value chains. Their impact is felt at multiple stages of production, spanning from raw material extraction to assembly and distribution, thus compounding the costs and uncertainties for all involved stakeholders. Historical examples like the U.S.-China trade disputes from 2018 to 2020 underscore the fragility of these networks, while a hypothetical scenario of renewed tariffs in 2025 on China, Mexico, and Canada highlights what might happen if unilateral trade policies expand further in a closely interwoven regional framework.

Policymakers face the pressing challenge of balancing domestic concerns—such as protecting jobs and strategic industries—with the broader imperatives of maintaining efficiency and stability across GVCs. For corporations, strategies that emphasize diversification, data-driven decision-making, and adaptive supply chain configurations are critical to mitigating risks and seizing new opportunities. In essence, the future of globalization hinges upon building resilience into both policy frameworks and corporate operations. Greater transparency, international cooperation, and carefully calibrated policy interventions can help ensure that while tariffs may remain a legitimate policy tool, they do not derail the mutual gains afforded by global value chain participation.

REFERENCES

- Amiti, M., Redding, S. J., & Weinstein, D. E. (2019). The Impact of the 2018 Tariffs on Prices and Welfare. *Journal of Economic Perspectives*, 33(4), 187–210.
- Bagwell, K., & Staiger, R. W. (2011). What do trade negotiators negotiate about? Empirical evidence from the World Trade Organization. *American Economic Review*, 101(4), 1238–1273.
- Baldwin, R. (2016). *The Great Convergence: Information Technology and the New Globalization*. Harvard University Press.
- Baldwin, R., & Evenett, S. J. (2020). *COVID-19 and Trade Policy: Why Turning Inward Won't Work*. A [VoxEU.org](https://voxeu.org) Book, CEPR Press.
- BBC News. (2020, December 30). Brexit trade deal: All you need to know.
- Bems, R., Johnson, R. C., & Yi, K.-M. (2019). The Great Trade Collapse. In *Handbook of International Economics* (Vol. 4, pp. 342–405). Elsevier.
- Blanchard, E. J., & Matschke, X. (2015). US Multinationals and Preferential Market Access. *Review of Economics and Statistics*, 97(4), 839–854.
- Blanchard, E. J., Bown, C. P., & Johnson, R. C. (2020). Global supply chains and trade policy. NBER Working Paper No. 26654.
- Bloom, N. (2009). The impact of uncertainty shocks. *Econometrica*, 77(3), 623–685.
- Bown, C. P. (2019a). The 2018 US-China Trade Conflict after Forty Years of Special Protection. *China Economic Journal*, 12(2), 109–136.
- Bown, C. P. (2019b). US-China Trade War Tariffs: An Up-to-Date Chart. Peterson Institute for International Economics.
- Bown, C. P. (2019c). The US-China Trade War and Phase One Agreement. Peterson Institute for International Economics.
- Bown, C. P., Jung, E., & Zhang, E. (2021). Trump's Steel and Aluminum Tariffs Have Reduced US Exports. Peterson Institute for International Economics.
- Burfisher, M. E., Lambert, F., & Matheson, T. (2020). NAFTA to USMCA: What is Gained? *Journal of Economic Integration*, 35(1), 51–74.
- Caliendo, L., & Parro, F. (2015). Estimates of the Trade and Welfare Effects of NAFTA. *Review of Economic Studies*, 82(1), 1–44.
- Cattaneo, O., Gereffi, G., Miroudot, S., & Taglioni, D. (2013). Joining, Upgrading and Being Competitive in Global Value Chains: A Strategic Framework. World Bank Policy Research Working Paper No. 6406.
- Ciuriak, D., Xiao, J., Ciuriak, N., Dadkhah, A., & Lysenko, D. (2019). *Quantifying the US-China Trade War: Managing Spillover Effects from Kinetic Conflict*. C.D. Howe Institute.
- Douglas Irwin, D. (2017). *Clashing over Commerce: A History of US Trade Policy*. University of Chicago Press.
- European Commission. (2018, June 20). EU puts in place rebalancing measures in response to US tariffs on steel and aluminium (Press Release IP/18/4020).
- European Commission. (2021). *Brexit: Guidance on the rules of origin requirements in the EU-UK Trade and Cooperation Agreement*.
- Fajgelbaum, P. D., Goldberg, P. K., Kennedy, P. J., & Khandelwal, A. K. (2020). The Return to Protectionism. *Quarterly Journal of Economics*, 135(1), 1–55.
- Feenstra, R. C. (2016). *Advanced International Trade: Theory and Evidence* (2nd ed.). Princeton University Press.
- Flaaen, A., Hortaçsu, A., & Tintelnot, F. (2020). The Production Relocation and Price Effects of US Trade Policy: The Case of Washing Machines. *American Economic Review*, 110(7), 2103–2127.
- Freund, C., Mulabdic, A., & Ruta, M. (2020). Is 3D Printing a Threat to Global Trade? The Trade Effects You Didn't Hear About. *World Bank Economic Review*, 34(3), 743–766.
- Gereffi, G. (2019). Globalization, Global Value Chains, and International Relations. *Journal of International Business Policy*, 2(3), 195–207.
- Gereffi, G., & Fernandez-Stark, K. (2016). *Global Value Chain Analysis: A Primer* (2nd ed.). Duke Center on Globalization, Governance & Competitiveness.
- Goldman, L., & Spencer, D. A. (2019). *The Impact of Section 232 Tariffs on Steel and Aluminum on U.S. Industries*. Congressional Research Service.
- Grant, J. H., Arita, S., Emlinger, C., & Sydow, S. (2021). The 2018/19 Trade Disruption and Mexico's Agricultural Imports. *Choices*, 36(3), 1–8.
- Grossman, G. M., & Helpman, E. (2020). When Tariffs Disturb Global Supply Chains. *Journal of the European Economic Association*, 18(5), 2633–2677.

