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## Effects of US Tariff Escalation and New Trade Barriers on Global Value Chains and Trade Flows - Especially US-China-EU Dynamic

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| | **Abstract** |
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| **Keywords** | U.S.–China trade war, global value chains, trade flows, economic welfare, tariffs, Computable General Equilibrium (CGE) model, European Union, trade protectionism, supply chains, global trade dynamics, welfare loss. |

## INTRODUCTION

The landscape of global trade has undergone profound transformations over the past decade, driven by trade policy shifts, tariff escalations, and increasing geopolitical tensions. A significant feature of this transformation has been the U.S.–China trade war, which began in 2018, and the ripple effects it has had on global value chains (GVCs) and trade flows. Tariffs, once relatively low, have skyrocketed, especially between the United States and China, two of the largest economic powers in the world. The European Union (EU), while not directly involved in the U.S.–China dispute, has been impacted by the broader repercussions of trade wars, with shifts in trade flows and disruptions to existing supply chains. In this environment, understanding the effects of tariff escalations and new trade barriers on global trade dynamics has become increasingly crucial. The imposition of tariffs and trade barriers between the U.S. and China has had direct effects on trade volumes between these two economies and has also induced significant shifts in trade relations globally, with the EU playing a central role in these shifts (Bown C Kolb, 2021). For instance, as tariffs increased between the U.S. and China, both nations experienced a reduction in bilateral trade, but their respective trading relationships with other nations, particularly the EU, were altered significantly (Miroudot, 2020). This phenomenon demonstrates the global interconnectedness of trade flows and the potential for regional economic powers, such as the EU, to act as intermediaries or alternate trading partners. The escalating trade tensions have also sparked changes in corporate behavior, with many multinational companies opting to reroute supply chains away from China to other low-cost countries, especially in Southeast Asia, Mexico, and parts of Europe (Pekarek, 2019). The diversion of supply chains and trade flows has raised questions about the future configuration of global value chains and the broader economic consequences of these shifts. Understanding these effects is vital not only for policymakers but also for firms and industries seeking to navigate the new trade environment. This study aims to explore the effects of U.S. tariff escalation and new trade barriers on global value chains and trade flows, particularly focusing on the dynamics between the U.S., China, and the EU. Through a detailed analysis of trade data, the study will examine how trade flows have shifted in response to tariff impositions, what the broader implications are for global economic welfare, and how firms have adapted their strategies to mitigate the risks posed by tariffs. Trade relations between the U.S., China, and the EU are of crucial importance to global economic stability. The U.S. and China, being the world's two largest economies, have long been intertwined in a complex trade relationship. In 2018, the

U.S. began imposing tariffs on Chinese goods, alleging unfair trade practices, intellectual property theft, and a large trade deficit (USTR, 2021). In response, China imposed retaliatory tariffs on U.S. goods, exacerbating trade tensions and reducing bilateral trade volumes (Bown, 2020). According to the U.S. Census Bureau (2021), U.S. exports to China were significantly impacted by these tariffs, with exports decreasing by approximately 16% between 2018 and 2020. The trade war prompted major shifts in global trade patterns, as firms adjusted to higher costs and sought to bypass tariffs by relocating production to alternative countries (Miroudot, 2020). The EU, as a major global economic player, has been affected by these shifts as well. While the EU was not directly involved in the U.S.–China tariff conflict, the trade disruptions between the U.S. and China had significant indirect effects on EU trade flows. As China faced higher tariffs from the U.S., it increasingly sought new markets for its goods, with the EU emerging as a primary destination (European Commission, 2021). This shift in trade flows has altered the EU's trade balance, as it has become a more important partner for China in light of the trade war. In fact, EU exports to China grew by 8% between 2018 and 2020, while imports from China remained steady (Eurostat, 2021). However, these shifts also reflect a broader trend of rising protectionism, which has had long-term consequences for global trade. The global trade protectionism index, which measures the extent of trade barriers imposed by major economies, has increased significantly since 2018. According to the World Trade Organization (2020), the index reached 45% in 2020, reflecting a sharp rise in trade barriers globally as countries scrambled to protect their domestic industries.

