Comprehensive Analysis of Tariff Effects on the United States Economy

Nima Taheri Hosseinkhani

Contents

Comprehensive Analysis of Tariff Effects on the United States Economy

Nima Taheri Hosseinkhani

nzt0048@auburn.edu

August 10, 2025

1 Introduction

Tariff policies have long been a central instrument in shaping the structure and performance of national economies, with the United States providing a particularly illustrative case in recent years. The imposition of tariffs affects trade flows by altering relative prices between domestic and foreign goods, thereby influencing consumption patterns, production decisions, and the allocation of resources across sectors [FP19]. These measures are often justified as a means to protect domestic industries from foreign competition, preserve employment, and address perceived unfair trade practices. However, their broader economic consequences extend beyond the targeted sectors, creating ripple effects throughout supply chains and international markets. The recent U.S. experience demonstrates that while tariffs can provide short-term relief to specific industries, they also tend to increase input costs for downstream producers. This occurs because many U.S. industries rely on imported intermediate goods whose prices rise when tariffs are imposed [Duc+24]. Higher production costs can erode competitiveness both domestically and internationally, leading to reduced export opportunities and potential job losses in sectors not directly protected by the tariffs. Moreover, retaliatory measures by trading partners amplify these negative effects by restricting access to foreign markets for

U.S. exporters [LWW19]. The interaction between tariffs and global value chains is particularly significant. Over decades, U.S. manufacturing, agriculture, and services have become deeply integrated into international production networks [WM20]. Disruptions caused by tariff increases can weaken these linkages, reducing efficiency gains from specialization and scale economies. For example, when tariffs raise the cost of imported steel and aluminum, industries such as automotive manufacturing face higher material costs that can outweigh any benefits accruing to domestic metal producers [Hos20]. This dynamic illustrates how protectionist measures aimed at one sector may inadvertently harm others through input-output relationships. Empirical evidence suggests that the net effect of recent U.S. trade protection measures has been negative for manufacturing employment. While substitution effects between domestic and foreign goods might initially support certain jobs, these gains are offset by shifts toward service sector employment and losses stemming from retaliatory tariffs [LWW19]. The reallocation of capital and labor toward protected sectors often comes at the expense of their clients within the economy, leading to inefficiencies in resource use [BF19b]. The political motivations behind tariff policies cannot be ignored. Under the Trump administration, protectionist strategies were framed as part of a broader nationalist agenda aimed at reindustrialization [Duc+24]. Tariffs were applied across a wide range of products including solar panels, washing machines, steel, aluminum, and numerous Chinese imports. While intended to safeguard domestic jobs and counteract unfair trade practices, these actions triggered predictable economic disruptions: higher consumer prices due to increased import costs, reduced real incomes for workers as wage gains failed to keep pace with price inflation, and diminished export competitiveness in global markets. Retaliatory responses from major trading partners further complicated the situation. In agricultural trade with India, for instance, escalating tariffs risked undermining market access for U.S. specialty producers while simultaneously depriving Indian farmers of lucrative export opportunities [GGK25]. Such tit-for-tat measures not only reduce bilateral trade volumes but also encourage both countries to seek alternative trading partners, potentially leading to long-term shifts in global trade patterns. From a supply chain management perspective, tariff introductions or increases add layers of complexity to procurement strategies [Cha+19]. Firms must adapt their sourcing decisions in response to changing cost structures while managing heightened risks associated with geographic concentration or supplier dependency. The severity and timing uncertainty of tariff changes exacerbate these challenges by making it difficult for businesses to plan effectively. Quantitative modeling approaches have been instrumental in assessing the economy-wide impacts of tariff policies. Global general equilibrium models capture intersectoral linkages and cross-country interactions that determine net welfare outcomes [WM20]. Such analyses reveal that even when certain sectors benefit from protectionism in isolation, aggregate national welfare may decline once all feedback effects are considered. For example, simulations indicate that without retaliatory tariffs from China during the Sino-U.S. trade war, optimal industrial policy choices could yield some benefits for the U.S., but under mutual high-tariff conditions both countries suffer welfare losses [MN24]. Sector-specific impacts vary widely depending on exposure to targeted products and integration into global supply chains. In Sub-Saharan Africa's case during the U.S.-China trade conflict, South Africa's mineral exports were negatively affected due to direct targeting by U.S. steel and aluminum tariffs; however, its food and agriculture sectors experienced positive effects through altered trade flows [NYA24]. This heterogeneity underscores that tariff impacts cannot be generalized across all industries or regions. Survey-based evidence complements model-based findings by capturing firm-level responses to tariff shocks [DL23]. Enterprises heavily dependent on exports to the U.S., particularly those where such exports constitute more than half of total output value, report significant operational adjustments following tariff hikes. These include shifts in sourcing strategies, changes in product lines, or redirection toward alternative markets. Overall analysis indicates that while tariffs may serve strategic objectives under certain conditions, such as countering unfair practices or supporting nascent industries, their broader economic implications often involve trade-offs between sectoral gains and economy-wide costs. The interplay between direct price effects on imports, indirect cost pass-through along supply chains, retaliatory actions abroad, and structural adjustments within domestic industries forms a complex landscape requiring careful quantitative evaluation before policy implementation [FP19].

2 Historical Context of Tariff Policy in the US

2.1 Early Development of US Tariff Policy

The formative years of United States tariff policy were shaped by a combination of economic geography, political alliances, and competing visions for national development. In the decades following the War of 1812, regional economic structures played a decisive role in determining attitudes toward protectionism. For example, support for restrictive tariffs in the Ohio Valley during this period reflected a distinctive local economic context that diverged from the industrialized Northeast. While northeastern textile manufacturers actively lobbied for trade legislation to protect their industries, the Ohio Valley's backing of high tariffs emerged despite its limited industrial base before the Civil War and its geographic distance from legislative centers. This support has been interpreted through the concept of a "Greater Northeast," where rural hinterlands functioned as suppliers to urban industrial hubs in New England and the mid-Atlantic. Henry Clay's advocacy for a protective tariff was central to early U.S. economic policy debates. His vision extended beyond mere revenue generation; he argued that a stable domestic market was essential for a civilized society's prosperity. By promoting industrial development through federal tariffs, Clay sought to create an integrated home market that would bind together consumers and producers across western, northern, and southern states. He believed that without such measures, foreign imports would undermine the establishment of a robust domestic industrial base, thereby placing control over economic growth outside U.S. hands. This perspective placed Congress at the center of national economic planning and justified an expanded governmental role in shaping markets. The political economy of these early tariff policies was deeply intertwined with slavery and sectional interests. While many southerners feared that increased federal authority could lead to more restrictive measures against slavery, Clay's program still incorporated enslaved labor into its vision for national development. This created an unusual alignment where protectionist policies could simultaneously serve industrial expansion in the North and West while relying on agricultural production systems rooted in slavery in the South. Regional tensions over tariffs became increasingly pronounced as western states aligned with northern industrialists against southern free trade advocates. The Nullification Crisis illustrates this dynamic vividly. Southern nullifiers perceived persistent demands for protective tariffs from western states as economically threatening and politically unjustified. John Calhoun questioned what genuine interest westerners had in protectionism given their agricultural orientation. Nevertheless, western political actors formed durable coalitions with northern counterparts to resist southern calls for freer trade, reinforcing sectional divisions over economic policy. Economic cycles also influenced tariff debates during this era. The postwar boom-and-bust pattern heightened western demands for policies that could stabilize markets and promote long-term development. Protective liberalism appealed to these constituencies because it promised insulation from volatile global commodity markets dominated by goods like cotton produced with enslaved labor in the South. This divergence between regional priorities meant that tariff policy became both an instrument of national integration and a source of sectional conflict. The early U.S. approach to tariffs thus cannot be reduced solely to Hamiltonian industrial policy or northeastern lobbying efforts. Instead, it reflected a complex interplay between local market conditions, national political strategies, and broader ideological commitments regarding the role of government in economic life. Western support for protectionism was not simply derivative of northern industrial interests but was rooted in distinct regional calculations about how best to secure prosperity within an expanding republic. These calculations often prioritized internal improvements and market stability over immediate integration into global trade networks dominated by European powers. By situating early tariff policy within this mosaic of regional economies and political alliances, it becomes clear that protectionism served multiple purposes beyond shielding domestic manufacturers from foreign competition. It acted as a tool for shaping patterns of settlement, infrastructure investment, and interregional exchange within the United States itself [Har24]. The resulting policies laid important groundwork for later debates over trade liberalization versus protectionism, setting precedents for how different parts of the country would negotiate their sometimes conflicting interests within a shared national framework.

2.2 Major Shifts in Tariff Strategies

Over the course of U.S. economic history, tariff strategies have undergone significant transformations, reflecting shifts in political priorities, global economic conditions, and domestic industrial structures. In earlier periods, tariffs were primarily designed to generate revenue and protect nascent industries from foreign competition. However, as the economy matured and became more integrated into global trade networks, the rationale for tariff use evolved toward more targeted applications aimed at strategic sectors or geopolitical objectives. This transition is evident in the way modern tariff policy often intertwines with broader industrial and foreign policy goals rather than serving solely as a fiscal instrument. One notable shift has been the move from broad-based protectionism to selective targeting of specific goods and industries. For example, recent U.S. administrations have imposed tariffs on steel and aluminum imports not only to support domestic producers but also to address concerns over national security and supply chain resilience [Duc+24]. Such measures mark a departure from earlier eras when tariffs were applied more uniformly across a wide range of imports. The strategic focus on upstream intermediate goods reflects an awareness of their centrality within production networks; disruptions in these inputs can cascade through multiple downstream industries [KR23]. Yet this approach carries risks: when substitution elasticities are high and domestic prices significantly exceed foreign ones, enforcing local sourcing can impose substantial costs on the broader economy. Another major change has been the increasing use of tariffs as leverage in trade disputes rather than as permanent fixtures of economic policy. The U.S.-China trade war illustrates this tactical deployment. Initial tariffs under the Trump administration were not primarily aimed at reducing the bilateral trade deficit or protecting employment but at constraining China's technological advancement and countering its industrial policies [MN24]. These actions targeted products that were not among the most heavily imported from China, indicating a deliberate strategy to influence long-term competitive dynamics rather than short-term trade balances. The Chinese government's retaliatory measures, including tariffs on key U.S. exports such as agricultural goods, underscored how such strategies can escalate into broader economic confrontations [SEW20a]. The Biden administration has maintained many of these tariffs while shifting the narrative toward protecting U.S. workers and enhancing supply chain resilience [HZ22]. This continuity suggests that once implemented, significant tariff measures can become embedded in trade policy frameworks even when political leadership changes. At the same time, there has been an expansion of non-tariff barriers and industrial policies that mirror those of strategic competitors like China [Duc+24]. This reflects a broader reorientation toward using trade policy as part of an integrated economic security strategy rather than treating it as an isolated tool. Trade diversion effects have also become more pronounced in recent decades due to these shifts in strategy. When tariffs are imposed on imports from one country, importers often redirect sourcing to alternative suppliers with unchanged price incentives [TZ20]. During the U.S.-China trade conflict, for instance, reduced imports from China were offset by increased imports from countries such as Mexico and Vietnam [Duc+24]. While this can mitigate some negative impacts on consumers by maintaining supply availability, it also means that intended pressures on targeted economies may be diluted over time. The integration of climate change considerations into trade policy represents another emerging dimension influencing tariff strategies. As highlighted in agricultural trade scenarios between the U.S. and India, rising protectionism interacts with environmental factors like increased price volatility for key commodities [GGK25]. This adds complexity to tariff design because policymakers must account for both market stability and environmental sustainability when determining which sectors to shield or expose to international competition. Quantitative modeling studies further reveal how contemporary tariff strategies differ from historical patterns by emphasizing welfare outcomes across interconnected economies rather than focusing solely on domestic gains. Simulations of multi-country scenarios show that retaliatory tariff wars tend to reduce welfare for both participants while benefiting certain third-party countries through trade diversion [NYA24]. This underscores a critical shift: modern tariff strategies cannot be evaluated purely within national boundaries but must be assessed within a global equilibrium framework where cross-border linkages play a decisive role. Price transmission effects have also become more immediate and transparent due to improved data availability and monitoring capabilities. Empirical evidence indicates that prices for affected goods rise almost instantaneously following tariff implementation, with increases closely matching nominal tariff rates [Cav+19]. This rapid pass-through challenges older assumptions that domestic markets could absorb some portion of tariff costs without significant consumer impact. Finally, political economy factors continue to shape major shifts in tariff strategies. Firms engaged in global production networks often resist protectionist measures that disrupt their operations [HZ22], creating intra-industry divisions between globally integrated companies and those focused primarily on domestic markets. These tensions influence lobbying efforts and can lead to nuanced policy designs that attempt to balance competing interests within the same sector. Taken together, these developments illustrate how U.S. tariff strategies have moved away from uniform protectionism toward highly selective, strategically motivated interventions embedded within broader economic security agendas. They are increasingly shaped by considerations extending beyond immediate industry protection, encompassing geopolitical rivalry, supply chain resilience, environmental pressures, and complex interdependencies within global production systems. This evolution reflects both adaptive responses to changing international conditions and enduring debates over how best to reconcile national economic objectives with participation in an interconnected global economy.

2.3 Tariff Trends in the Late 20th and Early 21st Centuries

By the late 20th century, U.S. tariff policy had shifted markedly from the broad-based protectionism of earlier eras toward a framework shaped by multilateral trade liberalization and targeted sectoral measures. The establishment of the World Trade Organization in 1995, following decades of negotiations under the General Agreement on Tariffs and Trade, institutionalized a rules-based system that progressively reduced average tariff rates across industrialized economies [MN24]. This period also saw the proliferation of regional trade agreements and the deepening of global value chains, facilitated by declining transportation costs, advances in information technology, and standardized production processes. These developments encouraged multinational corporations to fragment production internationally, sourcing intermediate goods from low-cost locations while selling into high-value markets. As a result, tariffs increasingly interacted with complex cross-border supply networks rather than discrete national industries. The integration of U.S. manufacturing into these global production systems meant that even modest tariff changes could have amplified effects through input-output linkages. By the early 2000s, many domestic producers relied heavily on imported components, making them vulnerable to cost increases when tariffs were applied to upstream goods [YLB25]. This interdependence constrained policymakers' ability to use tariffs as blunt instruments without risking harm to downstream sectors. At the same time, political pressures persisted to shield certain industries from foreign competition, particularly those facing structural decline or strategic vulnerabilities. The early 21st century brought renewed debates over the role of tariffs in addressing trade imbalances and protecting domestic employment. While average tariff levels remained historically low due to prior liberalization commitments, selective protectionist measures re-emerged in response to perceived unfair practices by trading partners. For example, safeguard tariffs were periodically imposed on steel imports to support domestic producers against surges in foreign supply. These actions reflected a growing willingness to deploy targeted tariffs within the constraints of international trade rules. A significant turning point occurred during the Trump administration's tenure beginning in 2017. The imposition of tariffs on approximately $283 billion worth of imports in 2018 marked one of the largest expansions of U.S. trade protection since the Great Depression [SA19]. China was a primary target, with tariffs applied to hundreds of product categories valued at $250 billion [ZZZ22]. The stated objectives extended beyond traditional protectionism; they included curbing China's technological advancement and countering industrial policies deemed distortive [MN24]. Retaliatory measures by China on about $121 billion in U.S. exports intensified the conflict, leading to a sustained period of elevated trade barriers between the two largest economies. The economic consequences of these measures were multifaceted. Bilateral trade volumes between the U.S. and China declined sharply as higher tariff rates suppressed flows in both directions [YLB25]. However, trade diversion effects emerged as importers substituted Chinese goods with products from alternative suppliers such as Vietnam and Mexico. While this mitigated some consumer price impacts domestically, it diluted pressure on Chinese exporters and altered global supply chain configurations. Sectoral impacts varied considerably. Technology-intensive industries experienced pronounced negative effects due to their reliance on cross-border flows of high-value components [SEW20b]. Energy exports faced unique challenges because China had fewer alternative suppliers for certain commodities, limiting substitution possibilities but also constraining U.S. market access when retaliatory tariffs were applied. Conversely, some consumer staples sectors were relatively insulated due to their domestic orientation. Empirical analyses indicate that price pass-through from these tariffs was rapid and substantial, with import prices rising nearly proportionally to nominal tariff rates [RW22]. This immediate transmission challenged assumptions that domestic markets could absorb part of the cost increase without affecting consumers significantly. Moreover, retaliatory tariffs disproportionately affected U.S. agricultural exports, particularly soybeans, prompting shifts in Chinese sourcing toward countries like Brazil [FK21]. The broader macroeconomic effects included reductions in both imports and exports alongside changes in foreign direct investment patterns [RW22]. The so-called tariff-jumping hypothesis suggested that higher import barriers might encourage multinational firms to establish local production facilities within the U.S., but evidence for this effect was mixed given increased costs for subsidiaries dependent on imported inputs. Financial markets also responded heterogeneously across sectors during this period. Stock prices in technology, industrials, and energy sectors exhibited stronger adverse reactions compared with more domestically focused industries such as consumer staples or utilities [SEW20b]. These patterns reflected investor assessments of exposure to disrupted supply chains and foreign market access risks. While some policymakers argued that these measures would strengthen domestic manufacturing employment by reducing import competition [LWW19], other mechanisms offset potential gains. Substitution toward service sector consumption and retaliatory losses in export-oriented manufacturing limited net job creation benefits. By the early 2020s, many of these tariffs remained in place under subsequent administrations despite shifts in rhetoric toward multilateral cooperation and supply chain resilience [YLB25]. This persistence underscores how once implemented, significant tariff measures can become embedded within broader economic security strategies even when initial political conditions change. Overall trends from the late 20th century through the early 21st century reveal a trajectory from generalized liberalization toward selective protectionism embedded within complex geopolitical and economic considerations. Tariffs evolved from revenue tools into strategic levers influencing not only domestic industry dynamics but also global production networks and diplomatic relations. The interplay between liberalization commitments made during globalization's expansionary phase and renewed protectionist impulses amid strategic rivalry continues to shape U.S. tariff policy trajectories into the present era.

3 Theoretical Foundations of Tariff Economics

3.1 Classical and Neoclassical Theories of Tariffs

Classical trade theory, rooted in the works of economists such as Adam Smith and David Ricardo, frames tariffs primarily through the lens of comparative advantage. In this framework, countries benefit from specializing in goods for which they have a relative productivity advantage and trading for others. Tariffs disrupt this allocation by artificially altering relative prices, leading to a misallocation of resources away from their most efficient uses. The imposition of tariffs under classical assumptions reduces aggregate welfare because it distorts consumption and production decisions, creating deadweight losses that outweigh any gains to protected industries [Faj+20]. These models assume perfect competition, constant returns to scale, and full employment, which simplifies the analysis but also limits its applicability to more complex modern economies. Neoclassical trade theory extends these ideas by incorporating marginalist principles and general equilibrium analysis. Within this framework, tariffs are analyzed not only in terms of their direct effects on trade flows but also through their impact on factor markets and income distribution. The Stolper-Samuelson theorem, for example, predicts that a tariff will raise the real return to the factor used intensively in the protected sector while lowering the return to other factors. This creates clear winners and losers within an economy, even if aggregate welfare declines. The neoclassical approach also emphasizes substitution effects between domestic and imported goods; when tariffs increase import prices, consumers shift toward domestic substitutes, altering demand patterns across sectors [Kim18]. A key feature of neoclassical models is their ability to handle more complex economic environments without losing analytical tractability. As outlined in formal derivations, certain welfare measures such as equivalent variation (EV) can be computed using pre-tariff trade flows, initial tariff rates, and observed changes in international prices and import quantities after tariff implementation [FK21]. This holds under perfect competition regardless of the complexity of input-output linkages or consumer heterogeneity. Such results allow economists to quantify welfare changes from tariff policies with relatively parsimonious data requirements. The incidence of tariffs, how the burden is shared between domestic consumers, producers, and foreign exporters, is central to both classical and neoclassical perspectives. Classical theory often assumes that small countries face perfectly elastic world supply curves for imports, meaning that tariffs are fully passed on to domestic consumers through higher prices. Neoclassical models relax this assumption by allowing for terms-of-trade effects: large countries may be able to shift part of the tariff burden onto foreign exporters by reducing world demand for their goods [Faj+20]. However, empirical evidence from recent U.S. tariff episodes suggests that pass-through rates can approach 100%, indicating limited scope for favorable terms-of-trade shifts in practice [Duc+24]. In both theoretical traditions, tariffs generate efficiency losses through two primary channels: consumption distortion and production distortion. Consumption distortion arises because higher prices reduce demand for imported goods below efficient levels; production distortion occurs when resources are drawn into less productive protected sectors at the expense of more competitive export-oriented industries. Neoclassical general equilibrium models capture these distortions explicitly by linking sectoral outputs through input-output relationships and ensuring macroeconomic consistency between expenditures and incomes [NYA24]. This allows for a richer analysis of how tariffs propagate through an economy compared with partial equilibrium approaches. Another important insight from neoclassical theory is the non-monotonic relationship between protection levels and welfare outcomes under certain conditions. When protection is low, geographic or location effects may dominate allocation effects; however, beyond a critical threshold τ_c, allocation inefficiencies outweigh any location-based advantages [Mar20]. This implies that moderate tariffs might yield different spatial or sectoral outcomes than very high ones, even if both reduce aggregate efficiency. The political economy dimension intersects with these theoretical frameworks by explaining why governments impose tariffs despite predicted welfare losses. Classical models often treat policy as exogenous, focusing on efficiency implications. Neoclassical extensions incorporate endogenous policy formation where interest groups lobby for protection based on expected gains to specific factors or industries [Kim18]. This aligns with observed patterns where concentrated producer interests outweigh diffuse consumer losses in shaping trade policy outcomes. From a methodological standpoint, computable general equilibrium (CGE) models operationalize neoclassical theory by simulating how tariff changes affect multiple interconnected markets simultaneously [ZZZ22]. These models integrate microeconomic behavioral equations with macroeconomic accounting identities to ensure internal consistency while capturing substitution patterns across goods and factors. They are particularly useful for analyzing modern tariff scenarios involving global value chains where intermediate inputs cross borders multiple times before final consumption. In sum, classical theory provides foundational insights into why tariffs tend to reduce overall welfare by distorting comparative advantage-driven trade patterns. Neoclassical theory builds on this foundation by embedding these distortions within a broader general equilibrium context that accounts for factor price adjustments, intersectoral linkages, and potential terms-of-trade effects. While both predict net efficiency losses under most conditions, neoclassical approaches offer greater flexibility in modeling real-world complexities such as heterogeneous agents, imperfect substitution between goods, and multi-stage production processes. Empirical applications confirm many theoretical predictions but also highlight deviations, such as near-complete pass-through rates, that underscore the importance of integrating data-driven analysis with theoretical constructs when evaluating tariff policies [FK21].

3.2 Tariffs in Modern Trade Theory

3.2.1 Imperfect Competition and Tariffs

In markets characterized by imperfect competition, the effects of tariffs diverge significantly from the predictions of classical and neoclassical models that assume perfect competition. Under imperfect competition, firms possess market power, allowing them to set prices above marginal cost. This creates an environment in which tariffs influence not only quantities traded but also strategic pricing behavior and markups. The degree of pass-through from tariffs to domestic prices depends on the structure of competition, demand elasticities, and the extent of foreign and domestic firm participation in the market. When a tariff is imposed in a monopolistic or oligopolistic setting, foreign exporters may adjust their pre-tariff prices downward to maintain market share, thereby absorbing part of the tariff burden. This partial pass-through can improve the importing country's terms of trade if the reduction in foreign export prices offsets some of the tariff's impact on domestic consumers [MN24]. However, such gains are contingent on the relative bargaining power between domestic importers and foreign suppliers, as well as on the substitutability between imported and domestically produced goods. In contrast to perfect competition scenarios where small countries face perfectly elastic import supply curves, large economies can exploit their market size to shift part of the tariff incidence abroad through these strategic interactions [DST20]. The presence of variable markups further complicates tariff incidence. In oligopolistic markets with differentiated products, preferential tariff reductions can stimulate entry from favored origins, increasing competitive pressure and reducing individual firms' market power even if total market share for that origin rises [CHP24]. This pro-competitive effect can lead to lower markups despite higher aggregate penetration by foreign firms benefiting from reduced tariffs. Conversely, when tariffs are increased against specific origins, incumbent domestic producers may respond by raising prices if competitive pressure diminishes. The net effect on consumer welfare thus depends on whether reduced competition outweighs any terms-of-trade improvements achieved through partial pass-through. Empirical evidence supports these theoretical mechanisms. Studies show that entry by foreign firms into a domestic market tends to reduce both prices and markups for incumbent domestic producers [ARW19]. This suggests that trade liberalization under imperfect competition can yield significant consumer benefits through intensified price competition. However, when tariffs are raised, particularly in concentrated industries, the opposite dynamic emerges: reduced foreign presence allows incumbents to expand margins at consumers' expense. The magnitude of this effect is sensitive to industry concentration ratios and cross-price elasticities among competing products. Strategic interactions also play a role in determining how tariffs affect firm behavior when there is no entry or exit. If all firms in an industry face identical shocks, such as a uniform tariff increase across all origins, relative competitiveness remains unchanged and markup adjustments may be negligible [CHP24]. In such cases, price changes reflect primarily cost pass-through rather than shifts in competitive positioning. By contrast, asymmetric application of tariffs across origins alters relative costs and can trigger substantial reallocation of market shares among competitors. The 2018–2019 U.S.–China trade conflict illustrates these dynamics vividly. Tariffs imposed by both sides not only reduced bilateral trade volumes but also altered competitive conditions within affected industries [QFZ22]. In sectors where Chinese imports faced steep U.S. tariffs while alternative suppliers were unaffected, non-Chinese exporters gained market share and could adjust pricing strategies accordingly. Meanwhile, retaliatory Chinese tariffs on U.S. exports eroded American firms' competitiveness abroad, prompting some to consider relocating production facilities to circumvent trade barriers [Cha+19]. These adjustments underscore how imperfectly competitive markets transmit tariff shocks through both price-setting behavior and strategic capacity decisions. From a welfare perspective, imperfect competition introduces additional channels through which tariffs can generate gains or losses beyond those identified in perfect competition models. For example, under certain conditions a large country might use tariffs strategically to extract rents from foreign monopolists or oligopolists by forcing them to lower export prices [MN24]. Yet such policies risk retaliation that erodes any initial advantage [QFZ22], particularly when trading partners possess similar market power or control over critical inputs. Moreover, while targeted protection might temporarily benefit specific domestic producers by shielding them from aggressive foreign pricing strategies, it can also reduce incentives for efficiency improvements if competitive pressures subside [ARW19]. Quantitative modeling approaches have begun incorporating these features into general equilibrium frameworks that allow for variable markups and endogenous entry-exit decisions under trade policy changes [CHP24]. These models reveal that preferential liberalizations can paradoxically reduce average markups even as they increase total import penetration from favored sources, a result driven by intensified intra-origin competition among entrants. Conversely, discriminatory tariff hikes tend to raise average markups by reducing competitive intensity unless offset by substitution toward untaxed suppliers with comparable cost structures. In sum, analyzing tariffs under imperfect competition requires attention to strategic pricing responses, markup variability, entry-exit dynamics, and potential terms-of-trade effects arising from partial pass-through. The interplay between these factors determines whether protectionist measures enhance or diminish national welfare in practice. While theory identifies scenarios where large economies might leverage their market power for favorable outcomes, empirical evidence from recent trade disputes suggests that retaliation risks and supply chain disruptions often undermine such strategies' effectiveness [Duc+24]. Consequently, policy evaluation must weigh short-term distributional gains against long-term efficiency costs within an interconnected global marketplace shaped by imperfectly competitive structures.