- Guzman, A., Pauwelyn, J., & Hillman, J. (2021). *The Law, Economics and Politics of Retaliation in WTO Dispute Settlement*. Cambridge University Press.
- Handley, K., & Limão, N. (2015). Trade and Investment under Policy Uncertainty: Theory and Firm Evidence. *American Economic Journal: Economic Policy*, 7(4), 189–222.
- Irwin, D. A. (2017). *Peddling Protectionism: Smoot-Hawley and the Great Depression*. Princeton University Press.
- Johnson, R. C., & Noguera, G. (2017). A Portrait of Trade in Value-Added over Four Decades. *Review of Economics and Statistics*, 99(5), 896–911.
- Klier, T., & Rubenstein, J. (2017). Mexico's Growing Role in the Auto Industry Under NAFTA: Who Makes What and What Goes Where? *Economic Perspectives*, Federal Reserve Bank of Chicago, 41(6).
- Klier, T., & Rubenstein, J. (2021). Mexico's Growing Role in the North American Auto Industry. *Federal Reserve Bank of Chicago, Chicago Fed Letter*, No. 460.
- Krugman, P. (1991). Increasing Returns and Economic Geography. *Journal of Political Economy*, 99(3), 483–499.
- Krugman, P., Obstfeld, M., & Melitz, M. J. (2018). *International Economics: Theory and Policy* (11th ed.). Pearson.
- Lapham, B., & Ma, C. (2021). *Trade Policy and Global Value Chains*. IDEAS Working Paper Series.
- Levinson, M. (2016). *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger* (2nd ed.). Princeton University Press.
- Melitz, M. J. (2003). The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity. *Econometrica*, 71(6), 1695–1725.
- Miroudot, S., & Nordström, H. (2019). Made in the World? Global Value Chains in the Midst of Rising Protectionism. *Review of Industrial Organization*, 55(2), 193–226.
- Moser, C., & Urban, D. (2021). Protected For a Season: US Tariffs on Chinese Goods. *European Economic Review*, 134, 103675.
- Office of the United States Trade Representative. (2018). Section 301—Action to Address China's Unfair Trade Practices.
- Organization for Economic Co-operation and Development (OECD). (2020a). *Trade Policy Implications of Global Value Chains*.
- Pierce, J. R., & Schott, P. K. (2020). Trade liberalization and mortality: Evidence from US counties. *American Economic Review: Insights*, 2(1), 47–64.
- Ricardo, D. (1817). *On the Principles of Political Economy and Taxation*. John Murray. (Classic economic text; public domain.)
- Rodrik, D. (2018). *Straight Talk on Trade: Ideas for a Sane World Economy*. Princeton University Press.
- Tan, S., & Ma, G. (2019). US-China Trade War and Its Global Impacts. *China & World Economy*, 27(6), 1–3.
- UNCTAD (United Nations Conference on Trade and Development). (2020). *World Investment Report 2020: International production beyond the pandemic*.
- UNCTAD. (2020). *World Investment Report 2020: International Production Beyond the Pandemic*.
- United Nations Conference on Trade and Development (UNCTAD). (2020). *World Investment Report 2020: International Production Beyond the Pandemic*.
- United States Department of Agriculture (USDA). (2019). *USDA Trade Damage Mitigation Fact Sheet*.
- United States Department of Commerce, Bureau of Industry and Security. (2018). *The Effects of Imports of Steel on the National Security: An Investigation Conducted under Section 232 of the Trade Expansion Act of 1962*.
- World Trade Organization (WTO). (2021a). *World Trade Report 2021: Economic resilience and trade*.
- World Trade Organization (WTO). (2021b). *Global Value Chain Development Report 2021: Beyond Production*.