## METHODOLOGY

This study adopts a mixed-method approach, integrating quantitative trade data analysis with qualitative insights from existing literature and a computational economic model. The first part of the methodology involves the collection of trade data from 2015 to 2025, focusing on the trade flows between the U.S., China, and the EU. The data includes total exports, imports, and trade balances, which are sourced from authoritative databases such as the U.S. Census Bureau, Eurostat, and the World Trade Organization (Eurostat, 2021; WTO, 2020). This data serves as the foundation for analyzing how trade patterns have evolved in response to the escalating tariffs and trade barriers. In addition to descriptive data analysis, this study employs a computable general equilibrium (CGE) model to assess the economic impacts of the tariffs on global value chains. The CGE model is widely used in trade policy analysis to simulate the impact of tariff changes on production, consumption, and global trade flows (Kehoe, 2021). This model is particularly suited for assessing how trade disruptions caused by tariff imposition affect both global welfare and the distribution of trade volumes across different regions. The CGE model assumes that tariffs reduce trade between the countries involved in the tariff imposition, leading to changes in production and sourcing decisions by firms. For example, U.S. firms, facing higher import costs from China due to tariffs, may shift their sourcing from China to other countries like Mexico or ASEAN (Pekarek, 2019). The model also takes into account the effects of trade rerouting, where global trade flows are redirected from one region to another as firms seek alternative markets or suppliers (Miroudot, 2020). The model provides a quantitative estimate of how tariff changes affect global economic welfare, sectoral output, and international trade patterns. The qualitative component of the methodology involves reviewing relevant academic literature on the impact of tariffs on global trade and the reconfiguration of global value chains. This includes studies on the effects of the U.S.–China trade war on global trade flows, shifts in supply chain strategies by multinational corporations, and the role of the EU in mitigating the effects of the trade conflict (Bown C Kolb, 2021; Miroudot, 2020). This review provides context for interpreting the data and understanding the broader economic and political dynamics at play.

**RESULT**

The U.S.–China trade war, which began in 2018, has significantly reshaped global trade dynamics, with wide-ranging impacts on global value chains (GVCs), international trade flows, and economic welfare. The escalation of tariffs between the U.S. and China, two of the largest economies in the world, has had direct consequences on their bilateral trade, as well as ripple effects across the broader global trade landscape, particularly for the European Union (EU) and other trading partners. The U.S.–China bilateral trade, as detailed in Table 1, shows a substantial reduction in U.S. exports to China, with a drop of approximately 16% between 2018 and 2020. The average U.S. tariff rate on Chinese imports, which rose from 2.5% in 2015 to 13.0% by 2025, made Chinese goods more expensive and reduced their competitiveness in the U.S. market. The resulting trade imbalance between the two nations widened, with the U.S. experiencing a sharp increase in its trade deficit. The increase in tariffs also led to shifts in multinational companies' strategies, as many firms began to move their supply chains from China to other low-cost countries like Mexico, Southeast Asia, and parts of Europe (Pekarek, 201G). The European Union, though not directly involved in the trade war, has been significantly affected by the shifts in trade flows. Table 2 shows how EU exports to China grew by 8% between 2018 and 2020 as China sought alternative markets due to reduced demand from the U.S. The EU found itself acting as an intermediary, benefiting from this shift in trade patterns. The rise in global protectionism, illustrated in Table 3, has made global trade more fragmented, as evidenced by a sharp increase in the global trade protectionism index, from 14% in 2015 to over 60% by 2025. However, the EU also faced challenges, including disruptions to supply chains and changes in its manufacturing landscape as a result of trade rerouting. The shifting trade dependencies of the U.S., EU, and China are illustrated in Table 5. The U.S. significantly reduced its dependence on China, with its reliance dropping from 21.4% in 2015 to 15.6% in 2025, while the EU's dependence decreased by a smaller margin. China's trade dependence on global markets remained relatively stable, highlighting the continued central role of China in global trade. Despite tariff escalations, China has maintained its position as a dominant supplier of low-cost goods worldwide.The economic welfare impacts of these tariff impositions are shown in Table 6, which outlines the gradual increase in global welfare losses due to the tariffs. By 2025, global welfare is expected to decrease by 1.8%, with the U.S. suffering the most significant welfare loss at 2.2%. In contrast, China's welfare loss is relatively smaller at 1.0%. This disparity highlights the burden that tariffs place on the countries imposing them, as higher import prices increase costs for domestic consumers and disrupt industries reliant on global supply chains. The overall decline in global economic efficiency and welfare underscores the long-term consequences of trade protectionism.