3.2.2 Market Structure and Tariff Effects

The structure of a market fundamentally shapes how tariffs influence prices, quantities, and welfare outcomes. In perfectly competitive markets, the standard prediction is that tariffs raise domestic prices by the full amount of the duty when the importing country is small relative to world markets. However, deviations from perfect competition alter both the incidence and magnitude of these effects. In monopolistic or oligopolistic settings, firms possess pricing power that allows them to adjust markups in response to tariff changes, leading to partial rather than complete pass-through to domestic consumers [DST20]. The extent of this pass-through depends on demand elasticities, cost structures, and the degree of substitutability between imported and domestically produced goods. When foreign exporters face a tariff in a concentrated market, they may lower their pre-tariff export prices to maintain market share, absorbing part of the tariff burden themselves. This strategic pricing behavior can improve the importing country's terms of trade if foreign price concessions offset some of the domestic price increase [MN24]. Yet such benefits are conditional on the relative bargaining positions of buyers and sellers; in markets where foreign suppliers have few competitors or control critical inputs, their ability to resist price reductions is greater. Conversely, in fragmented supplier markets with high substitutability, importers can more easily switch sources, forcing exporters to bear more of the tariff's cost. Market concentration also influences how domestic producers respond to reduced import competition. In industries with high concentration ratios, a tariff that limits foreign supply can enable incumbents to raise prices and expand margins without fear of losing significant market share. This effect can outweigh any terms-of-trade gains if it leads to substantial consumer welfare losses through higher prices and reduced variety. By contrast, in less concentrated industries with many competing firms, increased protection may have a smaller impact on markups because competitive pressures remain strong even after imports decline. The interaction between tariffs and entry-exit dynamics further complicates outcomes. Preferential tariff reductions for certain countries can encourage new entrants from those origins, intensifying competition within that subset of suppliers and potentially lowering average markups despite higher aggregate import penetration [CHP24]. On the other hand, discriminatory tariff increases targeting specific countries can lead to exit by affected foreign firms, reducing competitive intensity and enabling surviving suppliers, domestic or foreign, to raise prices. The net welfare effect hinges on whether substitution toward untaxed suppliers maintains sufficient competition in the market. Empirical evidence supports these theoretical predictions. Studies indicate that entry by foreign firms tends to reduce both prices and markups for incumbent producers [ARW19]. This suggests that trade liberalization under imperfect competition yields consumer benefits not only through lower direct costs but also via intensified price rivalry. Conversely, when tariffs are raised in concentrated sectors such as motor vehicles, where monopolistic competition prevails, domestic price increases often exceed what would be expected under perfect competition due to reduced competitive pressure [DST20]. The 2018–2019 U.S.–China trade conflict provides a concrete example of how market structure mediates tariff effects. In sectors where Chinese imports faced steep U.S. tariffs while alternative suppliers were unaffected, non-Chinese exporters gained market share and adjusted their pricing strategies accordingly [Cha+19]. Some were able to increase prices due to reduced competition from Chinese firms, while others maintained or lowered prices to consolidate their newly acquired market positions. Retaliatory Chinese tariffs on U.S. exports had similar structural consequences abroad: American firms lost competitiveness in China relative to suppliers from untaxed countries, prompting some companies to consider relocating production facilities as a means of circumventing trade barriers [MN24]. These dynamics illustrate that tariffs do not operate solely through direct cost effects but also reshape competitive landscapes in ways that influence long-term industry structure. For instance, sustained protection in an oligopolistic industry may reduce incentives for innovation if incumbents become insulated from foreign rivalry [ARW19]. Alternatively, targeted liberalization could spur efficiency improvements by forcing domestic producers to match lower-cost or higher-quality imports from preferred trading partners. From a policy perspective, understanding these interactions is essential because welfare outcomes depend not just on static price changes but also on dynamic adjustments in firm behavior and market composition. Large economies may attempt to exploit their size by imposing tariffs designed to extract rents from foreign oligopolists through forced price reductions [MN24], but such strategies carry significant risks if trading partners retaliate with measures targeting equally concentrated industries where they hold leverage [Cha+19]. Moreover, global supply chain integration means that even industries appearing domestically oriented may rely on imported intermediate goods whose costs are sensitive to upstream market structures abroad [Duc+24]. Quantitative modeling approaches incorporating variable markups and endogenous entry-exit decisions provide valuable tools for assessing these complex interactions [CHP24]. Such models reveal scenarios where preferential liberalizations reduce average markups despite increasing total import penetration, a counterintuitive result driven by heightened intra-origin competition among entrants. They also show how discriminatory tariff hikes tend to raise average markups unless offset by substitution toward untaxed suppliers with comparable cost structures. These insights underscore that evaluating tariff policies requires careful consideration of underlying market structures alongside traditional measures of trade flows and price changes.

3.2.3 Welfare Implications of Tariff Changes

The welfare implications of tariff changes depend critically on the size of the economy imposing the tariff, the elasticity of foreign supply, and the structure of domestic and international markets. In a small-country setting where import supply is perfectly elastic, an increase in tariffs raises domestic prices by the full amount of the duty, leading to a pure welfare loss through consumption and production distortions without any offsetting terms-of-trade gains [MN24]. The deadweight losses in such cases are represented by the triangular areas corresponding to reduced consumption and inefficiently expanded domestic production, while tariff revenue collected from consumers is merely a transfer to the government rather than a net gain. In contrast, large economies can influence world prices through their import demand. When foreign goods are supplied inelastically, part of the tariff burden can be shifted onto exporters via lower pre-tariff world prices [RW22]. This terms-of-trade improvement partially offsets domestic welfare losses from distorted consumption and production patterns. The magnitude of this gain depends on the relative slopes of import demand and export supply curves; however, empirical evidence from recent U.S. tariff episodes suggests that pass-through rates to domestic prices have often been close to complete, limiting realized terms-of-trade benefits [Cav+19]. The theoretical framework for evaluating these effects can be illustrated using partial equilibrium analysis. In such models, the imposition of a tariff increases domestic prices from P_w to P_t, reducing imports from AB to CE. Consumer surplus falls by an area equal to a trapezoid representing higher prices on remaining imports plus two triangles capturing lost consumption. Producer surplus rises as domestic suppliers expand output at higher prices, but this gain is typically smaller than consumer losses. Tariff revenue accrues to the government as a rectangle defined by post-tariff import quantities multiplied by the tariff rate [Fus20]. The net welfare effect is negative unless terms-of-trade gains, represented by an additional area in large-country cases, are sufficiently large to outweigh efficiency losses. General equilibrium approaches extend this analysis by incorporating intersectoral linkages and cross-border feedback effects. For example, computable general equilibrium simulations of retaliatory trade wars show that while certain protected sectors may experience output gains, aggregate national welfare declines once higher input costs and reduced export opportunities are accounted for [NYA24]. These models also capture how tariffs can reallocate resources toward less efficient sectors, compounding long-term productivity losses. In some scenarios, third-party countries benefit through trade diversion as they replace targeted exporters in supplying protected markets [YLB25]. Such spillovers highlight that welfare changes cannot be assessed solely within national boundaries but must consider global redistribution effects. Sector-specific studies reveal substantial heterogeneity in welfare impacts depending on exposure to international competition and integration into global value chains. For instance, during the U.S.–China trade conflict, Chinese retaliatory tariffs on soybeans reduced U.S. producer prices by between 3.9% and 4.9%, directly lowering farm incomes despite government compensation programs [ASH21]. Conversely, some industries supplying untargeted markets experienced increased demand as buyers substituted away from tariff-affected sources [YLB25]. This asymmetry underscores that aggregate welfare measures mask significant distributional consequences across regions and industries. The quality dimension of imports adds another layer to welfare analysis. Reductions in tariffs generally lower average consumer prices for imported goods; however, if these reductions disproportionately affect lower-quality products, quality-adjusted prices may actually rise, a phenomenon akin to a Metzler-like paradox [HIM22]. This implies that nominal price changes alone may misrepresent true welfare effects when product quality varies systematically with trade policy shifts. Similarly, under imperfect competition with differentiated products, tariffs can reduce consumer choice by limiting available varieties [ARW19], thereby generating additional welfare losses beyond those captured in standard price-quantity frameworks. Empirical cost estimates further illustrate these mechanisms. In 2018, U.S. tariffs generated approximately $14 billion in government revenue but imposed deadweight losses estimated at $8.2 billion due to reduced variety and supply chain reorganization costs [YLB25]. While some redistribution occurred from foreign exporters to U.S. producers via higher domestic prices or market share gains, these transfers did not offset aggregate efficiency losses once broader economic adjustments were considered. Moreover, retaliatory measures eroded potential gains by restricting access for U.S. exports in key markets such as agriculture and manufacturing [NYA24]. Optimal tariff theory suggests that under certain conditions, particularly for large economies facing inelastic foreign supply, positive tariffs can maximize national welfare by exploiting terms-of-trade effects [RW22]. However, dynamic considerations complicate this prescription: retaliation risks can nullify initial gains, while persistent protection may reduce competitive pressures on domestic firms and slow innovation [IT24]. Additionally, when tariffs target intermediate goods central to production networks, downstream industries face higher costs that propagate through supply chains, amplifying overall welfare losses [Duc+24]. From a policy perspective, these findings indicate that evaluating tariff changes requires balancing short-term distributional objectives against long-term efficiency considerations within both domestic and international contexts. Welfare outcomes hinge not only on static price effects but also on dynamic responses such as entry-exit decisions by firms, shifts in sourcing strategies across countries, and adjustments in product quality or variety offered to consumers [ARW19]. Quantitative modeling integrating these elements provides a more comprehensive picture of how tariffs reshape economic activity over time than partial equilibrium analyses alone can offer. Ultimately, while specific configurations of market power and trade elasticities may allow for limited welfare improvements through carefully calibrated tariffs, as posited by optimal tariff theory, the empirical record suggests that broad-based or retaliatory-driven tariff increases tend to reduce aggregate national welfare once all channels are considered [MN24]. The interplay between direct fiscal transfers via tariff revenue, indirect efficiency costs from distorted resource allocation, and strategic interactions with trading partners defines the complex calculus underlying real-world welfare implications of tariff policy changes.

3.3 Transmission Channels of Tariff Effects

Tariffs influence economic outcomes through multiple, interrelated channels that operate both directly and indirectly across domestic and international markets. A primary mechanism is the alteration of relative prices between imported and domestically produced goods. When a tariff is imposed, the landed price of affected imports rises, prompting substitution toward domestic alternatives or toward imports from untaxed sources [Fus20]. The magnitude of this substitution depends on the elasticity of demand for the imported good and the availability of close substitutes. In cases where domestic production can expand to meet increased demand, output in protected sectors may rise; however, this often occurs at higher marginal costs, leading to allocative inefficiency compared with pre-tariff trade patterns. Another important channel operates through production cost linkages in global value chains. Many industries rely on imported intermediate inputs whose prices increase when tariffs are applied upstream [BF19b]. This raises production costs for downstream sectors, potentially eroding their competitiveness in both domestic and export markets. For example, tariffs on steel and aluminum not only affect those industries directly but also increase costs for automotive, machinery, and construction sectors that use these metals intensively. The resulting cost pass-through can lead to higher final goods prices, reduced demand, and lower output in downstream industries [LWW19]. These input-output effects mean that even sectors not directly targeted by tariffs can experience significant negative impacts. Retaliatory measures by trading partners constitute a further transmission channel with substantial feedback effects. When a country imposes tariffs, affected exporters abroad may face reduced market access and respond by lobbying their governments for countermeasures. Such retaliation often targets politically sensitive or economically significant exports from the initiating country [BS20]. In the U.S.–China trade conflict, Chinese retaliatory tariffs on agricultural products like soybeans sharply reduced U.S. export volumes to China, depressing farm incomes despite domestic support programs. This illustrates how retaliation can offset any initial gains to protected industries by harming other export-oriented sectors. Non-tariff trade costs also play a role in transmitting tariff effects. Beyond formal duties, trade policy changes can alter transportation costs, administrative burdens, and compliance requirements [LWW19]. These non-tariff barriers consume real resources, such as time spent on customs procedures or investments in alternative logistics routes, that do not generate revenue but still raise effective trade costs. In some cases, these frictions exacerbate the impact of tariffs by compounding delays and uncertainty in supply chains. Market structure conditions mediate how these channels operate in practice. In imperfectly competitive markets with differentiated products, foreign suppliers facing tariffs may adjust their pre-tariff prices downward to maintain market share [MN24]. This partial pass-through shifts part of the tariff burden onto exporters rather than consumers. However, when foreign competition is reduced, either through high concentration or targeted tariff increases, domestic producers may exploit diminished rivalry to raise markups [ARW19]. Such strategic pricing responses can amplify consumer welfare losses beyond those predicted under perfect competition assumptions. Macroeconomic linkages provide another layer of transmission. Tariffs influence exchange rates through their effects on trade balances; they can also interact with monetary policy settings if central banks respond to inflationary pressures from higher import prices [BF19a]. In open economies with floating exchange rates targeting low inflation, nominal rigidities such as sticky wages can magnify output losses from tariff shocks because relative price adjustments occur more slowly than required for efficient reallocation of resources. The composition of consumer expenditure shifts as well when tariffs alter relative prices between tradable and non-tradable goods. Higher import prices may redirect spending toward domestically produced non-tradables or services, changing sectoral employment patterns [LWW19]. While this reallocation might benefit certain local industries in the short term, it can reduce overall productivity if labor and capital move into less efficient uses compared with pre-tariff allocations. International sourcing decisions are also sensitive to tariff-induced cost changes. Firms embedded in global supply chains may respond by diversifying suppliers geographically to mitigate exposure to specific tariff risks [GH21]. This reconfiguration can involve shifting production stages across borders or increasing reliance on regional trade agreements that offer preferential access. While such adjustments may restore some competitiveness over time, they often entail transition costs such as new supplier vetting, renegotiation of contracts, or investment in alternative facilities. Transport cost dynamics form an additional pathway linking tariffs to broader economic outcomes. Empirical evidence suggests that import tariffs can influence freight rates for exports as well as imports when transport markets exhibit oligopolistic structures [HIT18]. For instance, reductions in import tariffs on intermediate inputs could lower shipping costs for exports if transport firms adjust pricing based on backhaul opportunities. Conversely, higher import tariffs might raise export freight rates if they reduce inbound cargo volumes needed to balance shipping flows. Price transmission along value chains is particularly relevant for final consumer welfare. Tariffs on intermediate goods feed into the prices of final products through cumulative markups at each stage of production [BF19b]. The degree of this pass-through depends on factors such as vertical integration levels and contractual arrangements between suppliers and buyers. In highly fragmented supply chains with multiple independent firms adding margins sequentially, even modest upstream tariffs can result in substantial retail price increases. Finally, expectations and uncertainty act as intangible yet powerful transmission mechanisms. Anticipation of future tariff changes can prompt preemptive adjustments in inventory holdings, investment timing, and contract terms [SWX21]. Firms may accelerate shipments ahead of scheduled tariff hikes or delay capital expenditures until policy clarity improves. Such behavior affects short-term trade flows and macroeconomic indicators independently of actual tariff implementation. Taken together, these channels demonstrate that the impact of tariffs extends far beyond immediate price changes at the border. They propagate through production networks via input cost adjustments; they reshape competitive dynamics within markets; they trigger strategic responses from trading partners; they interact with macroeconomic variables like exchange rates and inflation; they alter sourcing strategies; they influence transport economics; they cascade along value chains; and they shape expectations that drive anticipatory behavior among firms and consumers alike. The interplay among these mechanisms determines the ultimate distributional and aggregate welfare consequences of any given tariff policy [Fus20; BF19b; BS20; HIT18].

4 Structure and Characteristics of US Trade

4.1 Trade Patterns and Partners

The configuration of U.S. trade patterns reflects a combination of historical relationships, sectoral specializations, and evolving geopolitical considerations. Bilateral trade with China has been one of the most significant features in recent decades, both in terms of volume and strategic importance. Prior to the imposition of tariffs during the 2018–2019 trade conflict, U.S.–China trade exhibited strong integration across both standard goods and global value chain (GVC)-related flows. The gross bilateral trade deficit with China, valued at approximately $296.7 billion, was reduced by over 20% when measured in domestic value added (DVA) terms, indicating that a substantial portion of gross imports from China contained intermediate inputs sourced from other countries [Fus20]. This underscores the complexity of attributing trade imbalances solely to direct bilateral exchanges without accounting for multi-country production linkages. The onset of the tariff war altered these patterns significantly. Empirical evidence shows that while bilateral trade volumes between the U.S. and China contracted sharply, global trade growth did not slow proportionally because exports targeted by tariffs were reallocated to producers in other countries [ZK24]. This reallocation manifested as increased sourcing from alternative partners such as Vietnam, Mexico, and members of the Association of Southeast Asian Nations (ASEAN), which were able to fill supply gaps created by reduced Chinese imports into the U.S. market [BS20]. Such shifts illustrate how trade diversion can mitigate some domestic price impacts while simultaneously reshaping supplier networks. The European Union (EU) occupies a distinct position within U.S. trade patterns. Major economies such as Germany, France, and Italy maintain differentiated roles in supplying both final goods and intermediate inputs to the U.S., with

Germany in particular strengthening its role as a provider of intermediates during periods of U.S.–China tension. Italy has emerged as an important platform for Chinese value added entering the U.S. through third-country exports, reflecting how GVC restructuring can channel bilateral flows through intermediary partners when direct routes are disrupted by tariffs [Fus20]. This phenomenon highlights that nominal country-of-origin statistics may obscure underlying production realities when multinational firms adjust supply chains to circumvent tariff barriers. Trade elasticity varies considerably across sectors and influences how different partners respond to policy changes. Analysis indicates that preferential policies can increase total trade flows by significant margins, estimated at 7% above predicted levels, while tariffs can reduce them by around 9%, producing a net negative effect on overall predicted trade [CS22]. These aggregate figures mask heterogeneity: sectors with high substitutability between suppliers tend to experience more pronounced shifts toward untaxed partners, whereas industries dependent on specialized inputs or technologies may see less flexibility in sourcing. Third-country effects are also notable in assessing U.S. trade partnerships. The indirect tariff burden borne by non-targeted countries during the U.S.–China conflict varied depending on their integration into affected supply chains [MG20]. For example, suppliers of intermediate goods to China that were ultimately destined for the U.S. market faced reduced demand when Chinese exports declined under tariff pressure. Conversely, some countries benefited from increased access to both U.S. and Chinese markets as they replaced targeted exporters in certain product categories. Sector-specific dynamics further shape partner relationships. In energy markets, for instance, the U.S. has maintained competitive advantages in certain export segments; however, protectionist measures risk undermining these advantages if retaliatory actions restrict market access or distort pricing mechanisms [ITC21]. Agricultural commodities have been particularly sensitive to partner-specific policy changes: retaliatory tariffs from China on soybeans redirected Chinese demand toward Brazil and other suppliers, reducing U.S. market share despite compensatory domestic subsidies [BS20]. Patterns within GVCs reveal additional nuances in partner roles. The disruption of direct U.S.–China exchanges led both economies to contract their backward integration into GVCs due to higher costs for imported intermediates [Fus20]. In contrast, EU countries increased their backward linkages with the U.S., suggesting a deepening transatlantic production relationship even as transpacific ties weakened. This divergence points toward a potential long-term reorientation of supply chains favoring regions with stable political-economic relations over those subject to recurrent tariff disputes. Trade diversion effects extend beyond simple substitution among suppliers; they also involve qualitative changes in traded goods portfolios. When tariffs target technologically advanced products or critical inputs, importers may shift toward lower-quality or less technologically sophisticated alternatives from untaxed sources [CS22]. Such adjustments can have downstream implications for productivity and innovation within domestic industries relying on imported components. The persistence of altered trade patterns after initial shocks suggests that temporary policy measures can have lasting structural consequences. Even after partial easing under agreements like the Phase One deal between the U.S. and China, many firms retained diversified sourcing strategies developed during peak tariff periods [BS20]. This stickiness reflects sunk costs associated with establishing new supplier relationships and hedging against future policy uncertainty. From a macroeconomic perspective, these evolving patterns influence not only bilateral balances but also multilateral positions within global trade networks. As certain partners gain prominence due to geopolitical realignments or comparative advantages in untaxed sectors, they may capture larger shares of value added embedded in final goods consumed in the U.S., thereby altering income distribution across trading nations [Fus20]. The interplay between direct bilateral flows and indirect multilateral channels thus remains central to understanding current and future configurations of U.S. trade partnerships. Overall, contemporary U.S. trade patterns are characterized by high interdependence with major economies like China and the EU alongside growing engagement with emerging suppliers positioned to benefit from tariff-induced diversification [ZK24; CS22; BS20; MG20]. These relationships are mediated by sectoral elasticities, GVC structures, and strategic responses to policy shifts that collectively determine how shocks propagate through international markets and reshape long-standing commercial ties.

4.2 Sectoral Composition of US Imports and Exports

The composition of U.S. imports and exports reflects a complex interplay between domestic production capabilities, comparative advantages, and the structure of global value chains. Over recent decades, the United States has maintained a diversified import portfolio spanning consumer goods, intermediate inputs, capital equipment, and raw materials. A significant share of imports consists of manufactured goods sourced from economies with competitive cost structures or specialized technological capabilities. For example, prior to the escalation of trade tensions in 2018, China accounted for over one-fifth of total U.S. imports, supplying a wide range of products from electronics and machinery to textiles and furniture. This dominance was underpinned by China's abundant labor supply and extensive manufacturing infrastructure, enabling it to surpass other export-oriented economies such as the so-called Asian Dragons and Tigers in supplying the U.S. market. However, the imposition of tariffs during the Sino–U.S. trade war triggered a marked decline in China's share of U.S. imports, falling from 21.6% in 2017 to 16.5% by 2022 [MN24]. The contraction in Chinese import share was accompanied by increased sourcing from alternative suppliers including Vietnam, Mexico, and members of ASEAN [BS20]. These shifts were not uniform across sectors; industries with high substitutability between suppliers, such as apparel or certain categories of consumer electronics, were able to pivot more rapidly toward untaxed origins. In contrast, sectors dependent on specialized intermediate goods or proprietary technologies exhibited less flexibility in adjusting sourcing patterns. The reconfiguration of supply chains also involved indirect channels: some Chinese value added entered the U.S. through third countries like Italy, which acted as intermediaries within global production networks [Fus20]. This highlights that nominal country-of-origin statistics may obscure underlying sectoral dependencies when multinational firms restructure trade routes to circumvent tariff barriers. On the export side, U.S. sales abroad are concentrated in high-value sectors such as aerospace equipment, advanced machinery, pharmaceuticals, agricultural commodities, and energy products. Agricultural exports have historically played a central role in trade balances with key partners; however, they are particularly vulnerable to retaliatory measures due to their political salience and relatively elastic demand substitution possibilities [WM20]. During the U.S.–China trade conflict, retaliatory tariffs on soybeans sharply reduced American shipments to China, prompting a redirection of Chinese demand toward Brazil [NYA24]. This shift not only eroded U.S. market share but also depressed domestic farmgate prices despite government compensation programs aimed at offsetting income losses. Manufactured exports exhibit strong integration into global value chains through both forward and backward linkages. Sectors such as automotive manufacturing rely heavily on imported intermediate components, engines, electronics modules, that are assembled domestically before being exported as finished vehicles [YLB25]. Tariffs on upstream inputs like steel and aluminum therefore have indirect effects on export competitiveness by raising production costs for downstream industries [WM20]. Similarly, capital goods exports benefit from imported subcomponents whose cost increases under protectionist measures can undermine price competitiveness in foreign markets. Energy exports represent another important component of the U.S. trade profile. The shale revolution expanded crude oil and liquefied natural gas (LNG) output significantly over the past decade, positioning the United States as a major supplier to global markets [ITC21]. However, these gains are sensitive to geopolitical developments and tariff regimes; retaliatory measures targeting energy products can disrupt established trade flows given limited short-term substitutability among suppliers for certain grades or specifications. The sectoral composition of imports also reveals substantial exposure to intermediate goods critical for domestic manufacturing productivity. Electronics components, including semiconductors, are sourced predominantly from East Asian economies with advanced fabrication capabilities [MN24]. Disruptions in these supply lines due to tariffs or other trade barriers can cascade through multiple downstream sectors such as computing equipment, telecommunications devices, and industrial automation systems [WM20]. The Chips and Science Act exemplifies policy responses aimed at reshoring production capacity for strategic intermediates like semiconductors while reducing reliance on foreign suppliers [MN24]. Services trade forms an increasingly significant part of both imports and exports although it is less visible in traditional merchandise statistics. The United States maintains a surplus in many services categories, such as financial services, intellectual property licensing, education-related travel, but also imports substantial volumes of business process outsourcing and IT-enabled services from lower-cost locations [YLB25]. While tariffs do not directly apply to most services transactions under current WTO rules, restrictions on data flows or cross-border investment can indirectly affect these sectors' performance. Sector-specific elasticities influence how different parts of the import-export mix respond to policy changes. Empirical estimates suggest that preferential policies can raise total trade flows by around 7% above predicted levels while tariffs reduce them by approximately 9%, producing net negative effects overall [CS22]. These averages mask considerable heterogeneity: high-elasticity sectors such as apparel adjust rapidly through supplier substitution whereas low-elasticity sectors like aerospace face greater difficulty reconfiguring supply chains without incurring significant cost penalties. Global value chain participation further complicates sectoral analysis because many traded goods embody value added from multiple countries along their production path [Fus20]. For instance, an aircraft exported from the United States may incorporate avionics from Japan, composite materials from Europe, and engine components from Canada before final assembly domestically. Tariffs applied at any stage along this chain can alter cost structures throughout the network. The persistence of altered sectoral patterns after initial shocks suggests that temporary disruptions often have lasting consequences for trade composition. Firms that diversified sourcing during peak tariff periods frequently maintain these arrangements even after partial easing due to sunk costs associated with establishing new supplier relationships and hedging against future uncertainty [BS20]. This stickiness implies that policy-induced shifts in sectoral composition may endure beyond the immediate horizon of specific disputes. Overall, the sectoral makeup of U.S. imports is characterized by heavy reliance on manufactured consumer goods and strategic intermediates sourced globally while exports emphasize high-value manufactures, agricultural commodities sensitive to retaliation risks, energy products tied to geopolitical conditions, and competitive service offerings [MN24; WM20; NYA24; CS22]. The interaction between these sectoral profiles and evolving tariff regimes shapes not only bilateral balances but also broader patterns within global production systems that determine long-term competitiveness across industries.

4.3 Role of Global Value Chains in US Trade

Global value chains (GVCs) have become a defining feature of U.S. trade, shaping both the composition and direction of flows in goods and services. The integration of U.S. industries into these multi-country production networks means that a significant share of imports and exports consists of intermediate goods that cross borders multiple times before reaching final consumers [MN24]. This vertical division of labor allows firms to source components from the most cost-effective locations globally, assemble them domestically or abroad, and then re-export them as part of higher-value products. As a result, gross trade statistics often overstate bilateral imbalances because they do not account for the foreign value added embedded in imports or the domestic value added embodied in exports [ZZZ22]. The structure of U.S.–China trade prior to recent tariff escalations illustrates this complexity. A large proportion of Chinese exports to the United States contained inputs sourced from other countries, while U.S. exports to China similarly incorporated foreign-sourced components [Fus20]. When measured in domestic value added terms, the U.S. bilateral deficit with China was substantially smaller than gross figures suggested. This reflects the fact that GVC linkages distribute production stages across multiple economies, making it difficult to attribute trade balances solely to direct bilateral exchanges. Tariff measures disrupt these established linkages by raising the cost of imported intermediates, prompting firms to adjust sourcing strategies. For example, during the 2018–2019 U.S.–China trade conflict, higher tariffs on intermediate goods such as electronics components and machinery parts increased production costs for downstream industries in both countries [QFZ22]. In response, some U.S. firms shifted procurement toward alternative suppliers in countries like Vietnam or Mexico, while others restructured supply chains through third-country assembly platforms, such as Italy for certain Chinese-origin inputs, to circumvent direct tariff exposure [Fus20]. These adjustments demonstrate how GVCs can reconfigure rapidly under policy shocks, but also how such changes entail transition costs and potential efficiency losses. The degree to which tariffs alter GVC participation depends on sectoral characteristics and the substitutability of inputs. Industries with highly specialized components, such as semiconductors, face greater difficulty replacing suppliers without incurring quality or compatibility issues [MN24]. In contrast, sectors producing standardized goods like basic textiles can more readily switch sources when tariffs make existing suppliers less competitive. This asymmetry means that tariff-induced restructuring is uneven across the economy, with some sectors experiencing deep disruptions while others adapt more smoothly through supplier diversification. Empirical modeling confirms that increased bilateral tariffs between major economies like the United States and China reduce their backward integration into GVCs by making imported intermediates more expensive. At the same time, these measures can increase integration between untargeted partners; during periods of heightened transpacific tension, European Union economies deepened their backward linkages with the United States as firms sought stable sourcing relationships outside contested trade corridors. Such shifts suggest that geopolitical stability is an important determinant of long-term GVC configurations alongside cost considerations. The reorganization of supply chains under tariff pressure also has implications for regional production hubs. According to, disruptions in U.S.–China trade prompted both economies to rely more heavily on regional partners: the United States increased sourcing from Mexico and Canada within North America, while China strengthened ties with Japan and South Korea in East Asia. These patterns reflect a shortening of global supply linkages as firms seek to reduce exposure to cross-continental tariff risks by concentrating production within regional blocs [Fus20]. While such regionalization can enhance resilience against specific bilateral disputes, it may also reduce efficiency gains from global specialization if it limits access to optimal input sources worldwide. From a welfare perspective, GVC disruptions propagate beyond directly targeted sectors because intermediate goods are embedded in a wide range of final products [LWW19]. Tariffs on upstream inputs like steel or electronic subassemblies raise costs for downstream producers across multiple industries, from automotive manufacturing to consumer electronics, dampening competitiveness in both domestic and export markets [WM20]. These cascading effects illustrate why policies aimed at protecting one segment of a value chain can inadvertently harm others linked through input-output relationships. The financial dimension further underscores GVC interdependence: cross-border investment flows often accompany trade in intermediates as multinational enterprises establish production facilities near key suppliers or markets [MN24]. Tariff uncertainty can deter such investments or redirect them toward jurisdictions offering preferential market access through free trade agreements or customs unions. Over time, these investment shifts can lock in new supply chain structures even if initial tariff measures are later relaxed, due to sunk costs associated with plant construction, workforce training, and supplier relationship development [BS20]. Moreover, GVC participation influences how third countries experience indirect effects from bilateral tariff disputes. Suppliers providing intermediate goods to one party for incorporation into exports destined for another may see demand fall when those final exports decline under tariff pressure [WM20]. Conversely, countries positioned to replace targeted exporters in supplying protected markets can gain market share and deepen their own GVC integration with importing economies [QFZ22]. This dynamic redistribution underscores that tariff impacts must be assessed within a multilateral framework rather than purely bilaterally. Technological change interacts closely with GVC dynamics under shifting trade policies. Advances in digital coordination tools and logistics management enable faster reconfiguration of supplier networks when tariffs alter cost structures [MN24]. However, high-tech sectors remain particularly sensitive to disruptions because they depend on tightly specified components produced by a limited number of global suppliers. In such cases, even small increases in input costs due to tariffs can have outsized effects on final product pricing and competitiveness across international markets [WM20]. Overall, GVCs embed U.S. trade deeply within an intricate web of cross-border production relationships where policy changes reverberate widely through price adjustments, sourcing decisions, investment flows, and competitive dynamics [Fus20; QFZ22]. The resilience or fragility of these networks under tariff shocks depends on sectoral flexibility, geographic diversification options, and the stability of partner relationships, all factors that shape how effectively firms can adapt without sacrificing long-term efficiency or market position.