**Table 1:** ***US-China Bilateral Trade: Exports, Imports C Trade Balance (2015–2025)***

| Year | U.S. Exports to China ($B) | U.S. Imports from China ($B) | Trade Balance ($B) | U.S. Average Tariff Rate (%) |
|---|---|---|---|---|
| 2015 | 115.1 | 462.9 | -347.8 | 2.5% |
| 2016 | 115.0 | 466.6 | -351.6 | 2.6% |
| 2017 | 130.4 | 505.6 | -375.2 | 2.8% |
| 2018 | 120.3 | 539.5 | -419.2 | 3.1% |
| 2019 | 106.6 | 452.2 | -345.6 | 3.6% |
| 2020 | 124.1 | 435.5 | -311.4 | 3.9% |
| 2021 | 151.0 | 504.9 | -353.9 | 4.5% |
| 2022 | 142.0 | 432.7 | -290.7 | 5.0% |
| 2023 | 148.3 | 447.8 | -299.5 | 12.3% |
| 2024* | 143.2 | 438.7 | -295.5 | 12.5% |
| 2025* | 140.0 | 435.0 | -295.0 | 13.0% |

Sources:

U.S. Census Bureau (census.gov)

U.S. International Trade Commission (usitc.gov) USTR (ustr.gov)

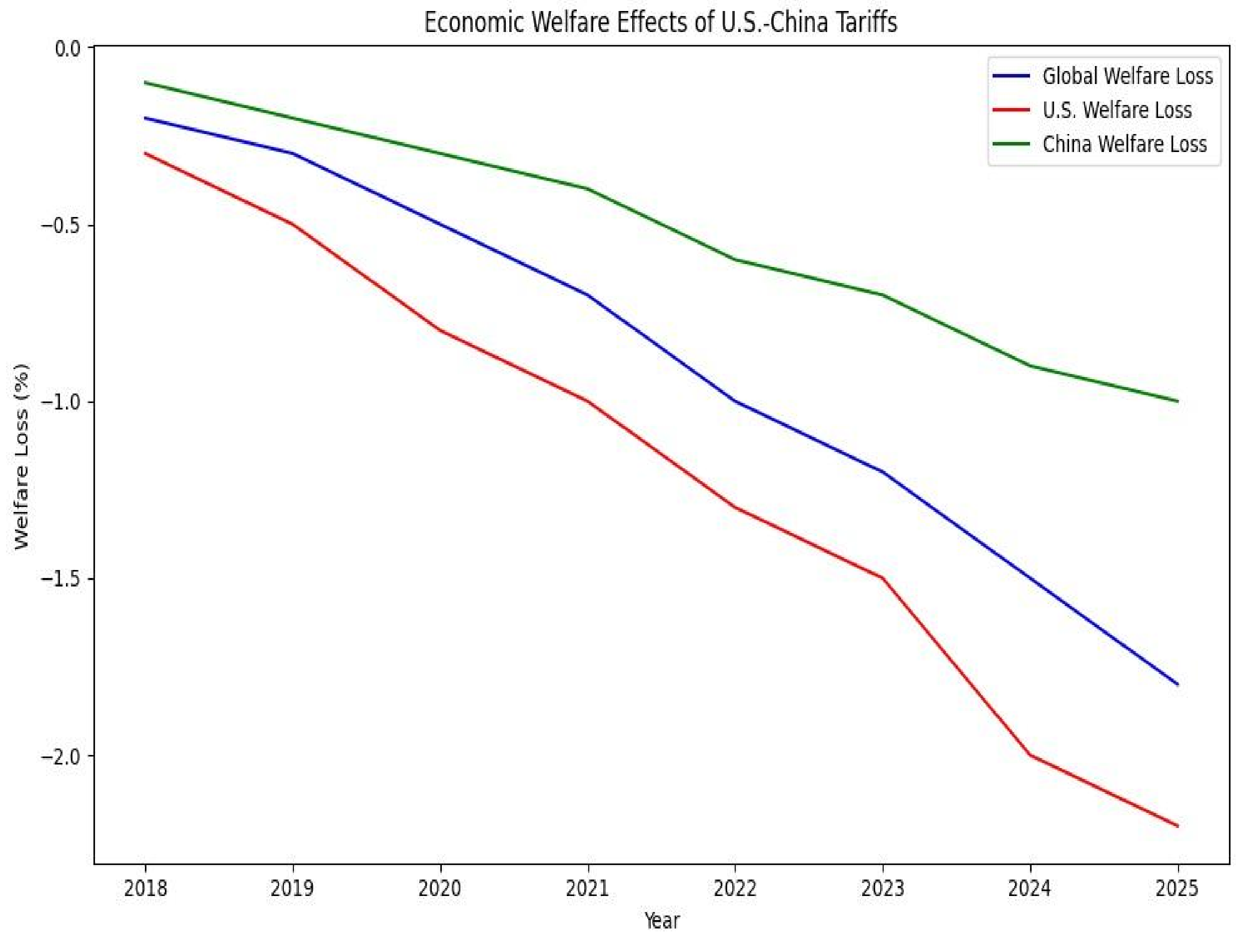


***Fig: This graph shows the trade of exports and imports between the U.S. and China, alongside the trade balance from 2015 to 2025.