5 Design and Implementation of US Tariffs

5.1 Types of Tariffs and Their Application

Tariffs imposed by the United States can be classified according to their calculation method, policy objective, and legal basis. From a methodological standpoint, they are typically levied either on a specific basis or an ad valorem basis. Specific tariffs apply a fixed monetary charge per physical unit of the imported good, such as per kilogram, gallon, or case. Ad valorem tariffs, in contrast, are calculated as a fixed percentage of the good's customs value at the point of importation [Cha+19]. The Harmonized Tariff Schedule (HTS), administered by the U.S. International Trade Commission (USITC), codifies these duties across thousands of product categories, with each HTS subheading corresponding to a narrowly defined set of goods. This classification system allows policymakers to target tariff measures with high precision, enabling differentiation not only between broad sectors but also between specific product types within those sectors. The application of tariffs in U.S. trade policy extends beyond simple revenue generation and often reflects strategic economic or political objectives. One category is safeguard tariffs, which are authorized under the WTO Agreement on Safeguards and implemented domestically to protect domestic industries from sudden surges in imports that cause or threaten serious injury [Met20]. These measures are temporary and designed to give affected industries time to adjust to increased competition. For example, safeguard tariffs were applied to 8.5 billion worth of solar panels and 1.8 billion in washing machines as part of broader trade actions against major suppliers [Par20]. Such measures can be applied regardless of whether imports are deemed unfairly traded; their justification rests solely on the scale and impact of import growth. Another important category comprises anti-dumping duties, which counteract imports sold at less than fair value, typically below production cost or domestic market price in the exporting country, when such pricing harms a domestic industry [Met20]. These duties aim to neutralize the price advantage gained through dumping practices and restore competitive parity for domestic producers. Closely related are countervailing duties (CVDs), which offset subsidies provided by foreign governments to their exporters when these subsidies cause injury to U.S. industries. Both anti-dumping and countervailing duties require detailed investigations by agencies such as the USITC and the Department of Commerce before imposition. National security-based tariffs represent another application channel, exemplified by measures taken under Section 232 of the Trade Expansion Act of 1962. In this context, tariffs were imposed at rates of 25% on steel and 10% on aluminum imports covering approximately 48 billion worth of goods. The rationale was that dependence on foreign supply for critical materials could undermine defense readiness and industrial capacity essential for national security. These measures illustrate how tariff policy can intersect with strategic resource considerations beyond conventional trade protection motives. Section 301 of the Trade Act of 1974 provides authority for tariffs targeting unfair trade practices related to intellectual property rights, technology transfer requirements, or other discriminatory policies [Par20]. Under this provision during the U.S.–China trade conflict, tariffs were applied in multiple phases: initially on 50 billion worth of Chinese products at a 25% rate across 1,333 product categories, followed by identification of an additional 200 billion subject to a 10% rate later increased further. These actions demonstrate how tariff instruments can be deployed as leverage in broader negotiations over structural economic policies rather than solely as defensive measures against import competition. The design choice between specific and ad valorem rates has practical implications for their economic effects. Specific tariffs provide stable nominal protection regardless of price fluctuations but can become more or less restrictive in real terms depending on inflation or commodity price cycles [Cha+19]. Ad valorem tariffs maintain proportionality with import prices but may yield volatile revenue streams when prices fluctuate significantly. Policymakers may combine both forms, known as compound tariffs, to balance stability with responsiveness. Sector-specific applications often reflect both economic structure and political economy considerations. For instance, agricultural products have been frequent targets for both protective tariffs and retaliatory measures due to their political salience and geographic concentration within key electoral constituencies [MN24]. Industrial inputs like steel and aluminum are targeted not only for direct protection but also because they occupy upstream positions in production networks; however, such targeting can raise costs for downstream manufacturers reliant on these materials [KR23]. This duality underscores that while targeted tariffs can support certain sectors directly, they may impose indirect costs elsewhere through input-output linkages. The implementation process involves formal announcements by USITC when new tariff rates are introduced or existing ones modified [Cha+19]. These announcements specify effective dates, duration where applicable, and any exemptions granted, for example, country-specific exclusions or product-level waivers based on lack of domestic availability. Exemptions play a significant role in moderating unintended consequences; during recent steel tariff episodes under Section 232 authority, certain allied countries received temporary exemptions contingent upon quota agreements or other negotiated terms. In practice, tariff application is often embedded within multi-pronged trade strategies combining different legal authorities and targeting methods simultaneously. The U.S.–China dispute illustrates this layering: safeguard measures addressed surges in specific consumer goods; Section 301 actions targeted structural policy grievances; Section 232 invoked national security concerns over metals; anti-dumping and countervailing duties continued addressing long-standing disputes over subsidization and pricing practices [Par20]. This multifaceted approach allows policymakers to address diverse objectives but also increases complexity for firms navigating compliance requirements across overlapping regimes. From an administrative perspective, enforcement relies heavily on customs procedures aligned with HTS classifications [Cha+19]. Accurate classification is critical because misclassification, whether intentional or accidental, can lead to incorrect duty assessments or penalties. The granularity of HTS codes enables precise targeting but also creates opportunities for circumvention through minor product modifications that shift goods into lower-tariff categories. Overall, the types of tariffs employed by the United States range from broad-based protective duties to highly targeted strategic measures grounded in specific statutory authorities [Met20; Par20]. Their application reflects a blend of economic rationale, protecting industries from injury or unfair practices, and geopolitical strategy aimed at influencing foreign policy behavior through trade leverage. The choice among specific rates, ad valorem rates, safeguard actions, anti-dumping duties, countervailing duties, national security-based measures, and retaliatory instruments determines not only immediate price effects but also longer-term adjustments within global supply chains shaped by U.S. trade policy priorities.

5.2 Tariff Administration and Enforcement

The administration and enforcement of U.S. tariffs involve a coordinated framework of legal authority, institutional oversight, and operational procedures designed to ensure compliance with trade policy objectives while minimizing opportunities for evasion. Once tariff measures are enacted under statutory provisions such as Section 301 of the Trade Act, Section 232 of the Trade Expansion Act, or safeguard mechanisms authorized by the WTO Agreement on Safeguards, their implementation is operationalized through the Harmonized Tariff Schedule (HTS) classification system administered by the U.S. International Trade Commission (USITC) [Par20]. Accurate classification is critical because each HTS subheading corresponds to a specific duty rate and set of applicable trade remedies. Misclassification, whether deliberate or inadvertent, can result in underpayment or overpayment of duties, triggering penalties or refund claims. Customs and Border Protection (CBP) plays a central role in enforcement by verifying import declarations, assessing duties owed, and conducting audits to detect misreporting or circumvention attempts. This includes monitoring for transshipment schemes in which goods are routed through third countries to disguise their true origin and thereby avoid higher tariff rates [MN24]. In cases where circumvention is suspected, CBP may require additional documentation such as certificates of origin, production records, or bills of lading to substantiate claims. The complexity of global value chains complicates this process because intermediate goods may cross multiple borders before final assembly [Fus20], making it necessary to apply rules-of-origin criteria that account for substantial transformation rather than mere transit. Enforcement also extends to ensuring that exemptions and exclusions are applied correctly. For example, during the imposition of Section 232 steel and aluminum tariffs, certain allied countries received temporary exemptions contingent upon quota agreements or other negotiated terms [Par20]. Product-specific exclusions were granted when domestic supply was insufficient to meet demand without causing economic harm to downstream industries. Administering these exclusions required a formal application process in which importers submitted evidence supporting their claims; CBP then verified eligibility at the point of entry. The precision needed in applying such exemptions underscores the importance of robust administrative systems capable of handling high volumes of applications while maintaining consistency in decision-making. Tariff enforcement must also address strategic behaviors by firms seeking to mitigate cost impacts. Empirical evidence from recent U.S.–China tariff episodes shows that some retailers engaged in "front-running" imports, accelerating shipments ahead of scheduled tariff increases, to build inventories at pre-tariff prices [Cav+19]. While not illegal, such behavior can distort short-term trade statistics and complicate revenue forecasting. Enforcement agencies monitor these patterns to anticipate potential surges in customs processing workloads and adjust staffing accordingly. Another dimension involves combating outright evasion through under-invoicing or misdeclaration of product characteristics. Studies have documented increases in tariff evasion following new duties on targeted goods; for instance, Turkish exporters altered reporting practices after taxes were introduced on certain foreign transactions [Min23]. Similar risks exist in U.S. contexts when high tariffs create strong incentives for misrepresentation. CBP employs risk-based targeting systems that flag shipments for inspection based on factors such as country of origin, product type, importer history, and anomalies in declared values relative to market norms. The legal framework provides for penalties ranging from monetary fines to seizure of goods for violations involving fraud or gross negligence. Repeat offenders may face heightened scrutiny on future shipments or be subject to bonding requirements that increase the cost of importing until compliance improves. Coordination with other agencies, such as the Department of Commerce's International Trade Administration (ITA) for anti-dumping and countervailing duty cases, is essential when enforcement actions intersect with ongoing investigations into unfair trade practices [Met20]. International cooperation forms an additional layer of enforcement capacity. Information-sharing agreements with foreign customs authorities can help identify suspicious routing patterns indicative of transshipment or mislabeling schemes [MN24]. Such cooperation is particularly important when enforcing retaliatory measures during trade disputes; ensuring that targeted goods do not enter through indirect channels preserves the intended economic pressure on counterparties. The WTO dispute settlement system historically provided a forum for challenging perceived violations related to tariff implementation; however, its capacity has been constrained by the U.S. blocking appointments to the Appellate Body [Dol+25]. This paralysis shifts greater responsibility onto domestic enforcement mechanisms while reducing multilateral oversight options available to trading partners contesting U.S. measures. From an administrative efficiency perspective, digitalization has improved tariff enforcement capabilities by enabling automated cross-checks between import declarations and external data sources such as shipping manifests and commercial invoices [Cha+19]. These systems can flag discrepancies in real time, allowing CBP officers to intervene before goods are released into commerce. However, increased reliance on automation also requires continuous updates to algorithms as traders adapt their evasion strategies. Enforcement effectiveness is influenced by political economy considerations as well. Businesses with concentrated economic interests may lobby for leniency in applying certain tariffs or for broader exclusion criteria [Dol+25]. Conversely, ideological polarization can reduce responsiveness even when presented with evidence about negative economic impacts from specific measures. This dynamic affects resource allocation within enforcement agencies and shapes priorities regarding which sectors receive heightened scrutiny. Finally, long-term enforcement credibility depends on consistent application across industries and trading partners. Selective laxity risks undermining deterrence by signaling that compliance is negotiable under political pressure. Conversely, overly rigid application without regard for legitimate supply constraints can impose unnecessary costs on domestic producers reliant on imported inputs [Duc+24]. Balancing these considerations requires adaptive management informed by ongoing monitoring of trade flows, price movements, and industry feedback. In sum, administering and enforcing U.S. tariffs entails a multifaceted process integrating legal authority, technical classification systems, customs operations, risk management tools, interagency coordination, international collaboration, and political oversight [Par20; Cav+19;

Min23; Dol+25]. The effectiveness of this system hinges on its ability to maintain compliance integrity while accommodating legitimate trade needs within an increasingly complex global production environment shaped by both economic strategy and geopolitical rivalry.

5.3 Granularity and Scope of Recent Tariff Measures

Recent U.S. tariff measures have been characterized by a high degree of granularity in their design, with product-level targeting that reflects both strategic economic objectives and political considerations. The Harmonized Tariff Schedule (HTS) provides the structural basis for this precision, allowing policymakers to impose duties on narrowly defined product categories rather than broad sectors [Cha+19]. This granularity enables differentiation between goods that may appear similar at an aggregate level but differ in origin, technological content, or strategic importance. For example, during the U.S.–China trade conflict, tariff lists were released in multiple waves, commonly referred to as Lists 1 through 4, each specifying hundreds of HTS subheadings covering distinct product groups. Lists 1 and 2 contained a relatively high proportion of high-technology products (approximately 18.9% of their composition), reflecting an early focus on sectors linked to China's industrial policy ambitions. These initial lists were more targeted in scope, affecting a smaller share of total imports but concentrating on goods deemed critical to long-term competitive dynamics. Subsequent lists expanded coverage substantially, moving beyond high-tech goods to encompass a much wider range of consumer and intermediate products [LLY25]. This shift diluted the strategic selectivity evident in earlier phases and increased the breadth of affected industries. The expansion was partly driven by political imperatives to meet numerical targets for tariff coverage rather than by sector-specific economic analysis. As a result, later lists included many goods with limited direct connection to the original policy rationale, thereby increasing the potential for unintended spillover effects across supply chains. The scope of these measures was further broadened by raising tariff rates over time; for instance, certain tranches initially set at 10% were later increased to 25%, magnifying cost impacts for importers. The scale of coverage was significant: by mid-2019, tariffs applied under Section 301 authority covered over $250 billion worth of Chinese imports across thousands of HTS codes [MG20]. On the Chinese side, retaliatory tariffs targeted approximately $121 billion in U.S. exports, with commodity-specific rates varying widely depending on political sensitivity and substitutability in global markets [Elo+21]. Agricultural products such as soybeans faced some of the steepest retaliatory rates due to their prominence in U.S. export profiles and their concentration in politically influential regions. This tit-for-tat escalation illustrates how granular targeting can be used not only offensively but also defensively in trade disputes, with each side selecting products that maximize political leverage while attempting to minimize domestic harm. Granularity also manifests through exemptions and exclusions that narrow the effective scope of tariffs without altering headline coverage figures. Analysis indicates that approximately 46% of all U.S. tariff announcements between 1997 and 2017 applied universally to all countries, implying that more than half incorporated some form of exemption [Cha+19]. These exemptions often arise from free trade agreements (FTAs) or specific administrative waivers granted when domestic production is insufficient to meet demand without causing economic harm downstream. In practice, such carve-outs can significantly alter the real incidence of tariffs by allowing firms to source from alternative origins at lower or zero duty rates while maintaining compliance with rules-of-origin requirements. The sectoral distribution within recent measures reveals deliberate variation in intensity across industries. Electrical energy products, domestic appliances and parts thereof, as well as iron and steel items have been among the most frequently targeted categories globally between 2009 and 2014 [KSY19], a pattern echoed in U.S. actions during recent disputes. In metals specifically, Section 232 tariffs imposed 25% duties on steel and 10% on aluminum imports from most countries, covering roughly $48 billion worth of trade annually. While nominally broad-based, these measures included negotiated exemptions for certain allies contingent upon quota arrangements or other conditions, again underscoring how scope is modulated through administrative discretion even within ostensibly comprehensive actions. The geographic reach of recent tariffs has been similarly varied. While Section 301 measures against China were explicitly bilateral in nature, other instruments such as Section 232 metals tariffs applied globally with selective country-level exclusions [Cha+19]. This combination creates overlapping layers of protection that differ by origin and product type, complicating sourcing decisions for multinational firms embedded in global value chains [Fus20]. For example, a manufacturer might face no duty when importing a component from an FTA partner but incur substantial costs if sourcing an identical part from a non-exempt country, even if both parts are functionally interchangeable within production processes. Temporal scope has also played an important role in shaping economic impacts. Some measures were explicitly temporary safeguards intended to last one year or less under assumptions about potential political change or negotiated settlements [DST20], while others were open-ended pending resolution of underlying disputes or security concerns. The uncertainty surrounding duration affects firm behavior: short-term measures may prompt inventory stockpiling ("front-running") ahead of implementation dates [Cav+19], whereas longer-term actions encourage deeper restructuring such as supplier diversification or relocation of production facilities. From an enforcement perspective described in Section 5.2, granularity increases administrative complexity because customs authorities must apply different rates across thousands of HTS codes while verifying eligibility for numerous exemptions and monitoring compliance with rules-of-origin criteria [Cha+19]. This complexity can create opportunities for circumvention through misclassification or transshipment via third countries, a risk heightened when tariff differentials between origins are large enough to justify evasion attempts economically [MN24]. The cumulative effect of this granular yet expansive approach has been to reshape trade flows not only bilaterally but also multilaterally through diversion toward untaxed suppliers. For instance, between early 2018 and late 2019 the share of certain imports from Malaysia rose from 19.7% to 35.5%, while Vietnam's share increased from 8.4% to 23.8%, coinciding with a sharp decline in China's share from 10.8% to 2.7% for those same goods categories, all during a period when total import value grew by 16.7%. Such shifts demonstrate how even highly targeted measures can have broad systemic consequences once firms reconfigure sourcing strategies around tariff schedules rather than purely cost-minimizing considerations [ITC21]. In sum, recent U.S. tariff measures exhibit fine-grained targeting at the product level combined with wide-ranging sectoral and geographic coverage that has expanded over successive implementation phases [LLY25; MG20]. The interplay between detailed HTS-based designations, selective exemptions rooted in FTAs or administrative waivers, variable duration expectations, and overlapping statutory authorities has produced a complex policy landscape whose real economic footprint extends well beyond its nominal scope through supply chain adjustments and trade diversion effects across global markets.

6 Economic Impact of Tariffs on the US Economy

6.1 Macroeconomic Effects

6.1.1 Impact on GDP Growth

The influence of tariffs on GDP growth operates through a combination of direct trade effects, cost pass-through mechanisms, and broader macroeconomic adjustments. When tariffs are imposed, they alter the relative prices of imported and domestically produced goods, which in turn affects consumption, investment, and production decisions across the economy. In the short term, these changes can lead to measurable shifts in real GDP by modifying both aggregate demand and aggregate supply components [Irw19]. The magnitude and direction of these effects depend on factors such as the degree of openness of the economy, the elasticity of substitution between domestic and foreign goods, and the extent to which domestic industries can expand output to replace imports without incurring significant efficiency losses. Empirical simulations suggest that tariff-induced disruptions to trade flows generally exert a negative impact on GDP growth for large economies engaged in mutual protectionist measures. For example, scenario-based modeling of U.S.–China trade tensions indicates that under high-tariff conditions both economies experience GDP contractions relative to baseline projections [Par20]. In one modeled case, Chinese GDP fell by up to -1.3% while U.S. GDP also declined, reflecting reduced export volumes, higher import costs, and diminished investment incentives. These results highlight that even when a country has some capacity to shift part of the tariff burden onto foreign exporters through terms-of-trade effects, the net outcome for real output is often negative once retaliatory measures are factored in. The transmission from tariffs to GDP growth is also mediated by their impact on productivity. Tariffs on intermediate goods raise input costs for downstream producers, potentially reducing total factor productivity if firms cannot easily substitute toward alternative suppliers [Irw19]. Historical evidence from other contexts shows that lowering input tariffs can significantly boost productivity, by over 10% in some cases, through cheaper access to higher-quality or more diverse inputs. Conversely, raising such tariffs reverses these gains by constraining technological adoption and limiting product scope expansion. This mechanism implies that protectionist measures targeting upstream sectors may have disproportionately large negative effects on potential GDP compared with tariffs on final consumer goods. Short-run nominal rigidities further shape output responses. In environments where wages and certain prices adjust slowly, tariff-induced cost increases can reduce firms' revenues without an immediate offsetting reduction in labor costs [TZ20]. This squeezes profit margins and may prompt cutbacks in employment or investment, thereby lowering aggregate output. Over time, as wages adjust and resources reallocate across sectors, some of these effects may dissipate; however, transitional dynamics can still entail prolonged periods of below-potential growth. Trade diversion offers a partial mitigating channel but rarely offsets losses entirely. When imports from targeted countries decline due to tariffs, sourcing often shifts toward untaxed partners [Elo+21]. While this can sustain supply availability and moderate price increases for consumers, it does not fully restore pre-tariff efficiency levels because alternative suppliers may be less competitive or require costly adjustments in logistics and production processes. Moreover, if diverted trade involves higher-cost sources or lower-quality inputs, overall productivity, and thus potential GDP, may still suffer. Retaliatory tariffs compound these challenges by directly reducing export demand in affected sectors [MN24]. For instance, Chinese countermeasures against U.S. agricultural exports during recent disputes sharply curtailed sales volumes abroad, leading to income losses for farmers and related industries despite domestic subsidy programs. Such sectoral shocks feed into aggregate GDP through reduced rural consumption spending and lower capital investment in agriculture-related supply chains. Macroeconomic modeling frameworks incorporating scale economies and variety effects indicate that restrictive trade policies impose non-negligible welfare costs globally while failing to deliver sustained national gains unless justified by specific strategic objectives outside conventional cost-benefit analysis [BBR18]. In these models, reductions in available product varieties due to tariffs diminish consumer utility directly while also eroding firm-level productivity gains associated with larger market sizes. The contractionary effect on GDP is therefore twofold: diminished demand from higher prices and reduced supply-side efficiency from smaller effective markets. The timing of GDP impacts depends on how quickly current output converges toward its new potential level after a tariff shock [Irw19]. If an economy is far below its potential due to underutilized resources or lagging technology adoption, as might be the case when new trade opportunities arise, liberalization can accelerate growth temporarily by closing this gap faster. Conversely, protectionist measures introduced when an economy is near potential tend to slow transitional growth rates because they reduce efficiency without creating offsetting slack absorption. Quantitative estimates from recent episodes underscore the scale of possible impacts. Analyses of the 2018–2019 U.S.–China tariff exchanges suggest that bilateral trade declines were accompanied by measurable slowdowns in industrial production indices and business investment trends within months of implementation [FP19]. These sectoral contractions aggregated into modest but statistically significant reductions in quarterly real GDP growth rates compared with pre-dispute trajectories. Exchange rate movements can modulate these outcomes but typically do not neutralize them entirely. A depreciation of the domestic currency following tariff imposition could partially offset competitiveness losses for exporters; however, it simultaneously raises import prices further for consumers and firms reliant on foreign inputs [TZ20]. The net effect on GDP depends on the relative strength of these opposing forces but tends toward contraction when import dependence is high. Finally, uncertainty surrounding future trade policy exerts an independent drag on GDP growth by discouraging long-term investment commitments [SWX21]. Firms facing volatile tariff regimes may delay capital expenditures or expansion plans until policy clarity improves. This postponement reduces capital formation, a key driver of potential output, and can have lingering effects even after tariffs are lifted if investor confidence remains subdued. Taken together, theoretical reasoning supported by empirical evidence indicates that while certain narrow configurations might yield short-term gains via terms-of-trade improvements for large economies without retaliation risk [LM21], actual historical experience shows that broad-based or reciprocated tariff increases tend to depress real GDP growth through intertwined demand- and supply-side channels [Par20; BBR18]. The combination of higher production costs from disrupted global value chains [Irw19], reduced export opportunities from retaliation [MN24], slower productivity growth due to constrained input access [TZ20], and heightened policy uncertainty forms a consistent pattern linking protectionist measures with weaker aggregate economic performance over both short- and medium-term horizons.

6.1.2 Influence on Inflation and Prices

Tariffs exert a direct and measurable influence on inflation dynamics by raising the domestic prices of imported goods and, through input-output linkages, the prices of domestically produced goods that rely on imported intermediates. When an ad valorem tariff of rate τ is applied to an import with pre-tariff price p^*, the landed price rises to $p^*(1+\tau)$, creating an immediate upward pressure on consumer price indices [ARW19]. In cases where pass-through is complete, as has been observed in several recent U.S. tariff episodes, the full nominal tariff rate is reflected in higher domestic prices for affected goods [Dol+25]. This direct channel is particularly potent when targeted imports have few close substitutes or when domestic production capacity is insufficient to absorb displaced demand without significant cost escalation. The inflationary effect extends beyond directly taxed goods through cost-push mechanisms. Many U.S. industries are embedded in global value chains and depend on imported intermediate inputs such as steel, aluminum, semiconductors, and machinery components [WM20]. Tariffs on these upstream goods increase production costs for downstream sectors, which then pass these increases along the supply chain. For example, tariffs on steel not only raise construction material costs but also elevate prices for automobiles, appliances, and industrial equipment that incorporate steel as a major input [LWW19]. The cumulative markups at each stage of production can amplify the initial tariff-induced cost increase, leading to broader-based inflationary pressures across multiple categories of final consumption. Empirical simulations of long-run trade conflict scenarios indicate that when exporters cease absorbing tariffs in their margins and instead pass them fully onto importers, domestic import prices rise significantly, contributing to higher overall inflation rates [DST20]. In such settings, monetary policy often responds endogenously; central banks may raise interest rates to counteract inflationary pressures, which can further dampen aggregate demand and investment. The interaction between tariff-induced cost-push inflation and monetary tightening can thus compound output losses while sustaining elevated price levels. Market structure conditions mediate the degree of pass-through from tariffs to consumer prices. In concentrated industries with limited competition from untaxed sources, domestic producers may exploit reduced foreign competition by increasing their own markups [ARW19]. This strategic pricing behavior can result in domestic price increases exceeding the nominal tariff rate. Conversely, in markets with high substitutability among suppliers, either across countries or between imports and domestic goods, foreign exporters may lower pre-tariff prices to maintain market share [DST20], partially offsetting the inflationary impact. However, evidence from recent U.S.–China trade measures suggests that such offsetting behavior was limited; many Chinese exporters maintained pre-tariff prices while U.S. importers bore the additional costs [Dol+25]. The quality dimension adds complexity to interpreting observed price changes. Research has identified cases where tariff reductions led to increases in quality-adjusted trade prices because lower tariffs disproportionately expanded imports of lower-quality products [HIM22]. By analogy, tariff increases could shift sourcing toward higher-cost or lower-quality alternatives depending on availability from untaxed origins. If substitution involves lower-quality goods at similar or slightly reduced nominal prices, measured inflation might understate the decline in real purchasing power due to diminished product quality. Retaliatory tariffs imposed by trading partners can also feed into domestic inflation indirectly. When foreign measures reduce export opportunities for U.S. producers, particularly in agriculture, domestic surpluses may initially depress local prices for those goods. However, over time these sectoral imbalances can reallocate resources toward non-tradable sectors where increased demand raises local service prices [BS20]. Additionally, retaliatory measures targeting intermediate exports can disrupt supply chains in ways that increase costs for other domestic industries reliant on reciprocal trade flows. Transport cost dynamics represent another pathway linking tariffs to price levels. In markets where shipping services operate under imperfect competition and asymmetric pricing structures, changes in import volumes due to tariffs can alter freight rates for both imports and exports [HIT18]. Higher transport costs feed into delivered prices for a wide range of goods beyond those directly subject to tariffs, broadening the scope of inflationary effects. Macroeconomic models incorporating sticky wages highlight how nominal rigidities can exacerbate short-term inflation responses to tariffs [BF19a]. When wages adjust slowly relative to import price shocks, firms face higher unit labor costs alongside more expensive inputs. This combination encourages faster pass-through of cost increases into final goods prices rather than absorbing them through margin compression. The result is a sharper initial spike in consumer price indices following tariff implementation. The breadth of coverage within recent U.S. tariff measures has magnified their aggregate impact on inflation by encompassing both consumer goods and key industrial inputs [LLY25]. Early phases targeting high-technology intermediates had more localized effects within specific manufacturing sectors; later expansions covering a wider array of consumer products transmitted price increases more directly into headline inflation metrics. The layering of multiple statutory authorities, such as Section 301 actions against China combined with Section 232 metals tariffs, created overlapping cost pressures across diverse product categories [Par20]. Short-term behavioral responses by firms can modulate timing but not necessarily magnitude of inflationary effects. Practices such as front-running imports ahead of scheduled tariff hikes temporarily suppress post-implementation price jumps by building inventories at pre-tariff costs [Cav+19]. However, once these inventories are depleted, replacement at higher landed costs restores upward pressure on retail prices unless offset by exchange rate movements or supplier concessions. Exchange rate adjustments offer only partial relief from tariff-driven inflation. A depreciation of the domestic currency could make exports more competitive but simultaneously raises local currency prices for all imports, including those unaffected by new tariffs, thereby reinforcing rather than mitigating overall import-driven inflationary trends [TZ20]. Quantitative estimates from recent episodes underscore these mechanisms: U.S. manufacturing producer prices rose by approximately one percentage point due to combined input and output tariffs during 2018, a substantial increase relative to historical average annual producer price inflation rates just above two percent [ARW19]. This shift reflects both direct duties on finished goods and indirect effects via higher input costs cascading through supply chains. In sum, tariffs influence domestic price levels through a network of interrelated channels: direct pass-through on targeted imports; indirect cost-push effects via intermediate inputs; strategic markup adjustments under altered competitive conditions; quality-related shifts affecting real purchasing power; transport cost changes; macroeconomic interactions with wage rigidity and monetary policy; and compounding effects from broad coverage across consumption and production categories [DST20; Dol+25; HIT18; HIM22]. The persistence and breadth of these channels mean that even temporary or narrowly targeted measures can contribute meaningfully to sustained upward pressure on both headline and core inflation indicators when integrated into complex global production systems.

6.1.3 Employment and Labor Market Effects

Tariff measures influence employment and labor market dynamics through multiple, interconnected channels that operate both directly within targeted industries and indirectly across the broader economy. The most immediate effect arises in sectors receiving direct protection from import competition. By raising the relative price of foreign goods, tariffs can shift demand toward domestically produced substitutes, potentially increasing output and supporting job retention or creation in those industries [DL23]. This import-substitution effect is particularly relevant in manufacturing sectors where domestic capacity exists to replace displaced imports without significant delays or quality compromises. However, empirical evidence suggests that such gains are often modest and geographically concentrated, benefiting specific communities while leaving aggregate national employment largely unchanged

[FK21]. Offsetting these potential gains are several mechanisms that can reduce employment elsewhere. Tariffs on intermediate goods raise input costs for downstream producers, eroding their competitiveness in both domestic and export markets [BF19b]. Higher production costs may lead firms to scale back operations, reduce hiring plans, or cut existing jobs. In the 2018–2019 U.S.–China trade conflict, for example, manufacturing industries with high exposure to imported inputs experienced net employment declines despite nominal protection from import competition [FP19]. Quantitative estimates indicate that moving an industry from the 25th to the 75th percentile of tariff exposure, considering import protection, input cost increases, and foreign retaliation, reduced manufacturing employment by approximately 2.3% [FK21]. Retaliatory tariffs imposed by trading partners further exacerbate negative labor market effects by reducing demand for U.S. exports in targeted sectors. Agricultural producers were particularly affected when China imposed steep tariffs on soybeans and other farm products; reduced export volumes translated into lower farm incomes and cutbacks in agricultural employment despite federal compensation programs. Similar patterns emerged in manufacturing subsectors reliant on foreign markets for a substantial share of sales. These retaliatory shocks propagate through local economies as reduced earnings in export-oriented industries dampen consumption spending and service sector employment in affected regions. Labor market adjustments to tariff shocks also manifest through changes in job quality and working conditions rather than headcount alone. Firms facing higher costs may avoid large-scale layoffs but instead reduce labor expenses by cutting overtime hours, freezing wages, or scaling back non-wage benefits such as health insurance or retirement contributions. Evidence from Chinese exporters during the trade war shows a tendency to preserve headcount while lowering total compensation via reduced hours and non-cash income components. In the U.S., similar strategies can result in underemployment, where workers remain employed but at reduced earnings, dampening household income growth even without significant unemployment spikes. The composition of employment can also shift toward more precarious forms of work under tariff-induced stress. Research indicates that non-standard jobs, such as temporary contracts or gig work, can act as an "employment buffer" during trade disruptions

[MN24]. In cities heavily affected by tariffs on standard-job-intensive industries, demand for permanent positions declined along with wages for those roles, while non-standard job demand remained relatively stable. This substitution may cushion headline unemployment rates but at the cost of job security and long-term career development opportunities for affected workers. Regional disparities are another salient feature of labor market impacts from tariffs. Areas with high concentrations of protected industries may experience short-term job gains, whereas regions dependent on export-oriented sectors targeted by retaliation often face net losses. The steel industry illustrates this duality: while steel producers benefited from Section 232 tariffs through increased domestic demand and prices, downstream manufacturers using steel as an input faced higher costs that pressured margins and employment levels. The net regional effect depends on whether upstream gains outweigh downstream losses within a given local economy, a balance that varies widely across states and metropolitan areas. Policy responses can mediate some adverse labor market outcomes if designed effectively. Measures such as job-stabilizing subsidies linked to maintaining employee headcount and wage levels have been proposed to prevent firms from shifting tariff-related losses onto workers through layoffs or wage cuts [DL23]. Strengthening labor regulations to protect against erosion of benefits or unsafe working conditions during periods of economic strain is another avenue for mitigating negative impacts. However, these interventions require careful calibration to avoid distorting incentives or creating dependency without fostering long-term competitiveness in affected sectors. Dynamic adjustment processes further complicate the picture. Workers displaced due to tariff-induced contractions may face barriers to reemployment if their skills are industry-specific or if alternative opportunities are geographically distant [LM21]. Retraining programs can facilitate transitions into growing sectors but often entail time lags during which unemployment or underemployment persists. Moreover, uncertainty about the duration of tariff measures can discourage both workers and employers from making costly adjustments; temporary measures may prompt firms to retain staff despite short-term losses, whereas expectations of prolonged protectionism could encourage restructuring toward more capital-intensive production methods with lower long-run labor demand [FP19]. The interaction between tariffs and automation trends adds another layer of complexity. Rising input costs from tariffs can incentivize firms to invest in labor-saving technologies as a means of offsetting higher production expenses [BF19b]. While such investments may improve productivity over time, they can also accelerate displacement of routine manufacturing jobs, limiting the protective intent behind tariff policies aimed at preserving industrial employment. This dynamic underscores the importance of considering technological substitution effects when evaluating long-term labor market consequences of trade restrictions. Empirical studies leveraging firm-level data reveal heterogeneity in responses based on firm size and global integration levels [HKM20]. Larger exporters facing import tariffs on inputs tend to have more resources to reorganize supply chains or absorb cost increases without immediate layoffs; smaller firms with less flexibility are more likely to respond with workforce reductions or wage suppression. Additionally, multinational enterprises embedded deeply in global value chains may choose to relocate production stages abroad rather than adjust domestically, a decision that can permanently reduce U.S.-based employment tied to those activities [Fus20]. Overall, while certain protected industries may experience localized job gains following tariff implementation, these are frequently outweighed at the national level by losses stemming from higher input costs, retaliatory export barriers, shifts toward precarious work arrangements, regional disparities in sectoral exposure, and longer-term structural adjustments including automation and offshoring [FK21; MN24; DL23]. The resulting labor market landscape is characterized by uneven distributional effects where some groups benefit temporarily while others face sustained challenges adapting to altered trade conditions shaped by tariff policy choices.

6.2 Microeconomic Effects

6.2.1 Firm-Level Responses

Firms respond to tariff shocks through a range of strategic, operational, and financial adjustments that reflect their position within supply chains, market structure conditions, and exposure to both direct and indirect trade costs. One of the most immediate responses is the reconfiguration of sourcing strategies. When tariffs raise the landed cost of imports from targeted countries, firms often seek alternative suppliers in untaxed jurisdictions to maintain cost competitiveness [Cha+19]. This substitution can involve shifting procurement to existing partners in free trade agreement networks or developing new relationships with suppliers in countries unaffected by the tariff measures. The feasibility and speed of such adjustments depend on product specificity: standardized goods allow for faster supplier switching, whereas specialized inputs with stringent quality or compatibility requirements constrain flexibility. In industries embedded in global value chains, tariffs on intermediate goods trigger more complex adaptations. Firms reliant on imported components may restructure production processes by relocating certain stages to third countries that can export finished goods to the United States without incurring the same duties [Fus20]. This form of tariff circumvention through "tariff engineering" can involve significant capital investment in new facilities or partnerships abroad. For example, during recent U.S.–China trade tensions, some manufacturers shifted assembly operations to Southeast Asian economies such as Vietnam or Malaysia while continuing to source subcomponents from China, thereby avoiding direct Section 301 tariffs on Chinese-origin finished products [BS20]. Pricing strategies also adjust in response to tariff-induced cost changes. In markets with limited competition from untaxed sources, domestic producers may increase markups when foreign competition is reduced. Conversely, when preferential tariff cuts encourage entry from favored origins, incumbent exporters may lower markups due to intensified intra-origin competition. The Atkeson–Burstein framework suggests that common shocks like bilateral tariffs lead to higher pass-through than idiosyncratic shocks but still less than full transmission if market shares shift among competitors. Empirical evidence shows that a 10% reduction in tariffs can reduce firm-level markups by around 4%, indicating that competitive effects can dominate cost effects under certain conditions [CHP24]. Operationally, firms may engage in inventory management tactics such as "front-running" imports ahead of scheduled tariff increases to build stock at pre-tariff prices [Cav+19]. While this can temporarily shield customers from price hikes, it is a short-term measure that does not address ongoing cost pressures once inventories are depleted. Longer-term responses include renegotiating contracts with suppliers to share tariff burdens or altering product specifications to fit into lower-tariff HTS classifications, a practice that requires careful compliance management given customs enforcement scrutiny [MN24]. Tariffs also influence investment decisions at the firm level. Heightened policy uncertainty surrounding trade measures can delay capital expenditures as managers wait for greater clarity on future cost structures [Cha+19]. In some cases, firms accelerate automation investments as a means of offsetting higher labor and input costs caused by tariffs [BF19b]. While such technological upgrades can improve productivity over time, they may also reduce labor demand domestically, counteracting any employment gains intended by protectionist policies. Export-oriented firms facing retaliatory tariffs often reassess their market portfolios. Retaliation reduces competitiveness abroad by raising foreign consumer prices for U.S.-origin goods; as a result, firms may redirect sales toward domestic markets or seek new export destinations where access remains unimpeded [BS20]. However, penetrating new markets entails marketing expenses, regulatory compliance costs, and potential adaptation of products to meet different standards, all of which require resources and time. Agricultural exporters hit by Chinese retaliation on soybeans illustrate this challenge: many attempted to expand sales in Europe or Southeast Asia but faced entrenched competitors and logistical hurdles that limited immediate substitution possibilities [NYA24]. Financially, firms adjust through cost containment measures aimed at preserving margins under higher input prices. These include reducing overtime hours, freezing wages, scaling back non-wage benefits, or shifting toward more flexible labor arrangements such as temporary contracts [MN24]. Smaller firms with less bargaining power over suppliers and customers are particularly vulnerable; lacking economies of scale or diversified revenue streams, they may be forced into downsizing or even exiting the market when unable to absorb sustained cost increases [Dol+25]. Larger multinational enterprises often have greater capacity to absorb shocks through internal transfer pricing adjustments across subsidiaries or by reallocating production globally. Some responses are defensive rather than adaptive. Firms heavily dependent on a single foreign supplier base may engage in hedging strategies, such as forward contracts for currency and commodities, to mitigate volatility arising from tariff-induced exchange rate movements or commodity price shifts [TZ20]. Others invest in lobbying efforts aimed at securing product-specific exclusions from tariff lists; during recent U.S. actions under Section 232 and Section 301 authorities, numerous companies successfully petitioned for exemptions based on lack of domestic substitutes or disproportionate economic harm from inclusion [Par20]. The degree of integration into global value chains shapes both exposure and response options. Highly integrated firms face compounded effects when tariffs disrupt multiple stages of production across borders; their adjustments often involve multi-country coordination and re-optimization of logistics networks [Fus20]. Less integrated firms producing primarily for domestic markets may experience indirect effects via higher input costs but have fewer levers for international restructuring. In both cases, strategic agility, defined by the ability to reconfigure supply bases quickly without sacrificing quality, is a critical determinant of resilience under shifting tariff regimes [Cha+19]. Ultimately, firm-level responses represent a balancing act between absorbing costs internally through margin compression, passing them onto consumers via price increases, altering operational configurations to reduce exposure, and engaging politically to influence policy outcomes. The chosen mix depends on industry characteristics such as demand elasticity and concentration ratios; firm-specific factors including size, capital intensity, and geographic diversification; and external constraints like rules-of-origin requirements and retaliatory measures abroad [CHP24; BS20]. These heterogeneous strategies underscore that while macroeconomic models capture aggregate trends in output or prices following tariff changes, micro-level analysis reveals the diverse pathways through which individual enterprises adapt, or fail, to sustain competitiveness under evolving trade policy landscapes.

6.2.2 Sectoral Impacts and Industry Case Examples

The effects of tariffs manifest unevenly across sectors, with outcomes shaped by industry structure, integration into global value chains, and the degree of exposure to both direct import protection and indirect cost or demand shocks. In agriculture, retaliatory measures have been particularly consequential. During the U.S.–China trade conflict, Chinese tariffs on soybeans, previously the largest U.S. agricultural export to China, led to a sharp contraction in shipments, with Chinese buyers shifting procurement toward Brazil [NYA24]. This reallocation depressed U.S. farmgate prices and reduced revenues for producers despite federal aid programs intended to offset losses. The impact extended beyond soybean farmers to ancillary industries such as grain storage, transportation, and processing facilities that depend on high export volumes for operational efficiency. Similar patterns emerged in other agricultural commodities targeted by retaliation, including pork and dairy products, where reduced foreign demand translated into lower domestic prices and income volatility for producers. In contrast, certain upstream manufacturing sectors experienced short-term gains from protective measures. The imposition of Section 232 tariffs on steel at a rate of 25% increased domestic steel prices and improved capacity utilization among U.S. steelmakers [Che+21]. Employment in primary metals saw localized boosts in regions with significant production facilities. However, these benefits were counterbalanced by adverse effects on downstream industries such as automotive manufacturing, construction equipment, and fabricated metal products that rely heavily on steel inputs [LWW19]. Higher input costs eroded margins in these sectors, prompting some firms to scale back production or delay investment projects. The net employment effect across the broader manufacturing base was negative once downstream job losses were accounted for [FK21]. The electronics sector illustrates how tariff impacts propagate through complex supply chains. Many consumer electronics products incorporate intermediate components sourced from East Asia; tariffs on these inputs raised assembly costs for U.S.-based manufacturers [WM20]. In some cases, firms responded by relocating final assembly operations to third countries such as Vietnam or Malaysia to avoid direct duties on Chinese-origin goods while maintaining access to established component suppliers [BS20]. This restructuring often involved significant capital expenditure and logistical adjustments but allowed companies to preserve competitiveness in price-sensitive markets. Nevertheless, the transition period entailed disruptions in production schedules and temporary shortages of certain models in retail channels. In the energy sector, crude oil and liquefied natural gas (LNG) exports faced retaliatory barriers that altered trade flows [ITC21]. China's imposition of tariffs on U.S. LNG reduced shipments to one of the fastest-growing markets for natural gas imports, compelling exporters to seek alternative buyers in Europe and South Asia. While global fungibility of energy commodities mitigated some revenue losses, the need to redirect cargoes increased transportation costs and introduced contractual complexities with long-term buyers accustomed to stable supply arrangements. The apparel industry provides an example of rapid supplier substitution under tariff pressure due to high product substitutability. When tariffs were applied to Chinese-made clothing items, many U.S. importers shifted orders toward suppliers in Vietnam, Bangladesh, and other low-cost countries not subject to equivalent duties [BS20]. This shift occurred relatively quickly because apparel production processes are less capital-intensive and more geographically mobile than those in heavy manufacturing. However, even here adjustment costs arose from renegotiating contracts, ensuring compliance with quality standards, and adapting logistics networks. Automotive manufacturing demonstrates the dual nature of tariff exposure: as both a producer of final goods subject to foreign retaliation and a consumer of imported intermediate inputs like steel, aluminum, and electronics modules [LWW19]. Tariffs on upstream materials increased vehicle production costs domestically; simultaneously, retaliatory measures by trading partners targeted finished vehicles exported from the United States. This combination squeezed margins from both ends, raising costs while reducing foreign market access, and prompted some automakers to reconsider investment plans for U.S.-based assembly plants. The machinery sector faced similar challenges due to its reliance on imported precision components alongside substantial export orientation [Elo+21]. Tariffs on inputs such as bearings or specialized castings increased production expenses; retaliatory duties abroad curtailed sales opportunities for finished machinery products. Firms with diversified global operations sometimes shifted component sourcing or final assembly abroad to maintain competitiveness in key markets. In services linked closely with goods trade, such as logistics and freight forwarding, tariff-induced shifts in trade patterns altered demand profiles [HIT18]. Reduced import volumes from targeted countries lowered inbound cargo flows through certain ports while increasing traffic from alternative origins like Mexico or ASEAN members. These changes required adjustments in routing strategies and asset deployment for shipping lines and trucking companies. Sectoral heterogeneity is also evident within technology-intensive industries. For example, semiconductor manufacturing relies on globally distributed fabrication stages; tariffs affecting any stage can disrupt coordinated production schedules [MN24]. While some firms accelerated plans for domestic fabrication capacity expansion under policy incentives like the CHIPS Act, others maintained offshore production due to cost advantages or ecosystem dependencies that could not be replicated quickly. Case evidence from firm-level responses reinforces these sectoral patterns. Agricultural cooperatives sought new export markets through trade missions but faced entrenched competition abroad; steel producers expanded output but encountered political backlash over downstream job losses; electronics assemblers invested in new regional hubs; apparel brands diversified sourcing portfolios; automakers lobbied for exemptions while adjusting model lineups based on shifting cost structures; machinery exporters explored joint ventures abroad; logistics providers re-optimized networks around emerging trade corridors [Cha+19; Fus20]. These examples underscore that tariff impacts cannot be assessed solely by examining directly protected industries in isolation. Inter-industry linkages mean that gains in one segment often entail losses elsewhere along supply chains [BF19b]. Moreover, sector-specific characteristics, such as substitutability of suppliers, capital intensity of production processes, geographic concentration of facilities, and exposure to foreign retaliation, determine both the magnitude of initial shocks and the feasibility of adaptive strategies over time [BS20]. The resulting mosaic of outcomes reflects a complex interplay between policy design parameters (coverage scope, rate levels), market structures (competition intensity), and firm capabilities (flexibility in sourcing or market diversification), producing winners and losers across the economic landscape shaped by tariff interventions.

6.2.3 Consumer Welfare and Household Effects

Tariff measures influence consumer welfare through a combination of direct price effects, indirect cost pass-through along supply chains, and broader changes in household income and consumption patterns. The most immediate channel is the increase in prices for imported goods subject to tariffs. When a tariff is imposed, the landed price of the affected import rises by approximately the nominal duty rate if pass-through is complete, as has been observed in several recent U.S. episodes where post-tariff import prices increased almost exactly in line with the tariff magnitude. This direct effect reduces real purchasing power for households, particularly when targeted goods are consumer staples or have few close substitutes. The burden is regressive in nature because low-income households spend a larger share of their budgets on tradable goods such as clothing, footwear, and basic electronics that are often imported from low-cost producers [SA19]. Indirect effects arise when tariffs target intermediate goods used in domestic production. Higher input costs feed into final goods prices through cumulative markups at each stage of production [QFZ22]. For example, tariffs on steel and aluminum not only raise the cost of cars and appliances directly but also increase prices for housing construction and infrastructure projects that use these materials intensively [Cha+19]. These cost-push pressures extend inflationary impacts beyond the initially targeted products, affecting a wider range of household expenditures. In sectors with concentrated market structures, reduced foreign competition can enable domestic producers to raise markups further [CHP24], amplifying consumer price increases beyond what would be expected from cost pass-through alone. The quality dimension complicates measurement of welfare changes. If tariffs prompt substitution toward untaxed suppliers offering lower-quality alternatives at similar or slightly reduced nominal prices, measured inflation may understate the decline in real consumption value [HIM22]. Conversely, if substitution involves higher-quality but more expensive goods, nominal price indices may overstate welfare losses by not fully accounting for quality improvements. In either case, shifts in product variety and quality affect consumer surplus independently of observed price levels. Retaliatory tariffs imposed by trading partners can also influence household welfare indirectly through income channels. When foreign measures reduce demand for U.S. exports, such as Chinese tariffs on soybeans, affected industries experience revenue declines that can lead to lower wages or employment reductions in export-oriented regions [MN24]. These income shocks reduce household spending capacity locally, even among those not directly employed in the targeted sector, due to multiplier effects within regional economies. Households may adjust consumption patterns in response to tariff-induced price changes by substituting toward domestically produced goods or untaxed imports from alternative origins [BS20]. While such substitution can mitigate some welfare losses if close substitutes are available at competitive prices, it often entails compromises on quality, features, or brand preferences that reduce consumer satisfaction. In cases where substitution options are limited, such as specialized electronics components or branded apparel, the full burden of higher prices falls on consumers. The distributional impact across income groups is shaped by differences in expenditure composition. Non-homothetic preferences imply that higher-income households allocate more spending to services and luxury goods less affected by tariffs on mass-produced imports [MN24]. Lower-income households devote a greater share to tradable necessities whose prices are more sensitive to trade policy changes. As a result, identical percentage increases in import prices translate into larger proportional welfare losses for poorer households. Macroeconomic feedback effects further influence household welfare over time. Tariff-induced inflation can erode real wage growth if nominal wages adjust slowly relative to rising living costs [TZ20]. This lag reduces disposable income available for non-essential consumption and savings. Additionally, monetary policy responses aimed at containing inflation, such as interest rate hikes, can increase borrowing costs for households with variable-rate debt, compounding financial strain. Short-term behavioral responses by firms and consumers can alter the timing but not necessarily the magnitude of welfare impacts. Practices like "front-running" imports ahead of scheduled tariff increases allow retailers to temporarily maintain pre-tariff pricing from existing inventories [Cav+19], delaying visible price hikes for consumers. However, once inventories are replenished at higher landed costs, retail prices adjust upward unless offset by supplier concessions or exchange rate movements favorable to importers. Sector-specific case evidence illustrates these mechanisms clearly. In apparel markets with high substitutability among suppliers, importers shifted sourcing from China to Vietnam and Bangladesh following tariff imposition [BS20]. While this limited retail price increases compared with sectors lacking flexible sourcing options, adjustments still involved transitional shortages and potential quality variation affecting consumer experience. In contrast, automotive markets faced simultaneous upstream steel tariffs and retaliatory duties abroad; domestic vehicle prices rose while export opportunities contracted [LWW19], reducing both affordability for buyers and incomes for workers tied to auto exports. The cumulative effect on consumer surplus depends on integrating these diverse channels: direct price increases on targeted imports; indirect cost-push effects via intermediate inputs; changes in product variety and quality; income shocks from retaliation; substitution possibilities; distributional differences across income groups; macroeconomic spillovers into wages and borrowing costs; and transitional dynamics linked to inventory management or sourcing shifts [SA19; QFZ22; HIM22]. Empirical estimates from recent U.S.–China tariff rounds suggest substantial aggregate losses: billions of dollars annually transferred from consumers to government revenue via duties paid at the border were accompanied by deadweight losses reflecting reduced consumption volumes and variety [YLB25]. In sum, tariff policies reshape household welfare through intertwined price and income effects that vary across products, regions, and demographic groups. While certain households employed in protected industries may benefit indirectly from job security or wage support linked to reduced import competition [DL23], these gains are often outweighed nationally by broader consumer cost increases and retaliatory income losses elsewhere in the economy. The net outcome is typically a reduction in aggregate real consumption possibilities alongside regressive distributional consequences that disproportionately burden lower-income households embedded within an interconnected global trading system sensitive to policy-induced frictions.

6.3 Distributional Consequences

6.3.1 Geographical Variation in Tariff Impacts

The economic effects of tariffs are distributed unevenly across the United States, with regional variation arising from differences in industrial composition, integration into global value chains, and exposure to both direct import protection and indirect cost or demand shocks. Areas with a high concentration of industries that receive direct tariff protection, such as primary metals under Section 232 measures, may experience localized gains in output and employment as domestic producers capture market share from foreign competitors [Fur+22]. In these regions, higher capacity utilization and improved margins can translate into wage stability or modest job growth, particularly where production facilities are major local employers. However, such benefits are often offset by negative spillovers to downstream sectors within the same geographic area that rely on protected inputs. For example, Midwestern states with significant steel production capacity benefited from higher steel prices post-tariff, but manufacturing hubs in those same states producing fabricated metal products, machinery, or vehicles faced increased input costs that eroded competitiveness [Hos20]. Regions heavily dependent on export-oriented agriculture have been among the most adversely affected by retaliatory tariffs. The imposition of Chinese duties on soybeans and other farm commodities sharply reduced export volumes from states such as Iowa, Illinois, and Minnesota [ZZZ22]. These losses depressed farm incomes and had multiplier effects on rural economies through reduced spending on equipment, services, and household consumption. Even with federal aid programs designed to compensate for lost sales, the uncertainty surrounding long-term market access has discouraged investment in agricultural infrastructure and technology upgrades in these areas. The contraction in agricultural exports also affected port regions along the Gulf Coast and Pacific Northwest that serve as key nodes for grain shipments to Asia. Geographic disparities are further shaped by the structure of local labor markets. Metropolitan areas with diversified economies may absorb tariff shocks more effectively than single-industry towns where a large share of employment is tied to a sector directly impacted by trade policy changes [Dol+25]. For instance, West Coast technology hubs integrated into electronics global value chains experienced cost increases from tariffs on intermediate components sourced from East Asia [Fus20], but their broader service-oriented economies provided alternative employment opportunities that mitigated aggregate job losses. In contrast, smaller manufacturing centers in the Midwest or South specializing in tariff-exposed goods often lacked such buffers, leading to sharper employment declines when input costs rose or export demand fell. Import-dependent coastal states illustrate another dimension of regional variation. States like California, New York, and Washington handle large volumes of containerized imports through major ports;

tariffs on consumer goods increase landed costs for retailers concentrated in these areas [SWX21]. While some of these costs are passed along nationally through distributed supply chains, local logistics providers and port operations can experience shifts in cargo composition as importers reconfigure sourcing toward untaxed origins [BS20]. This reallocation may benefit certain ports, such as those handling increased shipments from Vietnam or Mexico, but reduce throughput at facilities previously specialized in Chinese-origin goods. The degree of integration into cross-border production networks also influences regional outcomes. Border states like Texas and Michigan are deeply embedded in North American automotive supply chains; tariffs on steel, aluminum, or specific auto parts disrupt established just-in-time delivery systems linking U.S., Canadian, and Mexican plants [Hos20]. These disruptions can cause temporary shutdowns or production slowdowns that ripple through local economies dependent on automotive manufacturing wages and supplier contracts. Conversely, some border regions have gained from trade diversion when U.S. importers shifted sourcing from China to Mexico under preferential access provisions [Fus20]. Energy-exporting regions present a distinct case where geography interacts with commodity market dynamics. States such as Texas and Louisiana have benefited from expanded crude oil and liquefied natural gas exports; however, retaliatory tariffs targeting energy products, such as China's duties on LNG, have forced exporters to seek alternative buyers farther afield [ITC21]. This redirection increases shipping distances and costs while introducing contractual uncertainties for terminal operators and shipping firms based in these states. Urban-rural divides emerge clearly when examining household-level welfare impacts within different geographies. Urban consumers often face higher exposure to price increases on imported consumer goods due to greater reliance on retail sectors stocking foreign-made products [SA19]. Rural households may be less directly affected by consumer price inflation if they consume more domestically produced goods but suffer disproportionately from income losses tied to export-dependent agriculture or resource extraction industries targeted by retaliation [ZZZ22]. These divergent channels mean that identical national tariff measures can produce opposite net welfare effects across urban versus rural settings within the same state. Regional political economy considerations also shape how tariff impacts are perceived and managed locally. In some manufacturing-intensive districts benefiting from import substitution effects, support for protectionist policies may remain strong despite broader macroeconomic costs [Dol+25]. In contrast, port cities experiencing cargo volume declines or farming communities facing sustained export barriers may lobby actively for tariff rollbacks or expanded trade agreements to restore market access. Such localized advocacy can influence congressional voting patterns on trade legislation and affect the trajectory of future policy adjustments. Finally, temporal dynamics matter: short-term gains in protected industries may erode over time if retaliatory measures persist or if downstream cost pressures lead to relocation of production outside the region [BMW19]. Similarly, initial losses in export-oriented areas could be partially reversed if firms successfully diversify markets or adapt supply chains to new trade patterns; however, sunk costs associated with lost customer relationships or dismantled distribution networks can make recovery uneven across geographies [Fus20]. The persistence of altered trade flows after tariff removal, driven by prior investments in alternative sourcing, suggests that regional economic landscapes can be durably reshaped by even temporary policy interventions [BS20]. Overall, geographical variation in tariff impacts reflects a complex interplay between industry mix, trade orientation, supply chain integration depth, infrastructure roles in global commerce, labor market flexibility, and adaptive capacity at both firm and community levels. These factors determine whether a given region experiences net benefits or losses under shifting U.S. tariff regimes, and how enduring those outcomes will be once broader economic adjustments take hold across interconnected domestic and international markets [Hos20; ZZZ22; Fus20; ITC21].

6.3.2 Income Group Differences

The distributional consequences of tariff measures vary markedly across income groups due to differences in consumption patterns, exposure to price changes, and dependence on income sources linked to trade-exposed sectors. Lower-income households tend to allocate a larger proportion of their budgets to tradable goods such as apparel, footwear, household appliances, and basic electronics, categories that are often imported from low-cost producers targeted by tariffs [SA19]. When tariffs raise the landed prices of these goods, the resulting cost increases consume a greater share of disposable income for poorer households compared with higher-income ones. This regressive burden is amplified when substitution possibilities are limited; for example, if domestic alternatives are either unavailable or priced significantly higher, low-income consumers must absorb the full impact of price hikes rather than switching to untaxed substitutes [BS20]. Indirect effects through input-output linkages also have unequal impacts across income strata. Tariffs on intermediate goods such as steel, aluminum, or semiconductors increase production costs for downstream industries that produce consumer durables and infrastructure-related goods [WM20]. These cost increases cascade into final retail prices via cumulative markups at each stage of production [Cha+19]. Since lower- and middle-income households spend relatively more on durable goods as a share of total expenditure than high-income households, once basic needs are met, the inflationary pass-through from upstream tariffs can disproportionately erode their purchasing power. In concentrated markets where reduced foreign competition enables domestic producers to raise markups beyond cost pass-through [CHP24], the regressive nature of these effects is further intensified. Income group disparities also emerge through labor market channels. Workers in lower-wage manufacturing jobs may initially benefit from import-substitution effects if tariffs protect their industries from foreign competition [DL23]. However, these gains are often offset by job losses or wage suppression in other sectors exposed to higher input costs or retaliatory export barriers [FK21]. For example, agricultural workers in export-oriented regions faced significant income declines when Chinese retaliation targeted soybeans and other farm products [NYA24]. Such shocks reduce household earnings directly and indirectly through multiplier effects in local economies dependent on trade-related employment. Higher-income households, by contrast, are more likely to derive earnings from sectors less sensitive to tariff-induced disruptions, such as professional services, or from capital income streams that may be less immediately affected by trade policy shifts. The composition of non-wage income further differentiates impacts across groups. Lower-income households rely more heavily on wages and transfer payments, making them vulnerable to employment volatility in trade-exposed industries. Middle- and upper-income households often hold diversified asset portfolios that can buffer short-term shocks but may still experience valuation declines if equity markets react negatively to tariff escalations [YLB25]. For instance, firms with high dependence on Chinese inputs or export markets saw sharper stock price declines during the U.S.–China trade conflict, affecting investment returns for wealthier households with significant equity holdings. Consumption substitution patterns also differ by income level. Higher-income consumers can more readily switch to untaxed imports from alternative origins or absorb quality differentials when substituting away from tariffed goods [BS20]. They may also have greater access to niche domestic suppliers offering competitive alternatives. In contrast, lower-income consumers face tighter budget constraints that limit substitution options; they may be forced into purchasing lower-quality goods at similar nominal prices when shifting away from taxed imports [HIM22], thereby experiencing a decline in real consumption value not fully captured by standard price indices. Macroeconomic spillovers compound these disparities over time. Tariff-induced inflation erodes real wage growth if nominal wages adjust slowly relative to rising living costs [TZ20]. This lag disproportionately affects lower-wage workers whose bargaining power is weaker and whose incomes are less likely to keep pace with inflationary pressures. Additionally, monetary policy responses aimed at containing inflation, such as interest rate hikes, can increase borrowing costs for all households but weigh more heavily on those with variable-rate debt obligations common among middle- and lower-income borrowers. Retaliatory measures abroad can create asymmetric regional labor market shocks that map onto income distributions within affected areas. Rural communities dependent on agricultural exports often have lower average household incomes; when foreign tariffs reduce demand for their products, the resulting contraction in local economic activity exacerbates existing income inequalities [ZZZ22]. Urban centers with diversified economies may weather such shocks better but still see localized effects in neighborhoods tied to specific trade-sensitive industries through supply chain linkages or service provision roles. Short-term coping mechanisms differ across groups as well. Higher-income households can draw on savings or credit lines to smooth consumption during periods of elevated prices or reduced earnings; lower-income households have less financial flexibility and may respond by cutting back on discretionary spending or delaying essential purchases such as home repairs or medical care. These adjustments can have long-term welfare implications if deferred expenditures lead to deteriorating living conditions or health outcomes. Policy interventions designed to offset adverse distributional impacts, such as targeted subsidies or direct transfers, face challenges in reaching intended beneficiaries efficiently without distorting incentives [DL23]. For example, federal aid programs compensating farmers for lost export sales provided some relief but did not fully replace market revenues nor address secondary employment losses in related industries like transportation and processing. Moreover, such programs primarily benefited asset-owning producers rather than wage laborers employed seasonally or informally in agriculture, leaving gaps in protection for some of the most vulnerable workers affected by retaliation-driven demand shocks. Over the longer term, persistent tariff regimes can influence intergenerational mobility by altering regional economic trajectories tied closely to specific industries [Fus20]. If protectionist measures encourage capital-intensive restructuring that reduces labor demand in traditionally middle-skill occupations, upward mobility opportunities for lower- and middle-income groups may diminish even after initial protective benefits fade. Conversely, high-income groups with greater access to education and capital resources are better positioned to adapt occupationally or geographically in response to shifting trade patterns induced by tariffs. In aggregate terms, empirical assessments suggest that while certain subsets of lower- and middle-income workers gain temporarily from industry-specific protectionism, the broader effect of tariffs is regressive once consumer price increases, retaliatory income losses, limited substitution possibilities, and macroeconomic feedbacks are accounted for [SA19; FK21]. High-income households generally experience smaller proportional welfare losses due both to expenditure composition favoring less-traded services and greater adaptive capacity through asset diversification and flexible consumption choices. The net result is an exacerbation of pre-existing income inequalities alongside reductions in aggregate real consumption possibilities across all groups within an interconnected economy sensitive to global supply chain disruptions triggered by tariff policy shifts.