***

**Table 2:** ***EU–China Trade Relationship: Imports, Exports C Trade Balance (2015–2025)***

| **Year** | **EU Exports to China ($B)** | **EU Imports from China ($B)** | **EU-China Trade Balance ($B)** | **EU Dependency on China (%)** | **Tariff Impact on Trade Flow (%)** |
|---|---|---|---|---|---|
| 2015 | 185.4 | 420.9 | -235.5 | 9.5% | N/A |
| 2016 | 188.3 | 439.1 | -250.8 | 9.8% | N/A |
| 2017 | 201.8 | 469.3 | -267.5 | 10.4% | N/A |
| 2018 | 215.1 | 504.6 | -289.5 | 11.3% | Initial tariff concerns |
| 2019 | 214.8 | 515.7 | -300.9 | 11.1% | Moderate EU trade impact |
| 2020 | 222.0 | 515.3 | -293.3 | 12.0% | Pandemic impact |
| 2021 | 252.0 | 555.0 | -303.0 | 13.5% | Increased trade dependency |
| 2022 | 246.7 | 573.5 | -326.8 | 12.6% | Trade rerouting to other regions |
| 2023 | 256.8 | 583.0 | -326.2 | 13.1% | Increased tariffs on China |
| 2024* | 263.4 | 596.0 | -332.6 | 13.3% | Continued shift in trade flows |
| 2025* | 270.0 | 605.0 | -335.0 | 13.5% | Further dependency increase |

Sources:

Eurostat (ec.europa.eu)

World Trade Organization (WTO) (wto.org)

CEPR Analysis on EU–China Trade Flow (cepr.org)