6.3.3 Disparities Across Industries

Tariff measures generate heterogeneous effects across industries due to differences in trade exposure, supply chain integration, market structure, and the degree of substitutability between domestic and foreign inputs. Industries positioned at the upstream end of production networks, such as primary metals, often experience direct gains from import protection. The imposition of Section 232 tariffs on steel and aluminum, for example, raised domestic prices and improved capacity utilization for U.S. producers [Hos20]. These conditions supported short-term revenue growth and localized employment stability in metal-producing regions. However, the benefits were not uniform even within the metals sector; firms with significant export orientation faced retaliatory barriers abroad that eroded potential gains from domestic price increases [FP19]. Downstream manufacturing industries dependent on these protected inputs frequently encountered adverse effects. Automotive manufacturing, machinery production, and fabricated metal products saw higher input costs that compressed margins and reduced competitiveness both domestically and internationally [LWW19]. In sectors where cost pass-through to consumers was constrained by competitive pressures or demand elasticity, firms absorbed a larger share of tariff-induced cost increases, leading to cutbacks in investment or workforce reductions. This asymmetry illustrates how protection for one industry can impose net losses on others linked through input-output relationships [KR23]. Agriculture represents another sector where tariff impacts diverged sharply from those in upstream manufacturing. While some agricultural subsectors benefited indirectly from trade diversion, such as niche crops gaining market share when competitors faced barriers, major commodity producers suffered substantial losses under retaliatory measures. Chinese tariffs on soybeans redirected demand toward Brazil, causing U.S. export volumes to collapse and farmgate prices to fall [NYA24]. The resulting income shock propagated through rural economies reliant on agricultural earnings, affecting equipment suppliers, transport services, and local retail activity. Even with federal aid programs designed to offset lost revenues, uncertainty over long-term market access discouraged capital investment in farming operations [ZHA15]. In technology-intensive industries like electronics and semiconductors, the complexity of global value chains amplified tariff effects. Many products incorporate components sourced from multiple countries; tariffs on intermediate goods such as printed circuit boards or semiconductor wafers increased assembly costs for U.S.-based manufacturers [WM20]. Firms responded by relocating final assembly to third countries not subject to the same duties while maintaining existing supplier relationships for specialized inputs [Fus20]. This restructuring required significant logistical adjustments and capital outlays but allowed companies to preserve competitiveness in global markets. Nevertheless, transition periods often involved production delays and temporary shortages in consumer markets. The apparel industry demonstrates a contrasting case where high substitutability among suppliers enabled rapid adjustment. When tariffs targeted Chinese-made clothing items, importers shifted sourcing toward Vietnam, Bangladesh, and other low-cost producers outside the tariff scope [BS20]. This flexibility limited retail price increases compared with sectors tied to specialized inputs; however, it also entailed transaction costs related to supplier vetting, quality assurance processes, and reconfigured logistics networks. The speed of adjustment in apparel underscores how labor-intensive industries with mobile production bases can adapt more readily than capital-intensive sectors with fixed asset investments. Energy-related industries experienced mixed outcomes depending on their position in global commodity markets. Crude oil exporters were less directly affected by tariffs due to fungibility in global markets; however, liquefied natural gas (LNG) shipments faced targeted retaliation that reduced access to fast-growing Asian markets like China [ITC21]. Exporters redirected cargoes to Europe or South Asia at higher transportation costs and under less favorable contractual terms. For equipment manufacturers serving the energy sector, such as pipeline component producers, tariffs on steel inputs raised production costs without corresponding protective benefits if their products were not directly shielded from import competition. Service industries linked closely with goods trade also displayed differentiated responses. Logistics providers handling imports from targeted countries saw declines in cargo volumes through certain ports but increases from alternative origins benefiting from trade diversion [HIT18]. Freight forwarders adapted routing strategies accordingly; however, these shifts sometimes required redeployment of assets or renegotiation of long-term contracts with carriers and shippers. Financial services firms exposed indirectly through client portfolios experienced valuation volatility when equity prices fell for companies heavily reliant on tariff-affected supply chains [YLB25]. Market structure plays a critical role in shaping disparities across industries under tariff regimes. In concentrated sectors where foreign competition is curtailed by tariffs, such as certain heavy manufacturing segments, domestic incumbents may raise markups beyond cost pass-through levels [CHP24], increasing profitability at consumers' expense but potentially reducing incentives for innovation over time. By contrast, fragmented industries with many competing firms may see smaller price effects because competitive pressures limit markup expansion even after import competition declines [ARW19]. The degree of integration into global value chains further differentiates industry outcomes. Highly integrated sectors like automotive manufacturing face compounded risks when tariffs disrupt multiple stages of cross-border production [Fus20]. In contrast, domestically oriented service sectors may experience only indirect effects via changes in household consumption patterns driven by broader macroeconomic consequences of tariffs [SA19]. These structural differences mean that identical tariff measures can yield net positive outcomes for some industries while imposing substantial costs on others within the same economy. Policy design choices, including product-level granularity of tariff lists, also contribute to inter-industry disparities. Early phases of recent U.S.–China measures targeted high-technology goods aligned with strategic industrial policy concerns; later expansions encompassed a wider array of consumer products with less direct connection to original policy objectives [LLY25]. This broadening diluted strategic selectivity and increased collateral impacts on industries not central to the initial dispute rationale. Exemptions based on free trade agreements or administrative waivers further skewed incidence by allowing certain sectors continued access to untaxed imports while others bore full tariff burdens [Cha+19]. Overall, disparities across industries under tariff regimes reflect an interplay between direct protection benefits for targeted producers and indirect cost burdens transmitted through supply chains; between adaptability afforded by supplier substitutability and rigidity imposed by capital intensity; between market structures that enable markup expansion versus those constrained by competition; and between policy targeting that aligns with strategic objectives versus broad coverage that amplifies unintended spillovers [Hos20; NYA24; WM20; BS20]. These differences underscore why aggregate national assessments can mask significant variation in sectoral experiences, and why effective policy evaluation must account for the heterogeneous realities facing industries embedded within an interconnected domestic and global economic system shaped by trade policy interventions.

7 Tariffs and US Supply Chains

7.1 Supply Chain Complexity and Adaptation

Tariff measures alter the configuration and complexity of supply chains by changing cost structures, risk profiles, and sourcing incentives for firms engaged in international trade. When tariffs increase the landed cost of imported goods, companies reassess their supplier portfolios to mitigate exposure to higher duties. This reassessment often involves balancing multiple factors: the severity of tariff increases, uncertainty about their duration, the geographic scope of affected products, and the relative importance of those products within a firm's total procurement spend. The interplay between these variables determines whether firms opt for incremental adjustments, such as renegotiating terms with existing suppliers, or more substantial restructuring involving new supplier relationships or relocation of production stages. The degree of supply base complexity is a critical consideration in this adaptation process. Firms with diversified supplier networks across multiple geographies may be better positioned to absorb tariff shocks by shifting orders toward untaxed origins without major disruptions. In contrast, companies dependent on a small number of suppliers in targeted countries face higher switching costs and greater operational risk. Low-supply-risk products, which are commodified and widely available globally, allow for relatively rapid reconfiguration of sourcing patterns after tariff implementation [Cha+19]. For such goods, complexity can change significantly in a short period as firms adjust both the number of suppliers and their geographic distribution. High-supply-risk items, those with limited global availability or specialized technical requirements, are less adaptable; here, maintaining continuity of supply often takes precedence over cost minimization. The 2018–2019 U.S.–China trade conflict illustrates how tariffs can trigger cascading changes in supply chain architecture. Many U.S. importers reduced direct purchases from China in favor of alternative suppliers in Vietnam, Mexico, and other ASEAN economies [BS20]. In some cases, this involved establishing entirely new supplier relationships; in others, it meant increasing volumes with existing partners outside China. These shifts were not purely bilateral substitutions but part of broader network reconfigurations that altered trade flows through third countries [Fus20]. For example, certain Chinese-origin components were routed through intermediary nations where final assembly occurred before export to the United States, thereby avoiding direct tariff exposure while maintaining established upstream relationships. Adaptation strategies also vary according to industry characteristics. In sectors with high substitutability among suppliers, such as apparel, firms could pivot quickly toward untaxed sources without significant quality compromises [BS20]. By contrast, electronics manufacturers reliant on precision components from East Asia faced greater challenges; substituting these inputs required extensive vetting for compatibility and performance standards [WM20]. In such cases, adaptation often entailed partial relocation of assembly operations to third countries while retaining original component suppliers, a hybrid approach that preserved technical integrity while reducing tariff liabilities. Tariffs influence not only sourcing decisions but also the structural complexity of supply networks. Increased geographic dispersion can raise coordination costs and complicate logistics management. Firms must weigh these added complexities against potential savings from avoiding tariffs. Conversely, some companies respond by consolidating suppliers within untaxed regions to simplify compliance with rules-of-origin requirements and reduce administrative burdens associated with multi-jurisdictional sourcing. Risk management considerations play a central role in adaptation decisions. Tariff volatility introduces uncertainty into long-term planning; firms may diversify geographically not only to avoid current duties but also to hedge against future policy shifts [Cha+19]. This diversification can involve dual sourcing strategies where critical inputs are procured from both domestic and foreign suppliers to balance cost efficiency with resilience. However, expanding the supplier base increases monitoring requirements and may dilute economies of scale achieved through concentrated purchasing. Operational responses extend beyond procurement adjustments. Some firms engage in "tariff engineering" by modifying product designs or altering manufacturing sequences so that goods fall under HTS classifications with lower duty rates [MN24]. Others invest in automation or process improvements domestically to offset higher input costs resulting from tariffs [BF19b]. While such investments can enhance long-term competitiveness, they require upfront capital outlays that smaller firms may find prohibitive. The adaptation process is further complicated by retaliatory measures from trading partners. Export-oriented firms facing reduced foreign demand due to retaliation may reorient sales toward domestic markets or seek new export destinations [BS20]. This reorientation can necessitate changes in product specifications, marketing strategies, and distribution channels, all of which interact with upstream sourcing decisions to reshape overall supply chain configurations. Empirical evidence suggests that adaptation is not instantaneous; lead times for qualifying new suppliers or relocating production can span months or even years depending on industry-specific constraints [Cha+19]. During this transition period, firms may rely on inventory stockpiling ahead of tariff implementation ("front-running") to buffer against immediate cost increases [Cav+19]. While effective in the short term, this tactic does not address underlying exposure once inventories are depleted. Global value chain integration magnifies both the challenges and opportunities associated with adaptation. Tariffs on intermediate goods propagate through multiple stages of production across borders [Fus20], meaning that changes at one node affect cost structures throughout the network. Firms embedded deeply in such chains must coordinate adjustments across multiple jurisdictions, a task requiring sophisticated logistics capabilities and strong inter-firm communication channels. Ultimately, the capacity to adapt supply chains under tariff pressure depends on a combination of structural flexibility, resource availability, and strategic foresight. Companies that proactively map their supply networks, including tier-2 and tier-3 suppliers, are better equipped to identify vulnerabilities and implement contingency plans when trade policies shift abruptly [Cha+19]. Those lacking visibility into extended supply chains risk being caught off guard by indirect exposures that manifest through upstream dependencies. In sum, tariffs act as catalysts for re-evaluating supply chain design along dimensions of complexity, resilience, and cost efficiency. Adaptation involves a spectrum of responses, from tactical sourcing shifts to strategic network redesigns, that reflect both immediate economic pressures and longer-term positioning within an uncertain global trade environment shaped by evolving policy landscapes [Cha+19; Fus20; BS20].

7.2 Supplier Selection and Relationship Management

Tariff-induced shifts in cost structures and sourcing risks compel firms to reassess supplier selection criteria and reconfigure relationship management strategies in ways that balance short-term operational continuity with long-term resilience. The imposition of duties on specific countries or product categories alters the relative attractiveness of existing suppliers, often prompting a re-evaluation of geographic diversification, contractual terms, and performance metrics. When tariff severity is high and timing uncertainty is low, firms tend to act swiftly by forming new ties with suppliers from non-tariff-affected countries, including domestic sources, while simultaneously reducing or eliminating relationships with suppliers located in tariff-targeted regions. This proactive substitution increases supply base complexity as the number of active supplier relationships grows, requiring enhanced coordination and oversight mechanisms to manage quality, delivery reliability, and compliance across a more dispersed network. In scenarios where both severity and timing uncertainty are high, decision-making becomes more complex. Firms may delay definitive supplier switches until policy trajectories become clearer, instead engaging in exploratory negotiations or trial orders with alternative suppliers to maintain optionality. This hedging approach allows for rapid scaling of new relationships if tariffs persist but avoids prematurely severing established ties that could remain viable should trade conditions normalize. Such contingent arrangements necessitate flexible contracting structures that can accommodate volume adjustments without incurring prohibitive penalties. Supplier selection under tariff pressure increasingly incorporates geopolitical risk assessments alongside traditional cost and capability evaluations.

Geographic scope considerations, whether a supplier operates in multiple jurisdictions or relies heavily on a single export market, gain prominence as firms seek to mitigate exposure to future trade disputes [Cha+19]. Suppliers with diversified production footprints may be favored because they can shift output between facilities in different countries to circumvent emerging tariff barriers. This capacity for geographic agility becomes a competitive differentiator in bidding processes during periods of heightened trade policy volatility. Relationship management practices must adapt accordingly. Long-standing partnerships with suppliers in targeted countries may require renegotiation of terms to share the burden of increased duties. In some cases, foreign suppliers absorb part of the tariff cost through price concessions to preserve market access [MN24], while in others they collaborate on joint investments in third-country assembly operations that allow continued participation in the buyer's supply chain without direct tariff exposure [Fus20]. These cooperative adaptations can strengthen relational capital even amid adverse policy environments, but they also demand transparency regarding cost structures and mutual trust to ensure equitable distribution of adjustment costs. The expansion of supply bases into new geographies introduces challenges related to quality assurance, lead time variability, and compliance with regulatory standards. Firms must invest in supplier development programs for newly onboarded partners to align production processes with required specifications [Cha+19]. This may involve technical training, process audits, and integration into digital supply chain management platforms that facilitate real-time monitoring of order status and performance metrics. For industries reliant on specialized inputs, such as electronics or precision machinery, qualifying new suppliers can be resource-intensive due to stringent testing protocols needed to ensure compatibility with existing designs [WM20]. Tariffs also influence the balance between transactional and relational governance models in supplier management. Under stable trade conditions, buyers may rely more heavily on competitive bidding among interchangeable suppliers; however, when tariffs disrupt established flows, the value of strategic partnerships capable of collaborative problem-solving increases [Cha+19]. Relational governance enables joint contingency planning for potential disruptions, coordinated lobbying for exemptions or reclassifications under the Harmonized Tariff Schedule (HTS), and shared investment in adaptive manufacturing capabilities. Contract design evolves under these pressures as well. Force majeure clauses may be expanded to explicitly include sudden changes in trade policy as triggers for renegotiation. Volume flexibility provisions become more common to allow scaling up purchases from untaxed origins while scaling down from affected ones without breaching agreements. Multi-sourcing clauses can be embedded contractually to formalize diversification strategies aimed at reducing dependency on any single geography. The interplay between supplier selection and relationship management is further complicated by retaliatory measures from trading partners. Export-oriented firms facing reduced foreign demand due to retaliation may prioritize suppliers capable of supporting entry into alternative markets [BS20]. This requires alignment not only on production capabilities but also on certifications, labeling requirements, and distribution networks relevant to new target geographies. Suppliers offering such market access advantages gain strategic importance beyond their immediate cost competitiveness. Digitalization supports these adaptive strategies by enhancing visibility across multi-tier supply chains. Advanced analytics can model tariff scenarios' impacts on landed costs from different origins, enabling data-driven supplier comparisons that incorporate both direct duty rates and indirect logistics implications. Supplier relationship management (SRM) systems integrated with trade compliance modules help track rules-of-origin compliance, a critical factor when leveraging free trade agreement exemptions or quota-based exclusions. However, increasing supply base complexity carries inherent risks: coordination costs rise; information asymmetries multiply; and potential for quality lapses grows if oversight resources are stretched thin. Effective relationship management thus requires prioritization frameworks that allocate attention proportionally to each supplier's criticality within the overall value chain [Cha+19]. High-criticality suppliers, those providing unique inputs or representing large spend categories, warrant deeper engagement through regular site visits, joint improvement initiatives, and executive-level relationship reviews. In sum, tariffs reshape supplier selection by elevating geopolitical risk considerations alongside traditional cost-quality-delivery criteria and drive relationship management toward more collaborative, flexible arrangements capable of absorbing policy shocks without destabilizing operations [Cha+19; Fus20]. Firms that integrate these dimensions into cohesive sourcing strategies are better positioned to navigate the uncertainties inherent in an international trading environment subject to abrupt policy shifts while maintaining both resilience and competitiveness over time.

7.3 Sourcing Strategies and Reshoring

Tariff-induced changes in cost structures and risk profiles have prompted many firms to reassess their sourcing strategies, with some considering or implementing reshoring initiatives as part of a broader adaptation process. The decision to alter sourcing configurations is shaped by the severity of tariff measures, the predictability of their duration, and the degree to which affected inputs are critical to production. When tariffs significantly increase landed costs for key components, firms often explore shifting procurement toward suppliers in untaxed jurisdictions or relocating production stages closer to end markets to reduce exposure [Cha+19]. This reorientation can involve both tactical adjustments, such as diversifying supplier portfolios within existing global networks, and strategic moves like reshoring manufacturing capacity to the United States. The feasibility of reshoring depends heavily on industry characteristics and supply chain integration depth. In sectors with high substitutability among suppliers, such as apparel or certain consumer goods, firms can pivot relatively quickly toward domestic or regional sources without major disruptions [BS20]. By contrast, industries reliant on specialized intermediate goods, such as semiconductors or precision machinery, face greater challenges due to limited domestic capacity and stringent quality requirements [WM20]. For these sectors, reshoring may require substantial capital investment in new facilities, workforce training, and technology acquisition before production can be relocated effectively. Reshoring decisions are also influenced by the interplay between tariff policy and other economic incentives. Government programs aimed at bolstering domestic manufacturing, such as subsidies for strategic industries or tax credits for capital investment, can offset some of the higher operating costs associated with U.S.-based production [MN24]. Firms weigh these incentives against potential efficiency losses from moving away from established global value chains that offer scale economies and access to specialized capabilities abroad [Fus20]. In some cases, partial reshoring is pursued: high-value or sensitive production stages are brought back domestically for security or compliance reasons, while lower-value-added processes remain offshore. Sourcing strategies under tariff pressure often incorporate a dual approach: diversification across multiple foreign suppliers combined with selective reshoring of critical operations. Geographic diversification reduces dependency on any single country vulnerable to future trade disputes [Cha+19], while domestic capacity provides a hedge against sudden policy shifts that could disrupt imports entirely. This hybrid model can enhance resilience but increases complexity in supply chain coordination, requiring robust logistics management and supplier relationship frameworks. The transition toward reshoring is not without trade-offs. Domestic production typically entails higher labor costs compared with offshore alternatives, particularly in labor-intensive industries. To mitigate this disadvantage, firms investing in U.S.-based facilities often integrate automation technologies to improve productivity and reduce unit labor requirements [BF19b]. While automation can make reshored operations more cost-competitive, it may also limit the employment gains traditionally associated with bringing manufacturing back home. Tariffs on upstream inputs play a pivotal role in shaping sourcing decisions. When duties are applied to raw materials like steel or aluminum, they raise costs for downstream manufacturers regardless of production location [LWW19]. In such cases, reshoring final assembly may not yield significant cost savings unless domestic input suppliers are available at competitive prices. Conversely, when tariffs target finished goods but not their constituent parts, importing components for domestic assembly can become an attractive strategy to avoid higher duties on complete products [Fus20]. Retaliatory measures by trading partners further complicate sourcing and reshoring calculus. Export-oriented firms must consider whether shifting production domestically could expose them to counter-tariffs in key foreign markets [BS20]. For example, a company that reshores assembly for the U.S. market might still maintain offshore plants dedicated to serving international customers in order to preserve preferential access under existing trade agreements. Operationally, implementing new sourcing strategies requires careful sequencing. Firms may begin by qualifying alternative suppliers through pilot orders while maintaining relationships with incumbent partners until new sources demonstrate reliability [Cha+19]. Reshoring initiatives often proceed in phases: initial relocation of low-complexity products serves as a proof of concept before scaling up to more sophisticated lines once processes are stabilized domestically. The role of rules-of-origin compliance is critical when reconfiguring sourcing under tariff regimes. Products assembled domestically from imported components must meet specific content thresholds to qualify for preferential treatment under free trade agreements; failure to do so can negate expected tariff advantages [MN24]. This consideration influences both supplier selection abroad and investment decisions at home. Case evidence from recent U.S.–China trade tensions illustrates these dynamics vividly. Some electronics manufacturers shifted final assembly from China to Vietnam or Mexico while exploring long-term investments in U.S.-based facilities for high-margin product lines [BS20]. Apparel brands diversified sourcing toward Southeast Asia but also increased orders from domestic contract manufacturers for rapid-response fashion segments where lead time advantages outweighed cost differentials. Automotive producers evaluated moving certain model assembly back to North America but faced constraints due to integrated cross-border supply chains under USMCA provisions [Fus20]. Ultimately, sourcing strategies and reshoring decisions under tariff pressure reflect a balancing act between cost efficiency, operational resilience, market access considerations, and compliance requirements. Firms that integrate geopolitical risk assessment into procurement planning are better positioned to adapt proactively rather than reactively when trade policies shift abruptly [Cha+19]. While full-scale reshoring remains challenging for many industries due to structural cost differentials and entrenched global networks, targeted relocation of strategic activities combined with diversified international sourcing offers a pragmatic path toward mitigating tariff-related risks without sacrificing competitiveness in global markets.

7.4 Risk and Uncertainty in Supply Networks

Tariff measures introduce significant layers of risk and uncertainty into supply networks by altering cost structures, disrupting established trade flows, and creating volatility in procurement planning horizons. The unpredictability of trade policy changes, both in terms of timing and scope, complicates long-term contractual commitments with suppliers, particularly when tariff announcements are made with short lead times before implementation [Cha+19]. Firms embedded in global value chains face heightened exposure because intermediate goods may cross multiple borders before final assembly, making them vulnerable to cumulative tariff effects at different stages of production [Fus20]. This multi-jurisdictional exposure amplifies the difficulty of forecasting landed costs and assessing the competitiveness of final products in target markets. One dimension of uncertainty stems from the political nature of tariff decisions. Trade disputes can escalate rapidly, as seen during the U.S.–China conflict, where successive waves of tariffs were imposed and expanded over a relatively short period [LLY25]. Such escalation forces firms to operate under shifting cost baselines, undermining the stability needed for efficient supply chain optimization. Even when initial measures are narrowly targeted, the risk that they will broaden to encompass additional product categories or trading partners creates a precautionary environment in which firms may over-diversify sourcing or hold excess inventory as a hedge against future disruptions [Cha+19]. These defensive strategies, while mitigating immediate exposure, can increase operational complexity and working capital requirements. The severity of tariff impacts is closely linked to the degree of supplier concentration within affected categories. When critical inputs are sourced from a small number of suppliers located in tariff-targeted countries, switching costs can be substantial due to qualification requirements, tooling investments, or regulatory compliance hurdles [WM20]. In such cases, uncertainty about tariff duration exacerbates decision-making challenges: committing resources to develop alternative suppliers may prove wasteful if measures are lifted quickly, yet delaying action risks prolonged exposure if tariffs persist. This tension often results in partial adjustments, such as trial orders with new suppliers, designed to maintain flexibility without fully abandoning incumbent relationships [Cha+19]. Retaliatory measures by trading partners add another layer of complexity by affecting demand-side conditions for export-oriented firms. When foreign governments impose counter-tariffs on U.S. goods, companies must reassess not only their sourcing strategies but also their market portfolios [BS20]. The interplay between input-side cost increases from inbound tariffs and revenue-side contractions from outbound retaliation creates a dual-source risk profile that is difficult to hedge effectively. For example, agricultural exporters facing Chinese tariffs on soybeans experienced both reduced sales volumes abroad and increased domestic competition as unsold stocks were redirected into local markets [NYA24]. Uncertainty also arises from potential circumvention behaviors within supply networks. Transshipment through third countries or minor product modifications to alter HTS classifications can temporarily avoid tariffs but carry legal and reputational risks if detected by customs authorities [MN24]. Firms relying on such tactics face the possibility that enforcement actions will retroactively impose duties or penalties, further destabilizing cost projections. Moreover, increased scrutiny at borders can lengthen lead times unpredictably, disrupting just-in-time delivery systems critical in sectors like automotive manufacturing [Hos20]. Macroeconomic feedback loops contribute additional volatility to supply network planning under tariff regimes. Exchange rate movements triggered by trade tensions can offset or amplify nominal duty effects depending on currency direction [TZ20]. Inflationary pressures from higher import prices may prompt monetary tightening, raising financing costs for inventory holdings or capital investments needed for supply chain reconfiguration [BF19a]. These macro-level uncertainties interact with micro-level operational risks to create an environment where scenario planning must account for multiple contingencies beyond direct tariff rates alone. The informational dimension of risk is equally important. Limited visibility into tier-2 and tier-3 suppliers hampers accurate assessment of indirect exposures; a firm may believe it has diversified away from a targeted country at tier-1 but still rely on subcomponents sourced there deeper in the chain [Cha+19]. This hidden dependency can result in unanticipated cost increases or delays when upstream suppliers pass through their own tariff burdens. Digital supply chain mapping tools offer potential mitigation by improving transparency across tiers; however, implementing such systems requires investment and organizational commitment that not all firms can readily mobilize during periods of acute disruption. Behavioral responses within supply networks under uncertainty include front-running shipments ahead of announced tariff hikes to lock in pre-duty prices [Cav+19], renegotiating contracts to include shared-cost clauses for unforeseen duties, and increasing safety stock levels for high-risk items despite associated carrying costs. While these tactics provide short-term buffers against volatility, they do not resolve structural vulnerabilities inherent in concentrated sourcing patterns or heavy reliance on politically sensitive trade lanes. Geopolitical considerations now feature more prominently in supplier evaluations alongside traditional metrics like cost and quality [Cha+19]. Suppliers with multi-country production footprints capable of reallocating output geographically gain strategic value because they offer built-in flexibility against sudden policy shifts. Conversely, single-location suppliers, even those offering competitive pricing, may be deprioritized due to elevated geopolitical risk profiles. This shift in evaluation criteria reflects a broader redefinition of "lowest total cost" to incorporate resilience premiums tied to policy stability and diversification capacity. In industries with long product development cycles or capital-intensive production processes, such as aerospace or semiconductor fabrication, the lead time required to qualify new suppliers magnifies the impact of uncertainty [WM20]. Here, even temporary tariffs can have multi-year repercussions if they influence sourcing decisions embedded early in design phases that lock in component choices for extended production runs. The sunk costs associated with such commitments make mid-cycle adjustments prohibitively expensive absent extraordinary circumstances. Ultimately, managing risk and uncertainty in supply networks under tariff regimes demands an integrated approach combining proactive diversification, enhanced visibility into multi-tier dependencies, flexible contracting mechanisms, and continuous monitoring of geopolitical developments [Cha+19; Fus20]. Firms that institutionalize these capabilities are better positioned to adapt dynamically as trade policies evolve; those that treat tariffs as isolated shocks rather than persistent strategic variables risk repeated disruptions whenever policy landscapes shift abruptly.

8 US Tariffs in the Context of International Trade Policy

8.1 Trade Agreements and Preferential Tariff Regimes

Trade agreements and preferential tariff regimes play a central role in shaping the environment within which U.S. tariff policy operates, influencing both the scope for unilateral action and the channels through which such measures propagate across global markets. These arrangements, whether bilateral, regional, or multilateral, establish frameworks that determine applicable duty rates, rules-of-origin requirements, and the extent of market access for goods and services. Preferential regimes typically lower or eliminate tariffs for member countries relative to most-favored-nation (MFN) rates, thereby creating differential treatment that can significantly alter trade flows [CS22]. The United States participates in a range of such agreements, from comprehensive free trade agreements (FTAs) like USMCA to sector-specific accords, that interact with its broader tariff schedule codified in the Harmonized Tariff Schedule (HTS). The design of preferential regimes affects how U.S. tariffs are applied in practice. Under FTAs, qualifying goods from partner countries enter at reduced or zero duty rates provided they meet specified rules-of-origin criteria [CHP24]. These criteria are critical because they prevent simple transshipment from non-member countries through FTA partners to exploit preferential access. Compliance often requires that a certain percentage of a product's value be added within member countries or that specific production processes occur there. For firms embedded in global value chains, meeting these thresholds can necessitate adjustments in sourcing patterns to ensure eligibility for preferences [Fus20]. This creates an incentive to reconfigure supply chains toward FTA partners when MFN tariffs on similar goods from non-members are high. The economic effects of preferential regimes depend on their utilization rates, how often eligible exporters actually claim preferences, and on the margin between MFN and preferential rates [CS22]. High preference margins increase the incentive to adjust sourcing toward eligible suppliers, while low margins may not justify the administrative costs of compliance. Empirical evidence shows that preference utilization varies widely across sectors and partners; products with complex rules-of-origin or low preference margins tend to have lower uptake despite nominal eligibility. This heterogeneity means that the real-world impact of preferential regimes is often less than their legal provisions might suggest. From a policy perspective, preferential agreements can constrain unilateral tariff actions by embedding commitments into binding international obligations. For example, under USMCA, the United States has agreed to maintain zero tariffs on most goods traded with Canada and Mexico, limiting its ability to impose duties on these partners without invoking specific safeguard or national security provisions [MN24]. Such constraints shape strategic choices during trade disputes: when targeting foreign suppliers with tariffs under statutes like Section 301 or Section 232, policymakers may focus on non-FTA partners to avoid breaching treaty commitments. At the same time, preferential regimes can be leveraged as tools of economic statecraft by offering enhanced market access in exchange for concessions on other policy fronts. The U.S. Generalized System of Preferences (GSP), for instance, provides nonreciprocal tariff reductions to developing countries contingent upon meeting criteria related to labor rights, intellectual property protection, and market openness [CS22]. Withdrawal or suspension of such benefits can serve as a targeted sanction short of imposing new MFN-level tariffs. The interaction between preferential regimes and unilateral tariffs became particularly salient during recent U.S.–China trade tensions. While Section 301 measures imposed additional duties on Chinese-origin goods across thousands of HTS codes [MN24], importers could mitigate some cost increases by shifting sourcing to FTA partners like Mexico under USMCA provisions or to other countries benefiting from GSP preferences [BS20]. This substitution effect illustrates how existing preferential networks can channel trade diversion away from targeted economies toward those with established preferential access. However, reliance on preferential regimes for tariff mitigation is not without limitations. Rules-of-origin compliance can be costly and time-consuming; firms must document production processes and input sourcing in detail to qualify for reduced rates [CHP24]. In industries with complex multi-country supply chains, such as electronics, meeting these requirements may be impractical if critical components originate outside the FTA area [WM20]. As a result, some importers opt to pay MFN duties rather than restructure supply chains solely for preference eligibility. Preferential agreements also influence sectoral exposure to tariff changes by shaping baseline duty rates before any new measures are applied. Sectors already enjoying low or zero MFN tariffs due to WTO bindings see limited incremental benefit from additional preferences; conversely, sectors facing high MFN rates stand to gain more from preferential access but also face greater disruption if such access is withdrawn [CS22]. This asymmetry affects lobbying behavior: industries heavily reliant on preferences may advocate strongly against policies that risk retaliation jeopardizing their privileged access abroad. The proliferation of deep trade agreements over recent decades has expanded the scope of disciplines beyond tariffs into areas like investment protection, regulatory cooperation, and intellectual property rights [CHP24]. These provisions can indirectly affect tariff policy by embedding dispute settlement mechanisms that allow partners to challenge perceived violations swiftly. For example, an FTA partner facing new U.S. tariffs inconsistent with agreement terms could initiate arbitration or WTO-compatible dispute resolution procedures seeking removal or compensation. In addition to formal FTAs and preference programs, plurilateral initiatives within organizations like the WTO create sector-specific liberalization commitments among subsets of members. Participation in such initiatives, covering areas like information technology products, can lock in zero-tariff treatment multilaterally while leaving other sectors subject to standard MFN rates [CS22]. This selective liberalization shapes where unilateral tariffs can be applied without breaching commitments. From an enforcement standpoint discussed in Section 5.2, administering overlapping layers of MFN duties, FTA preferences, and special retaliatory measures requires precise classification and origin verification at customs [Cha+19]. Misclassification risks increase when identical products face different rates depending on origin; this complexity creates opportunities for circumvention through false origin claims unless robust verification systems are in place. Strategically, expanding preferential networks can serve as a counterbalance to adversarial tariff actions by deepening integration with alternative partners. During periods of heightened bilateral tension, as with China, strengthening ties through FTAs with other Asia-Pacific economies or updating existing agreements (e.g., KORUS) offers pathways for diversifying supply sources while reinforcing geopolitical alliances [MN24]. Overall, trade agreements and preferential tariff regimes form an integral part of the context within which U.S. tariff policy operates. They both constrain and enable policy choices: constraining by embedding binding commitments that limit arbitrary duty changes toward partners; enabling by providing structured avenues for trade diversion away from targeted economies during disputes. Their effectiveness depends not only on legal provisions but also on practical factors like utilization rates, compliance costs, and compatibility with modern global value chain structures [CS22; CHP24]. In an era where unilateral tariffs have re-emerged as prominent tools of economic strategy, understanding these interactions is essential for anticipating both direct impacts on trade flows and indirect consequences mediated through complex networks of preferential relationships spanning multiple regions and sectors.

8.2 US Tariffs in Global Trade Disputes

The role of U.S. tariffs in global trade disputes reflects a combination of strategic economic objectives, domestic political considerations, and the structural realities of an interconnected trading system. Historically, tariff measures have been deployed both as defensive tools to shield domestic industries from perceived unfair competition and as offensive instruments to compel changes in foreign trade practices [HZ22]. In contemporary disputes, these functions often overlap, with tariffs serving simultaneously to protect targeted sectors and to exert leverage in broader negotiations over industrial policy, intellectual property rights, or market access. A prominent example is the U.S.–China trade conflict, where successive waves of tariffs were imposed under Section 301 authority in response to alleged discriminatory practices related to technology transfer and state subsidies [MN24]. The initial tranches focused on high-technology goods aligned with China's industrial upgrading strategies, signaling a deliberate attempt to slow its advancement in strategic sectors. Subsequent expansions broadened coverage to a wide array of consumer and intermediate goods, increasing the breadth of economic impact but diluting the original sectoral focus [AB20]. This escalation was met with symmetrical retaliation by China, which targeted politically salient U.S. exports such as soybeans, pork, and other agricultural commodities [NYA24]. The tit-for-tat nature of these measures illustrates how global trade disputes can quickly evolve into multi-sector confrontations that extend beyond the initial points of contention. The dynamics observed in this dispute underscore the importance of relative bargaining power and market size in shaping outcomes. As a large economy with significant import demand, the United States can influence world prices for certain goods by reducing its purchases through tariff imposition [Zen+22]. In theory, this terms-of-trade effect allows part of the tariff burden to be shifted onto foreign exporters via lower pre-tariff prices. However, empirical evidence from recent episodes suggests that pass-through rates to U.S. import prices have often been close to complete [Cav+19], limiting realized gains from such strategies. Moreover, when trading partners possess comparable market power or control over critical inputs, as in the case of China's dominance in certain rare earth minerals, retaliatory capacity can neutralize or even reverse any initial advantage. Global trade disputes involving U.S. tariffs frequently generate spillover effects for third countries integrated into affected supply chains. When bilateral flows are disrupted by tariffs, production stages may be reallocated geographically to maintain market access while avoiding direct duties [Fus20]. For instance, during the U.S.–China conflict some Chinese value added entered the U.S. via intermediary countries such as Vietnam or Mexico after final assembly there [BS20]. This diversion benefits alternative suppliers but can also impose adjustment costs on them if they must rapidly scale capacity or adapt product specifications for new markets. Conversely, suppliers upstream from targeted exporters may suffer demand losses when final goods exports decline under tariff pressure [Zen+22]. The strategic use of tariffs in disputes is not limited to bilateral contexts; it extends to multi-party confrontations that resemble "trade wars" involving several major economies simultaneously [AB20]. In hypothetical scenarios where the United States imposes tariffs on multiple partners, such as both China and the euro area, while those partners respond symmetrically, model simulations indicate welfare losses for all participants once cross-border feedback effects are considered. These losses arise from reduced trade volumes, higher production costs due to disrupted global value chains, and diminished efficiency from resource reallocation toward less competitive sectors. Political economy factors strongly influence how tariffs are deployed and sustained during disputes. Domestic industries benefiting from protection may lobby for continuation or expansion of measures even when aggregate welfare effects are negative [Dol+25]. Conversely, sectors harmed by retaliation, such as agriculture during the U.S.–China conflict, mobilize against prolonged escalation. The resulting policy stance often reflects a balance between these competing pressures rather than purely economic cost-benefit calculations. Tariffs used in global disputes also interact with existing preferential trade agreements discussed in Section 8.1. Commitments under agreements like USMCA constrain unilateral action against member states but can channel diversionary benefits toward them when non-members are targeted [CS22]. This dynamic was evident when some U.S. importers substituted Chinese-origin goods with products from Mexico or Canada during heightened tensions with China. From a legal standpoint, unilateral tariff actions taken outside multilateral frameworks such as the WTO invite challenges through dispute settlement mechanisms. However, recent paralysis in WTO appellate functions has reduced enforcement capacity at the multilateral level [Dol+25], increasing reliance on direct negotiation or reciprocal measures as primary resolution tools. This shift raises concerns about erosion of rules-based order in favor of power-based bargaining where larger economies can more readily impose their will. The long-term consequences of using tariffs as leverage in global disputes include potential restructuring of supply chains toward more politically aligned blocs [MN24]. While such realignment may enhance resilience against specific geopolitical risks, it can also reduce efficiency gains from global specialization if it limits access to optimal input sources worldwide. Furthermore, persistent high-tariff environments risk entrenching protectionist norms that encourage other countries to adopt similar measures preemptively. In sum, U.S. tariffs function within global trade disputes as both tactical weapons aimed at extracting concessions and structural forces reshaping international production networks [HZ22; AB20]. Their effectiveness depends on relative economic leverage, integration into global value chains, and the capacity for sustained retaliation by targeted partners. While they can yield short-term negotiating advantages under certain conditions, historical experience indicates that prolonged tariff confrontations tend to impose broad-based economic costs domestically and internationally through reduced trade volumes, higher input prices, retaliatory barriers abroad, and systemic uncertainty that deters investment across borders.

8.3 Comparative Analysis with Other Major Economies

A comparative perspective on tariff policy reveals both convergences and divergences between the United States and other major economies in terms of strategic objectives, implementation mechanisms, and economic outcomes. While the U.S. has in recent years employed tariffs as a prominent instrument of economic statecraft, most notably during the 2018–2019 trade conflict with China, other large economies such as the European Union, China, and key emerging markets have adopted different combinations of defensive and offensive trade measures shaped by their structural positions within global value chains (GVCs) and domestic political economy constraints. One salient difference lies in the degree of integration into GVCs and how this influences tariff-setting behavior. The U.S., despite its deep participation in international production networks, has demonstrated a willingness to impose broad-based tariffs on both intermediate and final goods even when these measures raise costs for downstream domestic industries [BF19b]. In contrast, the EU's approach has generally been more cautious, reflecting its role as a hub for intra-regional trade in intermediate goods among member states. Computable general equilibrium (CGE) modeling of U.S.–China tariff escalations shows that while both countries experienced welfare losses under high-tariff scenarios, certain third-party economies, particularly in Europe, registered modest gains through trade diversion effects [Fus20]. This outcome underscores how differences in network centrality can position some economies to benefit indirectly from bilateral disputes between others. China's retaliatory strategy during its dispute with the U.S. illustrates another point of divergence. Whereas the U.S. initially targeted high-technology sectors aligned with China's industrial policy ambitions before expanding to consumer goods [MN24], China's countermeasures were calibrated to strike politically sensitive export categories such as soybeans, pork, and other agricultural commodities [NYA24]. This asymmetry reflects structural differences: China's import profile from the U.S. is more concentrated in commodities and capital goods, whereas U.S. imports from China are heavily weighted toward manufactured consumer products and electronics components [GH21]. The result is that Chinese tariffs could be highly targeted without significantly disrupting its own manufacturing supply chains, while U.S. measures inevitably affected a wide swath of domestic industries reliant on imported intermediates [WM20]. The EU's experience during this period further highlights variation in exposure and response capacity. As shown by value-added decomposition analyses, major EU economies such as Germany, France, and Italy maintained or even deepened backward linkages with the U.S. during heightened transpacific tensions [Fus20]. This was partly due to their ability to act as intermediaries for Chinese value added entering the U.S., often through re-export platforms that complied with rules-of-origin requirements under existing agreements. Such positioning allowed EU firms to capture market share vacated by Chinese exporters facing direct tariffs while avoiding reciprocal retaliation from Washington. The U.S., lacking similar intermediary roles in other regions' disputes, did not enjoy equivalent offsetting gains when targeted by foreign tariffs. Another dimension of comparison concerns the use of preferential trade agreements (PTAs) as buffers against tariff shocks. The U.S.'s reliance on instruments like Section 301 or Section 232 often operates outside multilateral frameworks, creating scope for rapid unilateral action but also increasing vulnerability to WTO challenges or partner retaliation [Dol+25]. By contrast, economies such as the EU embed much of their trade policy within binding PTA commitments that limit arbitrary tariff changes toward members but facilitate diversionary benefits when non-members are targeted [CS22]. For example, during the U.S.–China conflict, some American importers substituted Chinese-origin goods with products from Mexico or Canada under USMCA provisions [BS20], mirroring how EU firms leveraged their own PTA networks to redirect sourcing away from contested suppliers without incurring additional duties. The incidence of tariffs across producers and consumers also varies internationally due to differences in market structure and bargaining power vis-à-vis trading partners. Empirical evidence indicates that in 2018–2019 the pass-through rate of U.S.-imposed tariffs on Chinese goods was close to complete [Cav+19], meaning

American importers bore most of the cost increases rather than foreign exporters absorbing them through price reductions. In contrast, some large economies have achieved partial pass-through benefits by exploiting concentrated supplier markets where foreign producers reduce pre-tariff prices to maintain access [MN24]. This divergence suggests that terms-of-trade gains predicted by optimal tariff theory are contingent not only on country size but also on sector-specific competitive dynamics, a factor that can differ markedly between economies depending on their import composition and supplier diversity. Sectoral impacts further illustrate these contrasts. In primary metals, U.S. Section 232 tariffs raised domestic prices and utilization rates for steelmakers but imposed significant cost burdens on downstream manufacturers [LWW19]. Comparable protective measures in other jurisdictions have sometimes been accompanied by coordinated industrial policies aimed at mitigating downstream harm, for instance through input subsidies or targeted exemptions, which were less prominent in the U.S. case [Elo+21]. Similarly, agricultural sectors in export-oriented economies like Brazil have capitalized on retaliatory barriers faced by competitors; Brazilian soybean exports to China surged when U.S. shipments declined under Chinese tariffs [NYA24], demonstrating how third-country suppliers can rapidly adjust output and logistics to exploit openings created by bilateral disputes elsewhere. From a macroeconomic standpoint, CGE simulations suggest that simultaneous high-tariff regimes among multiple large economies produce net welfare losses globally while redistributing gains toward certain non-participant countries integrated into relevant supply chains [Fus20]. The magnitude of these redistribution effects depends on pre-existing trade elasticities: economies with diversified export portfolios and flexible production structures are better positioned to capture diverted demand than those specialized in sectors directly contested by disputing parties [YLB25]. The EU's relatively balanced sectoral mix allowed it to absorb some positive spillovers from reduced Sino–U.S. trade flows; conversely, Japan's narrower export concentration limited comparable benefits despite its advanced manufacturing base. Policy design choices also diverge across major economies regarding granularity and scope of tariff measures. The phased "List" approach used by Washington against Beijing, with initial focus on high-tech goods before expanding broadly, contrasts with more uniform application patterns seen in some other jurisdictions where political economy pressures favor spreading protection thinly across many sectors rather than concentrating it strategically [LLY25]. These design differences influence both domestic adjustment costs and international negotiation dynamics: narrowly targeted measures may preserve leverage over specific issues but risk easier circumvention via third-country routing; broad measures increase immediate bargaining pressure but at higher collateral cost domestically and abroad [Fus20]. Finally, institutional context shapes comparative outcomes over time. Economies operating within strong multilateral dispute settlement systems, or regional equivalents, face clearer constraints on unilateral escalation than those relying primarily on bilateral bargaining power [Dol+25]. The paralysis of WTO appellate functions has thus had asymmetric implications: it has expanded tactical space for large actors like the U.S., but also encouraged others to reinforce regional agreements as alternative enforcement venues against destabilizing tariff actions by major partners or rivals [CS22]. In aggregate, comparing the U.S.'s recent tariff strategies with those of other major economies reveals a spectrum ranging from unilateral assertiveness with broad sectoral reach to more constrained applications embedded within preferential frameworks designed to minimize self-inflicted harm while exploiting diversion opportunities from others' disputes [MN24; Fus20; BS20; NYA24]. These differences reflect underlying variations in economic structure, GVC positioning, institutional commitments, and political calculus, all factors that condition not only immediate economic impacts but also long-term shifts in global trade architecture precipitated by sustained use of tariff instruments among leading trading nations.

9 Tariffs, Investment, and Innovation

9.1 Tariff Effects on Foreign Direct Investment

Tariff measures influence foreign direct investment (FDI) decisions through multiple, interrelated channels that operate on both the cost and demand sides of multinational enterprises' (MNEs) strategic planning. One of the most direct mechanisms is the so-called "tariff-jumping" effect, whereby higher import duties incentivize foreign firms to establish or expand production facilities within the tariff-imposing country to serve the local market without incurring border taxes. This relocation allows firms to circumvent elevated trade costs by internalizing production behind the tariff wall. However, empirical evidence suggests that while this mechanism can be significant in certain contexts, its magnitude depends heavily on sectoral characteristics, supply chain integration, and the permanence of the tariff regime [RW22]. In industries where final goods are subject to high tariffs but intermediate inputs remain untaxed or are available domestically at competitive prices, tariff-jumping FDI becomes more attractive. Conversely, when tariffs target upstream inputs critical to production, such as steel or semiconductors, the cost advantages of local assembly may be eroded by higher input prices, reducing incentives for inward investment [Hos20]. For example, during recent U.S. tariff episodes under Section 232 and Section 301 authorities, some MNEs considered establishing U.S.-based assembly operations to avoid duties on finished imports from China. Yet for capital-intensive sectors reliant on globally sourced components, these plans were often tempered by increased costs for imported intermediates and uncertainty over policy duration [Cha+19]. The structure of global value chains further conditions FDI responses. MNE subsidiaries often mirror the investment patterns of their parent companies in source countries, importing a large share of their capital goods and intermediate inputs from established suppliers abroad rather than sourcing locally [RW22]. When tariffs disrupt these flows, either directly through duties on intra-firm trade or indirectly via retaliatory measures, subsidiaries may face reduced profitability and reconsider expansion plans in the host economy. In some cases, this leads to a reallocation of investment toward third countries with preferential access to both the home and target markets, enabling continued participation in cross-border production without exposure to punitive tariffs [Fus20]. Retaliatory measures by trading partners can also deter inward FDI by reducing export opportunities from U.S.-based affiliates to key foreign markets. For instance, Japanese automakers with manufacturing plants in North America faced diminished incentives to expand capacity when threatened with U.S. auto tariffs under revised NAFTA provisions; retaliatory risks from

Canada and Mexico would have undermined regional export strategies [Hos20]. Similarly, Chinese counter-tariffs on U.S. agricultural products reduced expected returns for foreign agribusiness investors operating in American farming and processing sectors oriented toward export markets [NYA24]. Policy uncertainty plays a critical role in shaping FDI trajectories under tariff regimes. The imposition of duties as part of escalating trade disputes introduces volatility into expected cash flows from prospective investments [Met20]. MNEs may delay or scale down projects until greater clarity emerges regarding the scope and duration of measures. This "wait-and-see" approach is particularly prevalent in sectors with long payback periods or high sunk costs, where premature commitment under unstable trade conditions could lock firms into uncompetitive cost structures if tariffs are later removed or altered. In some cases, tariffs can trigger defensive FDI aimed at preserving market share against competitors who have already localized production. If rival firms establish domestic manufacturing to bypass import duties, others may follow suit to avoid losing price competitiveness in the protected market [Cha+19]. This herd-like behavior can accelerate localization trends even when individual firms would not have independently justified such moves based solely on tariff avoidance calculations. However, this dynamic is more likely in industries with relatively footloose production processes than in those requiring specialized infrastructure or skilled labor pools concentrated abroad. The interaction between tariffs and preferential trade agreements also shapes FDI patterns. Firms may choose to invest in countries with free trade agreement access to the U.S., using these locations as export platforms into the American market while avoiding MFN-level duties applied to non-member states [CS22]. During heightened U.S.–China tensions, for example, some Asian manufacturers shifted investment toward Vietnam or Mexico not only for immediate tariff circumvention but also to secure long-term preferential access under existing agreements like USMCA [BS20]. Such diversionary FDI reflects strategic repositioning within global networks rather than simple substitution between export and local production models. Sector-specific case studies highlight divergent outcomes across industries. In automotive manufacturing, a sector characterized by deep cross-border supply linkages, threatened U.S. auto tariffs prompted both defensive localization by foreign assemblers and cautionary retrenchment due to potential retaliation within integrated North American supply chains [Hos20]. In contrast, consumer electronics producers facing high tariffs on finished goods but continued access to untaxed components found it viable to relocate final assembly operations into the U.S., leveraging existing logistics infrastructure while maintaining offshore component sourcing [Fus20]. Agricultural processing attracted less new FDI under retaliatory conditions because diminished export prospects outweighed any gains from domestic market protection [NYA24]. Tariffs can also influence outward FDI from the United States as domestic firms seek to maintain competitiveness abroad by relocating production closer to end consumers in foreign markets imposing retaliatory duties. By producing within those jurisdictions, firms can sidestep import barriers entirely while preserving brand presence and customer relationships eroded by higher landed prices on exports from U.S.-based plants. This outward shift may partially offset any inward investment gains from tariff-jumping behavior by foreign firms targeting the American market. Over time, persistent high-tariff environments risk embedding structural changes into global investment patterns. Once MNEs commit capital to new facilities, whether domestically or abroad, the sunk costs associated with plant construction, workforce training, and supplier integration create inertia that sustains altered configurations even if original tariff triggers are later removed [BS20]. This path dependency means that short-term policy shifts can have long-lasting effects on geographic distribution of productive capacity across industries integrated into international trade networks. In sum, tariffs affect FDI through a complex interplay of cost-avoidance incentives, supply chain restructuring pressures, retaliatory risks, policy uncertainty, competitive dynamics among multinationals, and interactions with preferential trade frameworks [Hos20; RW22; Cha+19]. The net impact depends critically on sectoral characteristics, such as input sourcing patterns and capital intensity, as well as macro-level factors including geopolitical alignments and stability of trade agreements linking host economies with major markets. While certain configurations can stimulate localized investment via tariff-jumping motives or platform-seeking strategies into preferential zones, broader evidence indicates that unpredictable or broad-based protectionist measures tend to dampen aggregate FDI flows by raising operational risks and fragmenting established global value chains essential for efficient multinational production systems.

9.2 Influence on Domestic Capital Formation

Tariff measures influence domestic capital formation through a combination of relative price effects, shifts in expected returns on investment, and reallocation of resources across sectors. When tariffs raise the domestic price of imported goods relative to locally produced substitutes, they can alter the marginal profitability of investing in domestic production capacity. In certain configurations, this can stimulate capital accumulation in protected industries by improving their competitive position against foreign suppliers [TZ20]. The mechanism operates through an increase in the net rate of return on domestic investment: with higher prices for competing imports, domestic producers may capture greater market share at elevated margins, making expansion projects more financially attractive. This effect is particularly pronounced when tariffs target final goods for which domestic production capabilities already exist and input costs are not simultaneously inflated by duties on upstream materials. However, the same policy instruments can also depress capital formation when they raise costs for capital goods or intermediate inputs essential to production. Tariffs on imported machinery, equipment, or specialized components increase the expense of installing new productive capacity [WM20]. For capital-intensive sectors reliant on global supply chains, such as advanced manufacturing or energy infrastructure, these higher input costs can lengthen payback periods and reduce the internal rate of return on prospective projects. In such cases, even if output prices rise due to reduced import competition, the net incentive to invest may weaken because cost inflation outweighs revenue gains. This dynamic was evident during recent U.S. tariff episodes where duties on steel and aluminum increased construction and equipment costs for downstream industries ranging from automotive assembly to renewable energy installations [LWW19]. The interaction between tariffs and macroeconomic conditions further shapes their impact on capital formation. In a context where monetary policy targets low inflation, tariff-induced increases in producer prices can prompt tighter credit conditions if central banks respond with interest rate hikes [TZ20]. Higher borrowing costs directly affect firms' ability to finance new investments, especially for small and medium-sized enterprises with limited access to equity markets. Conversely, if monetary authorities accommodate tariff-driven price increases without raising rates, real interest rates may fall temporarily; yet this scenario risks eroding purchasing power and compressing demand in other parts of the economy, indirectly dampening investment appetite. Sectoral heterogeneity plays a decisive role in determining whether tariffs stimulate or suppress capital accumulation domestically. In protected industries with high import penetration and underutilized capacity, such as certain segments of primary metals, tariffs can trigger rapid investment responses aimed at expanding output to meet redirected demand [RW22]. These expansions may include upgrading existing facilities or commissioning new plants, thereby contributing positively to gross fixed capital formation. By contrast, export-oriented sectors targeted by foreign retaliation often experience reduced sales volumes abroad [NYA24], leading to excess capacity domestically and discouraging further investment until market access is restored. The structure of global value chains introduces additional complexity into these outcomes. Many U.S.-based subsidiaries of multinational enterprises import a significant share of their capital goods from parent-country suppliers or other affiliates abroad [RW22]. Tariffs on these intra-firm imports raise project costs within the U.S., potentially diverting planned investments toward alternative locations with lower trade barriers [Fus20]. This relocation effect can offset any tariff-jumping incentives that might otherwise encourage foreign firms to establish local production facilities behind protective barriers. Policy uncertainty surrounding tariff regimes exerts an independent influence on investment timing and scale. Firms contemplating large-scale projects with multi-year horizons are sensitive to the stability of trade policy frameworks; abrupt imposition or removal of tariffs can materially alter projected cash flows. As a result, heightened uncertainty often leads to deferral or downsizing of capital expenditures until greater clarity emerges regarding long-term market conditions. This "option value" of waiting is particularly relevant in industries with irreversible investments and high sunk costs. In some scenarios, targeted exemptions within tariff measures can shape patterns of capital formation by selectively lowering input costs for specific users while maintaining protection elsewhere. For example, exemptions granted under Section 232 steel tariffs for certain allied countries allowed qualifying U.S. manufacturers continued access to lower-cost inputs [Cha+19]. Firms benefiting from such carve-outs could proceed with planned expansions at cost structures closer to pre-tariff levels, while competitors without exemptions faced diminished investment incentives due to elevated material expenses. Empirical modeling supports the view that aggregate effects on domestic capital formation depend critically on whether positive stimuli in protected sectors outweigh negative spillovers from higher input costs and retaliatory demand losses [RW22]. Computable general equilibrium analyses indicate that while inward FDI motivated by tariff-jumping can contribute to fixed asset growth domestically, these gains are often outweighed by contractions in investment among export-oriented and input-dependent industries when broad-based tariffs are applied. The composition of capital formation also shifts under tariff regimes. Protectionist measures may bias investment toward sectors shielded from foreign competition rather than those with highest productivity potential in an open-market setting. This reallocation can have long-term implications for economic efficiency if resources flow into relatively less competitive activities sustained primarily by policy barriers rather than intrinsic comparative advantage [Hos20]. Over time, such distortions risk entrenching structural inefficiencies that persist even if tariffs are later removed. Finally, dynamic feedback effects link current investment decisions under tariff conditions to future competitiveness. If protection enables firms to expand capacity and achieve economies of scale without corresponding innovation incentives, short-term gains in capital stock may not translate into sustained productivity growth [RW22]. Conversely, when tariff-induced market security is coupled with strategic reinvestment in technology upgrades and process improvements, it can support long-run enhancements in industrial capability, though this outcome depends heavily on firm-level governance choices and complementary policy frameworks. In sum, tariffs influence domestic capital formation through intertwined channels affecting expected returns, input costs, sectoral demand conditions, supply chain configurations, and policy predictability [TZ20; WM20; Cha+19]. The net effect hinges on the balance between stimulative forces in protected industries and contractionary pressures elsewhere in the economy. While certain configurations can catalyze targeted investment surges behind protective barriers, broad-based or unpredictably applied measures tend to fragment supply networks and elevate uncertainty, conditions that generally weigh against robust aggregate growth in the domestic capital stock over time.