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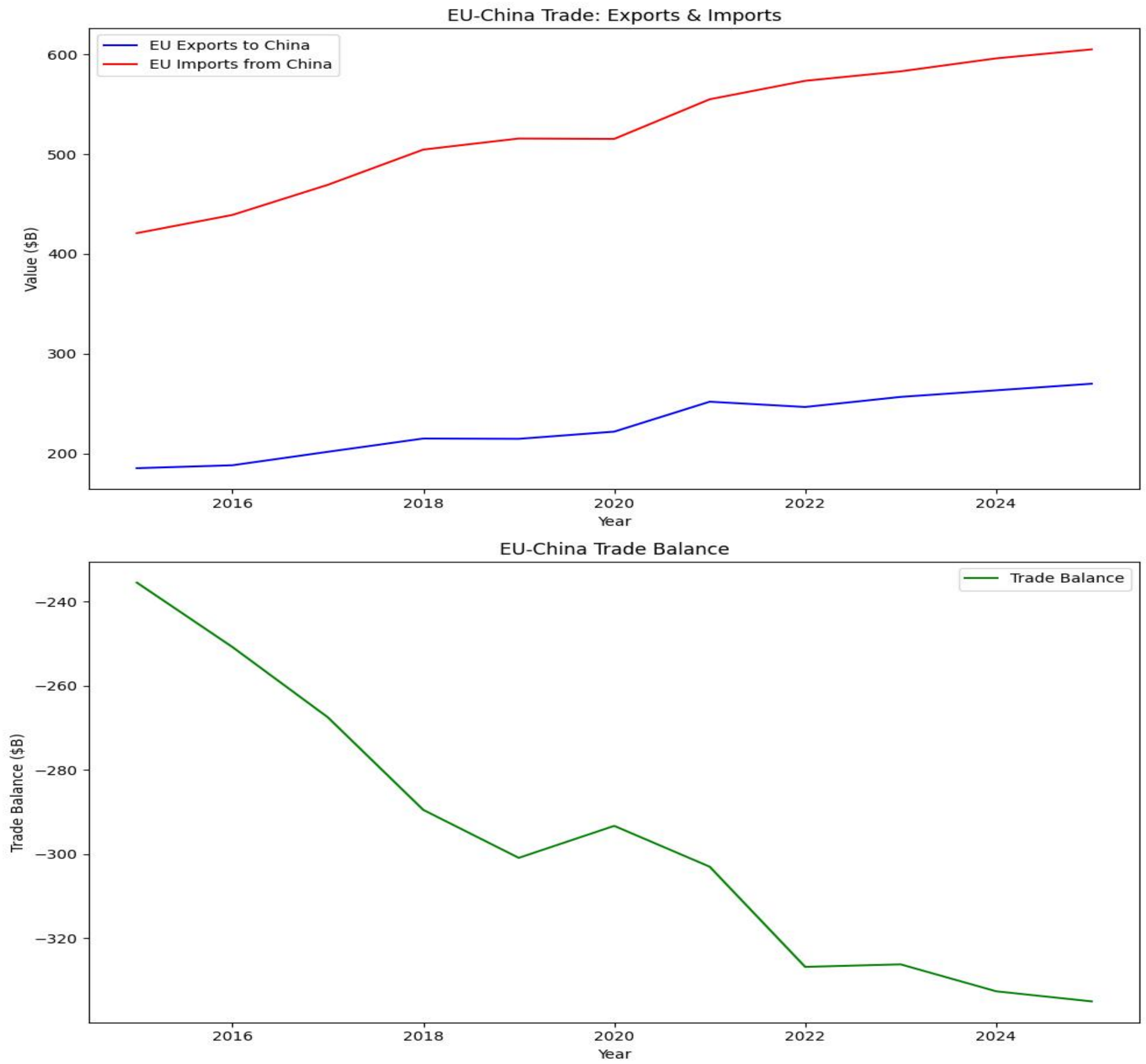