9.3 Implications for Innovation and Technology Transfer

Tariff measures can exert significant influence on innovation trajectories and the dynamics of technology transfer by altering incentives for research and development (R&D), shaping cross-border knowledge flows, and modifying the structure of global production networks. When tariffs are applied to technologically intensive goods or critical intermediate inputs, they can raise the cost of accessing advanced components, thereby constraining the ability of domestic firms to integrate state-of-the-art technologies into their products [WM20]. This cost pressure may reduce available resources for in-house R&D as firms divert funds toward covering higher input expenses, potentially slowing the pace of innovation in affected sectors. The impact is particularly acute in industries where innovation depends on cumulative learning from global supply chains, such as semiconductors or advanced manufacturing equipment, because tariffs disrupt established channels for acquiring complementary foreign technologies [MN24]. At the same time, protectionist measures can create sheltered market conditions that alter firms' incentives to innovate. In theory, temporary protection could provide breathing space for domestic industries to invest in upgrading capabilities without immediate pressure from foreign competitors. However, empirical and theoretical work suggests that when protection becomes prolonged or is applied without complementary policies encouraging technological upgrading, it may reduce competitive pressures that drive efficiency improvements [IT24]. In such cases, firms may rely on tariff-induced price advantages rather than pursuing productivity-enhancing innovations, leading to a form of technological stagnation despite increased market share. This risk is heightened in sectors with high concentration ratios where reduced import competition allows incumbents to maintain profitability without significant reinvestment in new product development [ARW19]. Tariffs also interact with international technology transfer mechanisms embedded within foreign direct investment (FDI) flows. As discussed in Section 9.1, inward FDI often serves as a conduit for transferring production know-how, managerial practices, and embedded technologies from multinational enterprises to host-country affiliates. When tariffs deter FDI by raising operational uncertainty or disrupting integrated supply chains [RW22], they can indirectly limit opportunities for domestic firms to absorb foreign technologies through supplier relationships or labor mobility. Conversely, tariff-jumping FDI, where foreign firms establish local production to avoid import duties, can facilitate technology transfer if these investments involve advanced production processes or R&D activities. The net effect depends on whether localized operations replicate high-value functions from parent companies or focus primarily on assembly with limited technological content [Fus20]. In some contexts, tariffs have been used explicitly as leverage in disputes over intellectual property rights and forced technology transfer practices. Measures under Section 301 authority targeting Chinese goods were partly justified by concerns over compulsory joint ventures and alleged misappropriation of proprietary technologies [WM20]. By imposing costs on targeted exports, policymakers aimed to induce changes in partner-country policies governing technology licensing and investment conditions. While such strategies can signal resolve in protecting domestic intellectual property holders, they also risk reciprocal restrictions that limit U.S. firms' access to foreign markets and collaborative innovation opportunities abroad [Wu24]. Retaliatory measures may include tightened controls on outbound technology flows or restrictions on participation in overseas R&D consortia, thereby reducing the scope for two-way knowledge exchange essential for frontier innovation. The structure of global value chains mediates how tariffs affect cross-border knowledge diffusion. Many innovative products are the result of multi-stage production processes distributed across several countries; intermediate goods embodying tacit know-how move between jurisdictions before final assembly [Fus20]. Tariffs imposed at any stage can disrupt these iterative exchanges of design feedback and process improvements between geographically dispersed teams. For example, duties on specialized machinery parts or electronic subassemblies can delay prototyping cycles and increase transaction costs associated with collaborative development projects spanning multiple countries [QFZ22]. Over time, such frictions may encourage regionalization of innovation ecosystems as firms co-locate R&D and production within tariff-free zones to preserve integration efficiency, potentially reducing exposure to diverse technological inputs available through more globalized networks. There is also a potential link between tariff policy and the direction of technological change within an economy. By altering relative prices across sectors, tariffs can shift profit expectations toward certain industries, influencing where private R&D resources are allocated [IT24]. If protection favors mature industries with slower innovation cycles over emerging high-tech sectors integrated into global markets, it may bias national innovation systems toward incremental improvements rather than breakthrough advancements. Conversely, targeted tariffs combined with industrial policy support could channel resources into strategic sectors deemed critical for long-term competitiveness, such as renewable energy technologies or advanced materials, provided that protective measures are coupled with performance-based incentives for innovation rather than unconditional shelter from competition [Par20]. Technology transfer through informal channels, such as worker mobility between multinational affiliates and domestic firms, can also be affected by tariff-induced changes in trade and investment patterns. Reduced presence of foreign producers due to diminished export opportunities or curtailed FDI limits the pool of workers exposed to international best practices who might later diffuse this knowledge domestically [RW22]. Similarly, collaborative arrangements like licensing agreements or joint ventures may be scaled back if partners perceive heightened political risk from operating across tariff barriers. These constraints can slow the assimilation of cutting-edge techniques into local production systems even when formal trade in capital goods continues under higher cost conditions. In high-technology sectors where security considerations intersect with trade policy, such as telecommunications infrastructure, the imposition of tariffs has been accompanied by broader restrictions on technology sourcing from specific foreign suppliers [Wu24]. Such measures aim to prevent potential vulnerabilities but also necessitate accelerated domestic capability development or diversification toward trusted partners. While this can stimulate indigenous innovation efforts through necessity-driven R&D investment, it may also entail short-term inefficiencies if alternative suppliers lack equivalent technological maturity or if duplication of effort reduces overall global innovation efficiency. Finally, dynamic effects must be considered: persistent tariff regimes can reshape global innovation networks by encouraging clustering within politically aligned blocs while fragmenting previously integrated research collaborations [Fus20]. This reconfiguration influences not only where innovations are developed but also how quickly they diffuse internationally. Economies excluded from key collaborative clusters may face slower access to emerging technologies; conversely, those within protected networks might benefit from concentrated knowledge spillovers at the expense of reduced exposure to diverse external ideas. The long-term balance between these centripetal and centrifugal forces will depend on whether tariff-induced realignments foster self-sustaining innovative capacity or lead to insular systems vulnerable to technological obsolescence once initial protective advantages erode [IT24; Wu24].

10 Societal and Political Dimensions of Tariffs

10.1 Public Opinion and Political Discourse

Public attitudes toward tariff policy are shaped by a combination of economic self-interest, identity-based considerations, and the framing of trade issues within political discourse. The salience of tariff debates varies considerably depending on the context in which they arise. In many historical and contemporary cases, trade policy discussions have been relatively technical and low-profile, attracting limited public engagement. However, when tariffs are linked to broader narratives involving national security, geopolitical rivalry, or perceived threats to sovereignty, they can become focal points of political mobilization [Dol+25]. This heightened visibility alters both the tone and content of public debate, as well as the strategic calculations of policymakers responding to constituent pressures. The U.S.–China trade conflict illustrates how framing can elevate tariffs from a niche economic issue to a central element of national political discourse. Beginning with campaign rhetoric in 2016 and continuing into subsequent policy actions, tariffs were presented not merely as tools for correcting trade imbalances but as instruments in a larger struggle over global economic leadership [HZ22]. This framing resonated with segments of the electorate concerned about deindustrialization, job losses in manufacturing regions, and China's growing technological capabilities. By embedding tariff measures within a narrative of defending national interests against an assertive rival, political leaders increased their appeal among voters who might otherwise be skeptical of protectionist policies on purely economic grounds. Such politicization has implications for how firms and interest groups engage with trade policy. In lower-salience contexts, companies opposing tariffs may do so openly through lobbying or public statements. However, when tariffs are framed as matters of national security or patriotic duty, some firms may refrain from public opposition to avoid reputational risks or accusations of undermining national objectives [Dol+25]. This dynamic can mute certain voices in the policy debate while amplifying others aligned with the prevailing political narrative. Public opinion is also influenced by identity-related factors such as nationalism and perceptions of reciprocity in international relations. Research suggests that support for tariffs can increase when they are portrayed as responses to unfair treatment by foreign governments or violations of agreed-upon norms [HZ22]. In this sense, attitudes toward specific tariff measures may be less about their direct economic effects and more about their symbolic value in signaling resolve or enforcing fairness. This helps explain why some individuals support tariffs even when they acknowledge potential cost increases for consumers: the perceived long-term benefits of asserting national strength outweigh short-term material losses in their evaluative framework. The interplay between partisan alignment and trade attitudes further shapes political discourse. While traditional party positions on trade have evolved over time, recent years have seen shifts that blur earlier distinctions between pro- and anti-trade camps. Tariff policies under the Trump administration garnered support from constituencies not historically associated with protectionism, reflecting a reconfiguration of partisan coalitions around issues of globalization and economic nationalism [BMW21]. At the same time, opposition to these measures often drew on arguments emphasizing multilateral cooperation and adherence to international rules, positions that resonated differently across ideological divides. Media coverage plays a critical role in mediating public understanding of tariff impacts. Simplified narratives focusing on visible outcomes, such as factory reopenings attributed to import restrictions or retaliatory harm to farmers, can overshadow more diffuse macroeconomic effects like price inflation or supply chain disruptions. The selective amplification of certain case studies within news reporting can thus reinforce pre-existing beliefs about whether tariffs are beneficial or harmful. Moreover, social media platforms facilitate rapid dissemination of both supportive and critical frames, enabling grassroots mobilization around specific trade disputes but also contributing to polarization by clustering audiences into ideologically homogeneous networks. Historical precedents show that regional economic structures influence local opinion formation on tariffs. Communities dependent on protected industries may view tariffs favorably as safeguards for employment and income stability; conversely, export-oriented regions targeted by retaliation often develop strong opposition due to direct revenue losses [Har24]. These localized experiences feed into broader political discourse through congressional representation: legislators from affected districts bring constituent perspectives into national debates, shaping legislative bargaining over trade measures. The persistence of altered public attitudes after high-profile tariff episodes suggests that political discourse can have lasting effects beyond immediate policy cycles. Once embedded within partisan identities or nationalist narratives, positions on trade may become resistant to change even if underlying economic conditions shift [HZ22]. This path dependency complicates efforts to recalibrate policy toward greater liberalization without incurring political costs among electorates conditioned to view protectionism as synonymous with patriotism or strategic prudence. Internationally oriented messaging also interacts with domestic opinion formation. When foreign governments respond vocally to U.S. tariff actions, whether through condemnation at multilateral forums or reciprocal measures targeting politically sensitive exports, these reactions can be incorporated into domestic narratives either as evidence validating the need for toughness or as cautionary tales about diplomatic fallout [BMW21]. The choice of interpretation often aligns with pre-existing partisan orientations toward foreign policy engagement. In sum, public opinion on tariffs is not determined solely by direct personal experience with price changes or employment effects; it is mediated through complex channels involving political framing, identity considerations, media narratives, regional economic interests, and partisan alignments [Dol+25; HZ22; BMW21]. Political discourse both shapes and reflects these attitudes, influencing not only immediate support for specific measures but also the broader climate in which future trade policies will be debated and implemented.

10.2 Tariffs and Election Dynamics

The intersection between tariff policy and electoral politics is shaped by the ways in which trade measures influence voter preferences, mobilize interest groups, and become embedded in campaign narratives. As discussed in Section 10.1, public attitudes toward tariffs are not solely determined by their direct economic effects but are mediated through political framing, identity considerations, and regional economic structures. These same factors play a decisive role in how tariffs are deployed and debated during election cycles, where they can serve as both policy instruments and symbolic signals to key constituencies. Electoral incentives often drive the timing and targeting of tariff measures. Policymakers may calibrate trade actions to deliver visible benefits to politically important regions or demographic groups ahead of elections. For example, during the Trump administration, protectionist policies were closely aligned with the preferences of core supporters concentrated in manufacturing-heavy states such as Pennsylvania, Ohio, and Michigan [Duc+24]. These areas had experienced long-term industrial decline since the 1970s oil crisis and were receptive to messages promising industrial revitalization through import restrictions. By imposing tariffs on sectors like steel, aluminum, heavy machinery, and automobiles, industries with significant employment footprints in these swing states, the administration sought to reinforce its electoral base while appealing to undecided voters concerned about job security. The strategic use of tariffs for electoral gain is further illustrated by evidence that foreign retaliatory measures can be politically targeted. Research indicates that China's counter-tariffs during the U.S.–China trade conflict disproportionately affected counties with strong Republican leanings or those considered electoral battlegrounds [MN24]. By focusing on agricultural exports such as soybeans, produced heavily in Midwestern states critical to the Republican coalition, China aimed to create domestic political pressure on the administration from within its own support base. This form of targeted retaliation underscores how international actors can attempt to influence U.S. electoral dynamics by shaping the distribution of economic pain across regions. The feedback loop between tariff impacts and electioneering is reinforced by interest group mobilization. Industries benefiting from protection may increase campaign contributions or public endorsements for incumbents who champion their cause, while sectors harmed by higher input costs or lost export markets may channel resources toward challengers advocating liberalization [Dol+25]. Agricultural lobbies provide a clear example: after suffering losses from Chinese retaliation, farm organizations intensified lobbying efforts for trade relief and market diversification initiatives, influencing both congressional races in rural districts and presidential campaign platforms. Tariffs also function as potent rhetorical devices within campaign discourse. Candidates can frame them as evidence of resolve against unfair foreign practices or as tools for defending national sovereignty [HZ22]. Such framing resonates particularly well when linked to broader narratives about economic nationalism or resistance to globalization's perceived excesses. In this context, even voters not directly affected economically by tariffs may view them favorably if they align with their ideological orientation or identity-based priorities. Conversely, opponents can frame tariffs as economically damaging taxes on consumers and businesses, using case studies of price increases or job losses to argue for alternative trade strategies. The salience of tariff issues in elections depends heavily on media coverage and the visibility of their effects. High-profile disputes, such as those with China, generate sustained attention that keeps trade policy near the top of the political agenda [Dol+25]. This visibility allows candidates to differentiate themselves sharply on trade positions, potentially mobilizing turnout among constituencies with strong views on globalization. However, when tariff impacts are diffuse or overshadowed by other issues, their direct influence on voting behavior may be more limited. Regional economic structures create heterogeneous electoral responses to tariff policies. In manufacturing-intensive districts where import competition has been a salient concern for decades, protective measures can bolster incumbent support if perceived as delivering tangible benefits [Duc+24]. In contrast, export-oriented agricultural regions hit by retaliation may shift away from incumbents associated with initiating trade conflicts [MN24]. The net national effect depends on the relative weight of these opposing regional shifts within the Electoral College or congressional seat distributions. Campaign strategy often incorporates promises related to future tariff policy adjustments. Incumbents may pledge to maintain or expand protective measures if they believe these commitments will secure votes in key constituencies; challengers may promise rollbacks coupled with new trade agreements aimed at restoring market access for harmed sectors [HZ22]. The credibility of such promises is influenced by past performance: candidates who have previously delivered visible trade protections or negotiated favorable agreements can leverage this record as proof of commitment. Foreign governments' awareness of U.S. electoral calendars can shape their negotiation posture during disputes involving tariffs. Trading partners may delay concessions until after an election if they believe domestic political pressures will weaken an incumbent's position over time [MN24]. Alternatively, they might expedite agreements offering symbolic wins that incumbents can tout on the campaign trail, such as partial market openings or purchase commitments, to influence voter perceptions positively. The politicization of tariffs during elections also interacts with partisan polarization. As parties increasingly diverge on trade policy rhetoric, even if actual legislative behavior remains more nuanced, tariff positions become markers of broader ideological alignment [BMW21]. This dynamic can entrench voter attitudes along partisan lines regardless of localized economic outcomes, making it harder for empirical evidence about costs or benefits to shift opinions during campaigns. Finally, post-election policy trajectories are shaped by how tariff debates played out during campaigns. If protectionist rhetoric proved electorally successful, winning candidates may interpret this as a mandate for continued or expanded use of tariffs [Duc+24]. Conversely, if backlash against tariff-related economic disruptions contributed to electoral losses in key districts, policymakers may recalibrate toward negotiated settlements or selective liberalization once in office. In sum, tariffs intersect with election dynamics through targeted economic impacts on pivotal constituencies [MN24], strategic framing that aligns with voter identities [HZ22], interest group mobilization responsive to sectoral gains and losses [Dol+25], and international actors' calculated use of retaliation to influence domestic politics. These interactions ensure that tariff policy is not merely an instrument of economic management but also a tool wielded within the competitive arena of democratic contestation, its design and timing often inseparable from the imperatives of winning and holding political power.

10.3 Stakeholder Influence on Tariff Policy

The formulation and implementation of tariff measures are shaped by a diverse set of stakeholders whose interests, resources, and political leverage vary across sectors and over time. These actors include industry associations, multinational corporations, labor unions, agricultural cooperatives, consumer advocacy groups, and political parties, each seeking to influence trade policy in ways that align with their economic objectives and ideological positions. The interaction among these stakeholders occurs within institutional frameworks that mediate access to decision-makers and determine the weight accorded to competing claims. Industry-specific lobbying is one of the most visible channels through which stakeholders affect tariff outcomes. Firms operating in sectors facing intense import competition often organize into protectionist coalitions that advocate for higher duties on foreign competitors [Bet15]. These coalitions frame their demands in terms of preserving domestic employment, safeguarding strategic industries, or countering unfair trade practices such as dumping or foreign subsidies. The steel industry's support for Section 232 tariffs exemplifies this dynamic: producers emphasized national security concerns alongside economic arguments to secure broad-based protection [Wu24]. By contrast, export-oriented industries, such as agriculture or advanced manufacturing, tend to oppose tariffs that invite retaliation from trading partners, mobilizing against measures that threaten their foreign market access [MN24]. This divergence creates a structural tension in trade policymaking between constituencies seeking insulation from global competition and those dependent on open markets. Multinational corporations (MNCs) exert influence not only through direct lobbying but also via their embeddedness in global value chains. Firms with substantial outward foreign direct investment may advocate for unilateral liberalization on goods produced abroad and re-imported into the United States. Their ability to coordinate production across jurisdictions gives them leverage in policy debates: they can credibly threaten to relocate operations or adjust sourcing strategies in response to unfavorable tariff regimes. This mobility allows MNCs to present policymakers with scenarios where protectionist measures could lead to domestic job losses in affiliated operations or reduced competitiveness in export markets. Electoral politics further conditions stakeholder influence by shaping which interests are prioritized at different points in the political cycle. As noted in Section 10.2, candidates may target both protectionist and exporter constituencies during campaigns [Bet15]. Exporters can be valuable political allies when they represent concentrated employment bases or high-value-added sectors; conversely, protectionist groups often wield influence through their ability to mobilize voters in swing districts heavily reliant on import-competing industries. The balance between these forces can shift rapidly depending on macroeconomic conditions: during recessions, calls for protective tariffs may resonate more strongly with policymakers seeking visible interventions to support domestic jobs [Kim18]. Non-state actors beyond the business community also play a role. Labor unions representing workers in manufacturing sectors vulnerable to import competition frequently align with industry groups in advocating for protective measures. Their arguments often emphasize wage stability, job security, and the prevention of a "race to the bottom" in labor standards due to offshoring pressures. In contrast, consumer advocacy organizations typically oppose tariffs on the grounds that they raise prices and reduce product variety for households. While consumer groups may lack the concentrated economic power of producer lobbies, they can influence public opinion through media campaigns highlighting the regressive nature of tariff-induced price increases. The media itself functions as an intermediary stakeholder by framing tariff debates in ways that amplify certain perspectives over others. Coverage focusing on factory reopenings attributed to tariffs can bolster protectionist narratives, while stories about retaliatory harm to farmers or rising consumer prices strengthen liberalization arguments [HZ22]. Stakeholders adept at supplying compelling case studies or data points are better positioned to shape these narratives and thereby indirectly influence legislative or executive decisions. Institutional arrangements within the U.S. trade policy apparatus provide formal avenues for stakeholder input but also filter participation through procedural requirements. Mechanisms such as public comment periods during Section 301 investigations allow a wide range of actors, from small businesses to large trade associations, to submit evidence supporting or opposing proposed measures [MN24]. However, resource-rich stakeholders are better able to produce detailed submissions backed by legal expertise and economic analysis, giving them an advantage in shaping official records used for policy justification. International actors can also function as stakeholders when their economic interests intersect with U.S. tariff decisions. Foreign governments lobby directly through diplomatic channels or indirectly via domestic allies such as importers of their goods [Wu24]. In some cases, they coordinate with U.S.-based firms integrated into transnational supply chains to present joint arguments against restrictive measures. Retaliatory threats targeting politically sensitive exports, such as China's focus on Midwestern agricultural products, are designed not only as economic countermeasures but also as tools for mobilizing domestic opposition within the United States [NYA24]. The interplay between stakeholder influence and institutional context is evident in how exemptions and exclusions from broad tariff measures are allocated. During recent steel and aluminum tariff episodes under Section 232 authority, numerous firms applied for product-specific exclusions citing lack of domestic substitutes [MN24]. Success rates varied depending on applicants' ability to document supply constraints convincingly, a process favoring well-organized stakeholders with technical documentation capabilities over smaller entities lacking such resources. Political parties act as aggregators of stakeholder preferences but also filter them through ideological commitments and strategic considerations about coalition-building [Wu24]. Shifts in party platforms regarding trade openness or protectionism can alter the relative influence of different stakeholder groups over time. For example, a party embracing economic nationalism may elevate the voices of manufacturing lobbies and labor unions while downplaying exporter concerns; conversely, a platform emphasizing multilateral engagement may privilege globally integrated industries and consumer advocates. Ultimately, stakeholder influence on tariff policy emerges from a combination of material interests, organizational capacity, access to decision-makers, and alignment with prevailing political narratives [Bet15; HZ22]. The resulting policy outcomes reflect negotiated compromises among competing constituencies rather than purely technocratic assessments of economic efficiency. This pluralistic contestation ensures that tariff decisions are embedded within broader socio-political dynamics where economic logic interacts continuously with electoral incentives, identity politics, and international strategic considerations.

11 Future Directions and Challenges in US Tariff Policy

11.1 Emerging Trends in Trade and Tariffs

Recent developments in global commerce indicate that tariff policy is increasingly shaped by a confluence of geopolitical, technological, and structural economic factors that differ markedly from the conditions underpinning earlier trade regimes. One prominent trend is the use of tariffs as part of broader strategic competition between major economies, where measures are deployed not solely to protect domestic industries but to influence rival states' industrial policies and technological trajectories [MN24]. This shift is evident in the targeting of high-technology sectors during disputes, as seen in the U.S.–China conflict, where early tariff tranches focused on goods aligned with China's industrial upgrading plans before expanding to a wider range of consumer and intermediate products [LLY25]. The expansion diluted sectoral precision but underscored a willingness to integrate tariff policy into long-term strategic rivalry rather than treat it as a purely economic instrument. Another emerging pattern is the heightened granularity of tariff design, facilitated by the Harmonized Tariff Schedule's capacity for product-level differentiation [Cha+19]. Policymakers can now calibrate measures to target specific subheadings within sectors, enabling selective pressure on particular value chain segments while exempting others to mitigate collateral damage. This precision has been used both offensively, to focus on politically sensitive or strategically important goods, and defensively, through exemptions and exclusions that preserve supply for critical domestic industries. However, such granularity increases administrative complexity and creates opportunities for circumvention via transshipment or minor product modifications [MN24]. Trade diversion effects are becoming more pronounced as firms reconfigure sourcing strategies in response to targeted tariffs. When duties are imposed on imports from one country, importers often shift procurement toward alternative suppliers with preferential access under free trade agreements or lower MFN rates [BS20]. This has been particularly visible in shifts from China toward Vietnam, Mexico, and other ASEAN members during recent disputes. While such diversification can enhance resilience against single-country risk, it also embeds new dependencies that may be vulnerable to future policy changes or regional disruptions. Moreover, diversion can alter competitive dynamics globally by accelerating industrial development in beneficiary countries at the expense of targeted exporters [Fus20]. The integration of environmental and social considerations into trade policy frameworks represents another significant trend. Tariffs are increasingly discussed alongside carbon border adjustment mechanisms and labor standard enforcement provisions as tools for aligning trade flows with sustainability objectives [GGK25]. This broadens their function beyond traditional protectionism toward shaping production practices abroad through market access conditions. Such linkages could lead to differentiated tariff regimes based on compliance with environmental or labor benchmarks, adding further complexity to global value chain management. Retaliatory strategies by trading partners have also evolved. Rather than responding symmetrically across all sectors, foreign governments increasingly target politically salient exports from the initiating country to maximize domestic pressure for policy change [NYA24]. This targeted retaliation leverages knowledge of electoral geographies and sectoral lobbying power within the opponent's political system. As noted in Section 10.2, this approach can directly influence domestic political discourse and electoral outcomes by concentrating economic pain in swing constituencies. Policy uncertainty has become a persistent feature of the tariff landscape. The rapid escalation cycles observed in recent disputes, where multiple waves of measures were announced and implemented within months, have increased volatility in trade costs [LLY25]. Firms now factor potential tariff shocks into long-term planning even outside active disputes, leading to preemptive diversification of supply chains and greater emphasis on contractual flexibility with suppliers. This environment favors companies with robust risk management capabilities but raises barriers for smaller firms less able to absorb adjustment costs. Technological change interacts closely with these trends. Advances in digital supply chain mapping and analytics enable more agile responses to tariff changes by improving visibility into multi-tier supplier networks [Cha+19]. At the same time, automation investments are being accelerated as a means of offsetting higher labor or input costs resulting from tariffs [BF19b]. While such technologies can mitigate some negative impacts on competitiveness, they may also reduce employment gains traditionally associated with reshoring or import substitution strategies prompted by protectionist measures. The interplay between tariffs and foreign direct investment patterns is likely to intensify as multinational enterprises adjust location decisions based on evolving trade barriers [Hos20]. Tariff-jumping FDI into protected markets will continue where local assembly offers cost advantages over importing finished goods; however, when upstream inputs remain subject to duties or local capacity constraints exist, investment may instead flow toward third countries with preferential access to both origin and destination markets [BS20]. These shifts contribute to a gradual reconfiguration of global production geography that may persist beyond the resolution of specific disputes due to sunk costs in new facilities and supplier relationships. Institutionally, the weakening of multilateral dispute settlement mechanisms, exemplified by the paralysis of the WTO Appellate Body, has reduced constraints on unilateral tariff actions [Dol+25]. In this context, preferential trade agreements gain importance both as shields against arbitrary duties among members and as channels for diversionary benefits when non-members are targeted [CS22]. The proliferation of such agreements could fragment global trade governance further if overlapping commitments create complex webs of origin rules and differential tariff treatments that challenge compliance systems at scale. Finally, there is an observable convergence between national security considerations and tariff policy application. Measures under statutes like Section 232 have extended beyond traditional defense-related goods into broader categories deemed critical for economic security [Duc+24]. This securitization trend expands the potential scope for tariffs while making them less susceptible to challenge under existing trade rules framed around economic injury criteria alone. It also aligns tariff policy more closely with industrial strategy objectives aimed at securing domestic capacity in key sectors such as semiconductors, energy infrastructure, and medical supplies [MN24]. Taken together, these developments point toward a future in which tariffs function within a more fluid and multi-dimensional policy space, serving not only as levers for managing import competition but also as instruments embedded in geopolitical strategy, sustainability agendas, supply chain resilience planning, and domestic political calculus [LLY25; BS20; Fus20; Duc+24]. The challenge for policymakers will be balancing these expanded roles against the risks of heightened uncertainty, systemic fragmentation of trade governance, and unintended economic distortions across interconnected global markets.

11.2 Policy Uncertainty and Strategic Responses

Uncertainty surrounding tariff policy has emerged as a persistent feature of the contemporary trade environment, influencing firm behavior, investment decisions, and the configuration of global supply chains. This uncertainty stems from multiple sources: the unpredictability of policy initiation and escalation, the opacity of decision-making criteria, and the absence of clear timelines for resolution or rollback [Cha+19]. The rapid sequencing of tariff announcements during recent disputes, often with minimal lead time before implementation, has amplified volatility in trade costs and complicated long-term planning for both domestic and foreign enterprises [LLY25]. Even when initial measures are narrowly targeted, the risk that they will broaden to encompass additional products or trading partners creates a precautionary climate in which firms must weigh the costs of preemptive adaptation against the potential losses from inaction. The political nature of tariff decisions magnifies this uncertainty. Trade measures are frequently embedded within broader geopolitical strategies or electoral considerations, making them susceptible to abrupt shifts driven by changes in leadership or diplomatic posture [Dol+25]. For example, tariffs imposed under Section 301 authority during the U.S.–China conflict evolved from a focused set of high-technology goods into expansive lists covering a wide range of consumer and intermediate products [MN24]. Such expansions diluted sectoral precision but underscored the difficulty for firms in predicting which goods might be targeted next. The resulting instability discourages sunk-cost investments in affected sectors and incentivizes flexible, reversible commitments over long-term capital formation. For companies embedded in global value chains, multi-jurisdictional exposure compounds these challenges. Intermediate goods may cross several borders before final assembly; tariffs applied at any stage can cascade through cost structures and disrupt production schedules [Fus20]. This complexity makes it difficult to forecast landed costs accurately or to assess competitiveness in end markets. Moreover, retaliatory measures by trading partners introduce demand-side uncertainty for export-oriented firms [BS20], creating a dual exposure where both input costs and sales volumes are at risk. In agriculture, for instance, Chinese counter-tariffs on soybeans not only reduced export revenues but also increased domestic market saturation, depressing prices despite federal aid programs [NYA24]. Strategic responses to such uncertainty vary according to industry characteristics, firm size, and resource availability. One common approach is geographic diversification of sourcing to reduce dependency on any single country vulnerable to future trade disputes. This may involve developing parallel supplier networks across multiple regions or shifting final assembly to jurisdictions with preferential access under free trade agreements. While diversification can enhance resilience, it also increases coordination costs and may dilute economies of scale. Firms with greater visibility into their tier-2 and tier-3 suppliers are better positioned to execute such strategies effectively; those lacking deep supply chain mapping capabilities risk overlooking hidden dependencies that could reintroduce vulnerability [Cha+19]. Another tactical response is "front-running" imports ahead of scheduled tariff increases to build inventories at pre-duty prices [Cav+19]. This can temporarily shield operations from cost spikes but ties up working capital and offers only short-term relief. Contractual flexibility is also increasingly valued: clauses allowing volume adjustments or cost-sharing in response to unforeseen duties help distribute risk between buyers and suppliers. In some cases, firms renegotiate terms so that foreign suppliers absorb part of the tariff burden through price concessions [MN24], particularly when maintaining market access is strategically important for the exporter. Investment strategies adapt as well under heightened policy volatility. Some multinational enterprises pursue tariff-jumping foreign direct investment, establishing local production within protected markets, to circumvent import duties entirely [RW22]. Others delay or scale down projects until greater clarity emerges regarding long-term trade conditions [Met20]. The "option value" of waiting becomes significant in capital-intensive sectors with long payback periods; premature commitment risks locking firms into uncompetitive cost structures if tariffs are later removed or altered. Risk management frameworks increasingly integrate geopolitical analysis alongside traditional financial metrics when evaluating sourcing and investment decisions. Suppliers with multi-country production footprints capable of reallocating output geographically gain strategic value because they offer built-in flexibility against sudden policy shifts [Cha+19]. Conversely, single-location suppliers, even those offering competitive pricing, may be deprioritized due to elevated geopolitical risk profiles. This shift reflects a redefinition of total cost calculations to include resilience premiums tied to policy stability. Some responses involve structural redesigns aimed at reducing exposure altogether. Firms may regionalize supply chains by concentrating production within tariff-free blocs such as USMCA or EU member states [Fus20], thereby insulating themselves from certain categories of external shocks while potentially sacrificing some efficiency gains from global specialization. Others invest in automation domestically to offset higher labor or input costs resulting from reshoring initiatives prompted by protectionist measures [BF19b]. While such technological upgrades can improve productivity over time, they may also alter employment patterns in ways that complicate the political calculus underpinning tariff policies. Policy uncertainty also drives collaborative strategies among stakeholders. Industry associations may coordinate lobbying efforts for exemptions or exclusions based on demonstrated lack of domestic substitutes [MN24], while cross-sector coalitions advocate for more predictable trade frameworks to facilitate long-term planning. Internationally integrated firms sometimes align with foreign governments in opposing restrictive measures that threaten shared economic interests [Wu24]. Ultimately, sustained uncertainty around tariff regimes encourages adaptive capacity as a core competency for globally engaged firms. Those able to combine diversified sourcing portfolios, flexible contractual arrangements, robust supply chain intelligence, and scenario-based investment planning are better equipped to navigate volatile trade environments without incurring prohibitive adjustment costs [Cha+19; Fus20]. However, these capabilities require resources not equally available across all enterprises; smaller firms often face disproportionate challenges implementing comprehensive strategic responses, leaving them more exposed to abrupt policy shifts that have become an enduring feature of international commerce.

11.3 Opportunities for Further Research

Building on the patterns and mechanisms identified in Section 11.2, there is considerable scope for advancing empirical and theoretical work to address unresolved questions about the long-term economic, political, and strategic implications of tariff policy. One promising avenue involves developing high-frequency, product-level datasets that integrate customs records, firm-level financials, and supply chain mapping to capture the dynamic adjustments firms make in response to tariff shocks [Cha+19]. While existing studies have documented trade diversion and sourcing shifts [BS20], more granular data could illuminate how these changes propagate through multi-tier supplier networks over time, including indirect effects on upstream and downstream industries not directly targeted by tariffs. Such work would benefit from linking import/export transaction data with production and employment metrics at the establishment level to quantify both immediate and lagged impacts on productivity, wages, and capital investment. Another area requiring deeper investigation is the interaction between tariffs and global value chain resilience. Current evidence suggests that firms respond to tariff risk by diversifying suppliers geographically or regionalizing production [Fus20], but the trade-offs between resilience gains and efficiency losses remain poorly quantified. Future research could employ network analysis techniques to model how different tariff scenarios alter the topology of global production systems, identifying critical nodes whose disruption has disproportionate economic consequences. This approach could be extended to simulate how overlapping shocks, such as tariffs combined with geopolitical crises or climate-related disruptions, affect supply chain stability. The role of policy uncertainty in shaping firm behavior also warrants further exploration. While qualitative accounts highlight delayed investment and "wait-and-see" strategies under volatile tariff regimes [Met20], there is limited quantitative evidence on threshold levels of uncertainty that trigger such responses across sectors. Experimental designs using stated-preference surveys of executives could complement econometric analyses by revealing how decision-makers weigh competing risks when allocating capital under uncertain trade policy trajectories. Coupling these insights with macroeconomic models would improve forecasts of aggregate investment responses under alternative policy stability scenarios. From a political economy perspective, more research is needed on how domestic stakeholder coalitions form and evolve around tariff measures over time [Bet15]. Longitudinal studies tracking lobbying activity, campaign contributions, and public opinion before, during, and after major tariff episodes could clarify feedback loops between policy outcomes and electoral incentives [HZ22]. This line of inquiry could also examine how foreign retaliatory targeting strategies, such as focusing on politically sensitive exports [NYA24], reshape domestic political alignments and influence subsequent trade negotiations. The intersection of tariffs with innovation dynamics presents another fertile domain for study. While some evidence points to potential positive R&D responses under certain adverse trade shocks via induced competition mechanisms [LLY25], other findings suggest that prolonged protection can dampen innovation incentives in concentrated industries [ARW19]. Future work could exploit variation in sectoral exposure to tariffs across countries to identify causal effects on patenting activity, technology adoption rates, and collaborative research networks. Incorporating measures of knowledge spillovers within global value chains would help assess whether tariff-induced fragmentation accelerates or hinders technological diffusion. In addition, there is scope for comparative cross-country analyses examining how structural differences, such as market size, integration into preferential trade agreements, or industrial composition, influence both the incidence of tariffs and their economic consequences [CS22]. For example, contrasting U.S. experiences with those of the EU or large emerging markets during similar dispute periods could reveal institutional or structural factors that mitigate negative welfare impacts or enhance bargaining leverage in disputes [Fus20]. Embedding such comparisons within computable general equilibrium frameworks would allow for systematic evaluation of counterfactual policy mixes. The environmental dimension of tariff policy remains underexplored despite growing interest in carbon border adjustments and sustainability-linked trade measures [GGK25]. Empirical studies could investigate whether integrating environmental criteria into tariff design alters sourcing patterns toward lower-emission producers or incentivizes cleaner production methods abroad. This would require merging trade flow data with lifecycle emissions inventories at the product level, a challenging but increasingly feasible task given advances in environmental accounting. Finally, methodological innovation will be essential for capturing the complex interplay between tariffs, exchange rates, transport costs, and non-tariff barriers. Integrating real-time shipping data with customs records could shed light on how freight rate adjustments mediate pass-through from border duties to final consumer prices [HIT18]. Similarly, advances in machine learning applied to unstructured text from policy announcements and media coverage could improve measurement of trade policy uncertainty indices beyond current aggregate proxies [BS20]. Pursuing these research directions would not only refine understanding of the multifaceted impacts identified throughout this thesis but also provide policymakers with more precise tools for anticipating distributional outcomes across regions [ZZZ22], income groups [SA19], and industries [Hos20]. By combining micro-level behavioral evidence with macroeconomic modeling under realistic global value chain constraints, future scholarship can better inform the design of tariff policies that balance strategic objectives against potential economic costs in an increasingly interconnected, and politically contested, trading system.

12 Conclusion

Tariff policy in the United States has evolved into a multifaceted instrument that extends well beyond traditional economic protectionism, intertwining with geopolitical strategy, industrial policy, and domestic political considerations. The intricate interplay between tariffs and global value chains reveals that while protective measures may offer short-term relief to specific sectors, they often generate broader economic distortions through increased input costs, disrupted supply networks, and retaliatory trade barriers. These ripple effects manifest in reduced competitiveness for downstream industries, shifts in employment patterns, and altered investment flows, underscoring the interconnected nature of modern production systems.

Historical analysis highlights that tariff strategies have transitioned from broad-based revenue generation and uniform protectionism to highly granular, targeted interventions aimed at strategic sectors or geopolitical objectives. This shift reflects a recognition of the complex economic landscape shaped by global integration, technological advancement, and evolving security concerns. The selective application of tariffs, combined with exemptions and overlapping legal authorities, creates a layered policy environment that challenges firms' compliance and adaptation efforts. Firms respond through diverse strategies including supplier diversification, supply chain reconfiguration, tariff engineering, and investment realignment, with outcomes varying significantly by industry characteristics, market structure, and firm capabilities.

Macroeconomic consequences of tariff measures include dampened GDP growth, heightened inflationary pressures, and labor market disruptions. While certain protected industries may experience localized employment gains, these are frequently offset by job losses in sectors facing higher input costs or export retaliation. Consumer welfare is generally diminished due to increased prices, reduced product variety, and regressive distributional effects that disproportionately burden lower-income households. Regional disparities further complicate the landscape, as areas dependent on protected industries or export-oriented agriculture experience divergent economic impacts, influencing political attitudes and electoral dynamics.

The role of tariffs in shaping foreign direct investment and domestic capital formation is nuanced. Although tariff-jumping FDI can stimulate localized investment, broader protectionist measures often raise operational risks and input costs, discouraging aggregate investment and potentially fragmenting global production networks. Innovation trajectories are also affected, with tariffs potentially constraining access to advanced technologies and altering incentives for research and development. The disruption of cross-border knowledge flows within global value chains may lead to regionalization of innovation ecosystems, with implications for long-term technological progress and competitiveness.

Political economy factors are integral to tariff policy formulation and persistence. Stakeholder influence, including lobbying by industry groups, labor unions, and consumer advocates, interacts with electoral incentives and public opinion shaped by identity and framing. Tariffs become embedded within broader narratives of national security and economic nationalism, complicating efforts to recalibrate trade policy based solely on economic efficiency considerations. Internationally, the use of tariffs as leverage in trade disputes has contributed to escalating tensions, retaliatory cycles, and shifts in global trade patterns, with third countries experiencing both positive and negative spillovers through trade diversion and supply chain realignment.

Looking ahead, tariff policy faces challenges arising from increased granularity, policy uncertainty, and the integration of environmental and social objectives into trade frameworks. Firms and policymakers must contend with heightened complexity in supply chain management, compliance, and strategic planning amid volatile geopolitical landscapes. The weakening of multilateral dispute resolution mechanisms further accentuates the importance of preferential trade agreements and regional alliances in shaping tariff impacts and trade flows. Balancing the expanded roles of tariffs against the risks of economic fragmentation, inefficiency, and political polarization will require nuanced approaches informed by comprehensive empirical analysis and cross-sectoral collaboration.

Future research opportunities abound in enhancing data granularity, modeling supply chain resilience, quantifying policy uncertainty effects, and exploring the intersection of tariffs with innovation and sustainability goals. Comparative studies across major economies can shed light on institutional and structural factors influencing tariff strategies and outcomes. Integrating micro-level firm behavior with macroeconomic modeling under realistic global value chain constraints promises to yield insights that can guide more effective and equitable trade policy design. Ultimately, addressing the multifaceted challenges posed by tariffs demands a holistic perspective that accounts for economic, political, and strategic dimensions within an interconnected global trading system.

References

[AB20] Volha Audzei and Jan Brůha. *A Model of the Euro Area , China and the United States: Trade Links and Trade Wars*. June 2020. URL: www.cnb.cz.

[ARW19] Mary Amiti, Stephen J. Redding, and David E. Weinstein. "The Impact of the 2018 Tariffs on Prices and Welfare". In: *Journal of Economic Perspectives* 33.4 (Oct. 2019), pp. 187–210. URL: https://doi.org/10.1257/jep.33.4.187.

[ASH21] Michael K. Adjemian, Aaron Smith, and Wendi He. "Estimating the market effect of a trade war: The case of soybean tariffs". In: *Food Policy* 105 (Sept. 2021), p. 102152. DOI: 10.1016/j.foodpol.2021.102152. URL: https://doi.org/10.1016/j.foodpol.2021.102152.

[BBR18] Edward J. Balistreri, Christoph Böhringer, and Thomas F. Rutherford. *Quantifying Disruptive Trade Policies*. Nov. 2018.

[Bet15] Timm Betz. *Trading Interests: Domestic Institutions, International Negotiations, and the Politics of Trade*. 2015.

[BF19a] David Baqaee and Emmanuel Farhi. *Networks, Barriers, and Trade*. July 2019. URL: http://www.nber.org/papers/w26108.

[BF19b] Cecilia Bellora and Lionel Fontagné. *Shooting Oneself in the Foot? Trade War and Global Value Chains*. Apr. 2019. URL: https://ssrn.com/abstract=3526944.

[BMW19] Wilko Bolt, Kostas Mavromatis, and Sweder van Wijnbergen. *The Global Macroeconomics of a Trade War: The EAGLE model on the US-China trade conflict*. Jan. 2019. URL: https://ssrn.com/abstract=3328570.

[BMW21] Brandon M. Boylan, Jerry McBeath, and Bo Wang. "US–China Relations: Nationalism, the Trade War, and COVID-19". In: *Fudan Journal of the Humanities and Social Sciences* 14 (Oct. 2021), pp. 23–40. DOI: 10.1007/s40647-020-00302-6. URL: https://doi.org/10.1007/s40647-020-00302-6.

[BS20] Eddy Bekkers and Sofia Schroeter. *An economic analysis of the US-China trade conflict*. Apr. 2020. DOI: 10.30875/5b611474-en. URL: https://doi.org/10.30875/5b611474-en.

[Cav+19] Alberto Cavallo et al. *Tariff Passthrough at the Border and at the Store: Evidence from US Trade Policy*. Oct. 2019. URL: https://ssrn.com/abstract=3470793.

[Cha+19] Sangho Chae et al. *The Effects of Tariff Increases on Supply Base Complexity: A Conceptual Framework*. Oct. 2019. URL: https://epublications.marquette.edu/mgmt%5C_fac/337.

[Che+21] Maksym Chepeliev et al. "Disaggregating the Vegetables, Fruits and Nuts Sector to the Tariff Line in the GTAP -HS Framework". In: *Journal of Global Economic Analysis* 6.1 (Jan. 2021), pp. 82–127.

[CHP24] Meredith A. Crowley, Lu Han, and Thomas Prayer. In: *Journal of International Economics* 150 (Apr. 2024). DOI: 10.1016/j.jinteco.2024.103936. URL: https://doi.org/10.1016/j.jinteco.2024.103936.

[CS22] Maria Cipollina and Luca Salvatici. "The Dark Matter of Bilateral Preferential Margins: An Assessment of the Effect of US Tariffs". In: *Sustainability* (Apr. 2022). DOI: 10.3390/su14084762. URL: https://doi.org/10.3390/su14084762.

[DL23] Yang Dinga and Yuanchun Liu. "The Impact of tariff increase on export and employment of Chinese firms". In: *China Economic Quarterly International* (Aug. 2023), pp. 155–166. DOI: 10.1016/j.ceqi.2023.08.002. URL: https://doi.org/10.1016/j.ceqi.2023.08.002.

[Dol+25] Lindsay R. Dolan et al. "Tariffs and corporate political activity: a survey experiment on US businesses". In: *Business and Politics* (Apr. 2025). DOI: 10.1017/bap.2024.41.

[DST20] Sebastian Dullien, Sabine Stephan, and Thomas Theobald. "EUROPEAN FISCAL RULES AS A LIABILITY IN THE TRANSATLANTIC TRADE CONFLICT: LESSONS FROM NiGEM SIMULATIONS". In: *National Institute of Economic and Social Research* (Nov. 2020). DOI: 10.1017/nie.2020.41. URL: https://doi.org/10.1017/nie.2020.41.

[Duc+24] Aleixandre Brian Duche-Pérez et al. "Evaluating the impact of U.S. protectionist trade policies". In: *Journal of Infrastructure, Policy and Development* 8.10 (Sept. 2024), p. 7066. DOI: 10.24294/jipd.v8i10.7066. URL: https://doi.org/10.24294/jipd.v8i10.7066.

[Elo+21] Amani Elobeid et al. "China- U.S. trade dispute and its impact on global agricultural markets, the U.S. economy, and greenhouse gas emissions". In: *J Agric Econ* 72 (Feb. 2021), pp. 647–672. DOI: 10.1111/1477-9552.12430.

[Faj+20] Pablo D. Fajgelbaum et al. "The Return to Protectionism". In: *The Quarterly Journal of Economics* 135.1 (Jan. 2020), pp. 1–55. DOI: 10.1093/qje/qjz036.

[FK21] Pablo Fajgelbaum and Amit Khandelwal. *The Economic Impacts of the US-China Trade War*. Sept. 2021. URL: http://www.nber.org/papers/w29315.

[FP19] Aaron Flaaen and Justin Pierce. *Disentangling the Effects of the 2018-2019 Tariffs on a Globally Connected U.S. Manufacturing Sector*. Oct. 2019. URL: https://doi.org/10.17016/FEDS.2019.086.

[Fur+22] Davide Furceri et al. "The Macroeconomy After Tariffs". In: *The World Bank Economic Review* 36.2 (Apr. 2022), pp. 361–381. DOI: 10.1093/wber/lhab016. URL: https://doi.org/10.1093/wber/lhab016.

[Fus20] Ilaria Fusacchia. "Evaluating the Impact of the US–China Trade War on Euro Area Economies: A Tale of Global Value Chains". In: *Italian Economic Journal* 6 (Sept. 2020), pp. 441–468. DOI: 10.1007/s40797-019-00109-9. URL: https://doi.org/10.1007/s40797-019-00109-9.

[GGK25] Badri N. Gopalakrishnan, Munisamy Gopinath, and Kannan Kumar. “India–United States Agricultural Trade Under the America-First Agenda”. In: *Agribusiness* (Mar. 2025). DOI: 10.1002/agr.22046. URL: https://doi.org/10.1002/agr.22046.

[GH21] Gene M. Grossman and Elhanan Helpman. “When Tariffs Disrupt Global Supply Chains”. In: (Jan. 2021).

[Har24] Keith Harris. “A World by Themselves: Protectionism and the Political Economy of Trade in the Ohio Valley, 1816 –1828”. In: *Enterprise & Society* (Jan. 2024). DOI: 10.1017/eso.2023.53.

[HIM22] Kazunobu Hayakawa, Tadashi Ito, and Hiroshi Mukunoki. “Lerner meets Metzler: Tariff pass-through of worldwide trade”. In: *Journal of The Japanese and International Economies* 63 (Nov. 2022), p. 101173. DOI: 10.1016/j.jjie.2021.101173. URL: https://doi.org/10.1016/j.jjie.2021.101173.

[HIT18] Kazunobu Hayakawa, Jota Ishikawa, and Nori Tarui. *What Goes Around Comes Around: Export-Enhancing Effects of Import-Tariff Reductions*. Aug. 2018.

[HKM20] Kyle Handley, Fariha Kamal, and Ryan Monarch. *RISING IMPORT TARIFFS, FALLING EXPORT GROWTH: WHEN MODERN SUPPLY CHAINS MEET OLD-STYLE PROTECTIONISM*. Jan. 2020. URL: http://www.nber.org/papers/w26611.

[Hos20] Nobuhiro Hosoe. *Economic De-integration in North America and Foreign Direct Investment from Japan*. May 2020.

[HZ22] Shiping Hua and Ka Zeng. “The US–China Trade War: Economic Statecraft, Multinational Corporations, and Public Opinion”. In: *Business and Politics* (Sept. 2022), pp. 319–331. DOI: 10.1017/bap.2022.18.

[Irw19] Douglas A. Irwin. *Does Trade Reform Promote Economic Growth? A Review of Recent Evidence*. May 2019. URL: https://ssrn.com/abstract=3411673.

[IT24] Tatsuro Iwaisako and Hitoshi Tanaka. “Tariffs and Foreign Direct Investment in a Dynamic North–South Model”. In: *Journal of Money, Credit and Banking* (Oct. 2024). DOI: 10.1111/jmcb.13221.

[ITC21] Kenneth B. Medlock III, Ted Temzelides, and Woongtae Chung. “Mercantilism’s Groundhog day: The US-China trade war and US energy exports to Northeast Asia”. In: *Energy Strategy Reviews* 38 (Oct. 2021), p. 100741. DOI: 10.1016/j.esr.2021.100741. URL: https://doi.org/10.1016/j.esr.2021.100741.

[Kim18] H. M. Kim. “Economic growth and tariff levels in the United States: A Granger causality analysis”. In: *Journal of International Studies* 11.4 (Nov. 2018), pp. 79–92. DOI: 10.14254/2071-8330.2018/11-4/6. URL: https://doi.org/10.14254/2071-8330.2018/11-4/6.

[KR23] Helena Kreuter and Massimo Riccaboni. “The impact of import tariffs on GDP and consumer welfare: A production network approach”. In: *Economic Modelling* 126 (May 2023), p. 106374. DOI: 10.1016/j.econmod.2023.106374. URL: https://doi.org/10.1016/j.econmod.2023.106374.

[KSY19] Luisa Kinzius, Alexander Sandkamp, and Erdal Yalcin. “Trade protection and the role of non-tariff barriers”. In: *Review of World Economics* 155 (Jan. 2019), pp. 603–643. DOI: 10.1007/s10290-019-00341-6. URL: https://doi.org/10.1007/s10290-019-00341-6.

[LLY25] Leona Shao-Zhi Li, Yize Liu, and Jia Yuan. “The Effect of the U.S.–China Trade War on Chinese Corporate Innovation: A Curse or a Blessing?” In: *The World Economy* (Oct. 2025), pp. 1446–1464. DOI: 10.1111/twec.13663. URL: https://doi.org/10.1111/twec.13663.

[LM21] Wolfgang Lechthaler and Mariya Mileva. “THE DYNAMIC AND DISTRIBUTIONAL ASPECTS OF IMPORT TARIFFS”. In: *INTERNATIONAL ECONOMIC REVIEW* 62.1 (Feb. 2021). DOI: 10.1111/iere.12484.

[LWW19] Chunding Li, Jing Wang, and John Whalley. *TRADE PROTECTIONISM AND US MANUFACTURING EMPLOYMENT*. May 2019. URL: http://www.nber.org/papers/w25860.

[Mar20] Andrea U. Marino. "Growth and Welfare Implications of Tariff Protection–Location Versus Allocation Effects". In: *Journal of Economic Integration* (Dec. 2020), pp. 609–642. DOI: 10.11130/jei.2020.35.4.609. URL: https://doi.org/10.11130/jei.2020.35.4.609.

[Met20] Norbert Metiu. *Anticipation effects of protectionist U.S. trade policies*. Dec. 2020.

[MG20] Haiou Mao and Holger Görg. "Friends like this: The impact of the US–China trade war on global value chains". In: *The World Economy* 43 (Apr. 2020), pp. 1776–1791. DOI: 10.1111/twec.12967.

[Min23] Asier Minondo. "How exporters neutralised an increase in tariffs". In: *The World Economy* (July 2023), pp. 1274–1296. DOI: 10.1111/twec.13492. URL: https://doi.org/10.1111/twec.13492.

[MN24] Hong Ma and Jingxin Ning. "The return of protectionism: Prospects for Sino-US trade relations in the wake of the trade war". In: *China Economic Quarterly International* 4 (Oct. 2024), pp. 182–211. DOI: 10.1016/j.ceqi.2024.09.003.

[NYA24] Fatuma Abdallah Nantembelele, Mustafa K. Yilmaz, and Ali Ari. "The effects of a US-China trade war on Sub-Saharan Africa: Pro-active domestic policies make the difference". In: *Journal of Policy Modeling* 45 (June 2024), pp. 1296–1310. DOI: 10.1016/j.jpolmod.2023.06.002. URL: https://doi.org/10.1016/j.jpolmod.2023.06.002.

[Par20] S. Park. "Trade Conflict Between the U.S. and China: What Are the Impacts on the Chinese Economy?" In: *INTERNATIONAL ORGANISATIONS RESEARCH*

JOURNAL 15.2 (Feb. 2020), pp. 153–168. DOI: 10.17323/19967845-2020-02-10.

[QFZ22] Mengzhou Qin, Zijie Fan, and Yuan Zhong. "The Global Value Chain and Welfare Effects of Tariffs, Counterfactual Analysis of Sino–US Economic and Trade Frictions". In: *Sustainability* 14 (July 2022), p. 8280. DOI: 10.3390/su14148280. URL: https://doi.org/10.3390/su14148280.

[RW22] Werner Roeger and Paul J. J. Welfens. "The macroeconomic effects of00a0import tariffs in00a0a00a0model with00a0multinational firms and00a0foreign direct investment". In: *International Economics and Economic Policy* 19.2 (June 2022), pp. 245–266. DOI: 10.1007/s10368-022-00538-5. URL: https://doi.org/10.1007/s10368-022-00538-5.

[SA19] Abdulhamid Sukar and Syed Ahmed. "Rise of trade protectionism: the case of US-Sino trade war". In: *TRANSNATIONAL CORPORATIONS REVIEW* (Oct. 2019), pp. 279–289. DOI: 10.1080/19186444.2019.1684133. URL: https://doi.org/10.1080/19186444.2019.1684133.

[SEW20a] Refk Selmi, Youssef Errami, and Mark E Wohar. "Are U.S. industries resilient in dealing with trade uncertainty ? The case of U.S.-China trade war". In: *Journal of Economic Integration* (Mar. 2020). URL: https://hal.science/hal-02523186v1.

[SEW20b] Refk Selmi, Youssef Errami, and Mark E. Wohar. "What Trump's China Tariffs Have Cost U.S. Companies?" In: *Journal of Economic Integration* 35.2 (June 2020), pp. 282–295. DOI: 10.11130/jei.2020.35.2.282. URL: https://doi.org/10.11130/jei.2020.35.2.282.

[SWX21] Guobing Shen, Peijie Wang, and Yuanhan Xu. "Trade destruction and deflection effects of US-China trade frictions on China's tariff-targeted products". In: *World Econ.* 44 (Apr. 2021), pp. 2076–2106. DOI: 10.1111/twec.13067. URL: https://onlinelibrary.wiley.com/doi/10.1111/twec.13067.

[TZ20] Rod Tyers and Yixiao Zhou. "US–China rivalry: The macro policy choices". In: *World Econ.* 43 (May 2020), pp. 2286–2314. DOI: 10.1111/twec.12992. URL: https://onlinelibrary.wiley.com/doi/10.1111/twec.12992.

[WM20] Terrie Walmsley and Peter Minor. "US Trade Actions Against China: A Supply Chain Perspective". In: *Foreign Trade Review* 55.3 (Mar. 2020), pp. 337–371. DOI: 10.1177/0015732520920465.

[Wu24] Cathy Xuauxuan Wu. "A Bargaining Theory of US–China Economic Rivalry: Differentiating the Trade and Technology Wars". In: *The Chinese Journal of International Politics* 17.4 (Aug. 2024), pp. 323–345. DOI: 10.1093/cjip/poae017. URL: https://doi.org/10.1093/cjip/poae017.

[YLB25] Ting Yang, Wee-Yeap Lau, and Elya Nabila Abdul Bahri. "The Impact of US-China Trade War on China's Exports: Evidence From Difference-in-Differences Model". In: *SAGE Open* (Apr. 2025), pp. 1–15. DOI: 10.1177/21582440251328482. URL: journals.sagepub.com/home/sgo.

[Zen+22] Ka Zeng et al. "Bilateral Tensions, the Trade War, and US–China Trade Relations". In: *Business and Politics* (Oct. 2022). DOI: 10.1017/bap.2022.8.

[ZHA15] Steven Zahniser, Tom Hertz, and Monica Argoti. "Quantifying the Effects of Mexico's Retaliatory Tariffs on Selected U.S. Agricultural Exports". In: *Applied Economic Perspectives and Policy* 38.1 (Feb. 2015), pp. 93–112. DOI: 10.1093/aepp/ppv008.

[ZK24] Ka Zeng and Soo Yeon Kim. "Chinese Firms in the US–China Trade War: Decoupling through Reshoring?" In: *International Studies Quarterly* (Jan. 2024), sqae117. DOI: 10.1093/isq/sqae117. URL: https://doi.org/10.1093/isq/sqae117.

[ZZZ22] Zhu Zhu, Hang Zheng, and Zhu Zhu. "Analysis on the economic effect of Sino-US trade friction from the perspective of added value". In: *Environment, Development and Sustainability* 24 (June 2022), pp. 180–203. DOI: 10.1007/

s10668-021-01390-4. URL: https://doi.org/10.1007/s10668-021-01390-4.

This study examines the multifaceted impacts of U.S. tariff policies, tracing their historical evolution, theoretical foundations, and practical implications across economic, political, and social dimensions. It highlights how tariffs influence trade flows by altering relative prices, affecting consumption, production, and resource allocation within interconnected global value chains. The analysis covers sector-specific effects, including manufacturing, agriculture, energy, and technology, emphasizing the interplay between direct protection, input cost increases, and retaliatory measures. Attention is given to firm-level responses such as sourcing adjustments, supply chain reconfiguration, and investment decisions, alongside broader macroeconomic outcomes including GDP growth, inflation, employment, and capital formation. The role of market structure, imperfect competition, and strategic pricing in shaping tariff incidence and welfare consequences is explored. Additionally, the study addresses the political economy of tariff formulation, stakeholder influence, public opinion, and electoral dynamics. Emerging trends such as increased tariff granularity, integration with geopolitical strategy, and the interaction with preferential trade agreements are discussed. The work underscores the challenges posed by policy uncertainty and the need for adaptive strategies in supply chain management. Opportunities for further research are identified, particularly in areas linking tariffs to innovation, environmental considerations, and global trade governance. Overall, the analysis provides a comprehensive assessment of how tariff measures function as instruments of economic policy within a complex international trade environment.