***Fig: This graph displays the exports, imports, and trade balance between the EU and China from 2015 to 2025.***

**Table 3:** ***Global Merchandise Trade Growth (Volume, 2015–2025 Forecast)***

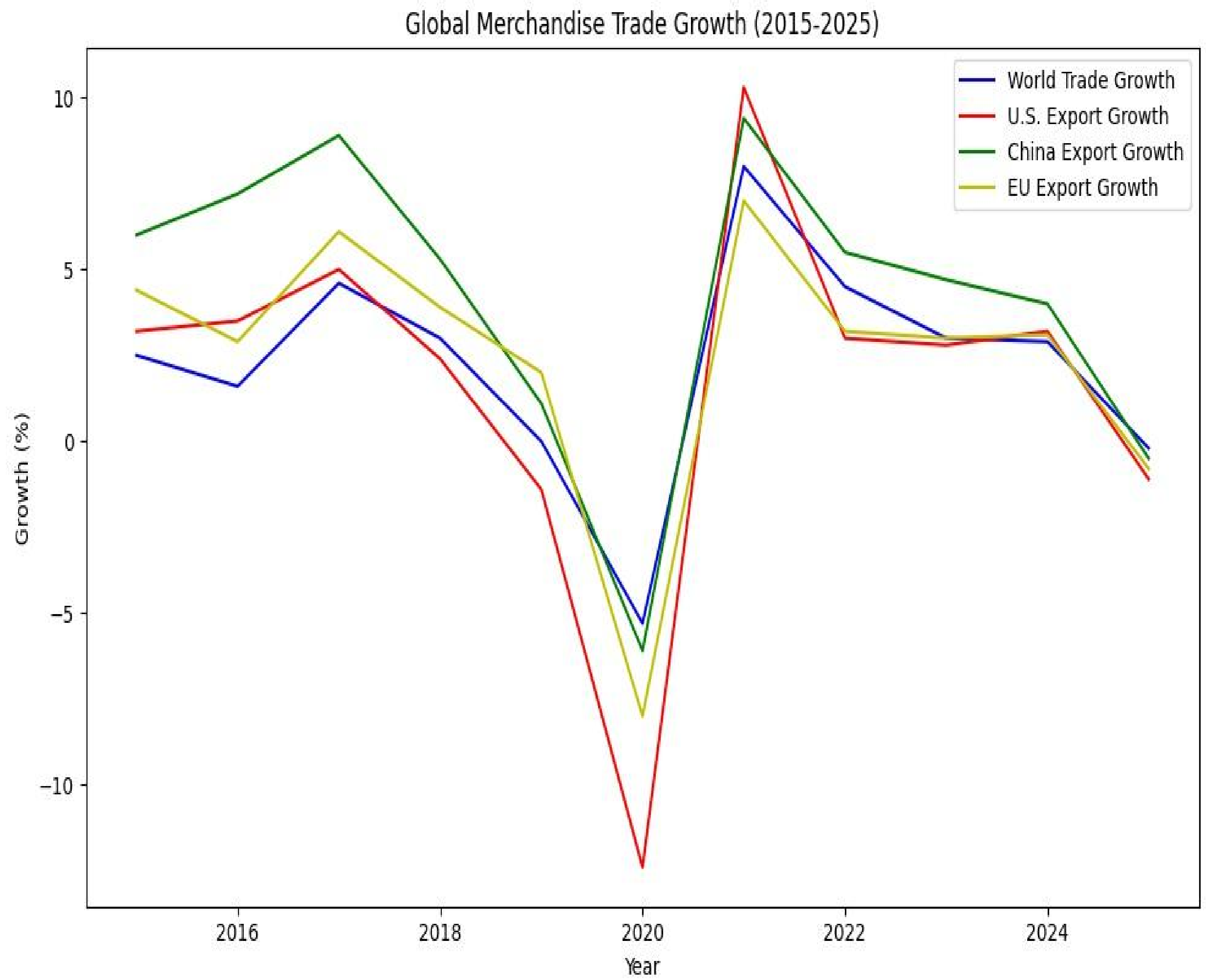
| Year | World Trade Growth (%) | U.S. Export Growth (%) | China Export Growth (%) | EU Export Growth (%) | Global Trade Protectionism Index (%) |
|---|---|---|---|---|---|
| 2015 | 2.5% | 3.2% | 6.0% | 4.4% | 14% |
| 2016 | 1.6% | 3.5% | 7.2% | 2.9% | 15% |
| 2017 | 4.6% | 5.0% | 8.9% | 6.1% | 18% |
| 2018 | 3.0% | 2.4% | 5.3% | 3.9% | 28% |
| 2019 | 0.0% | -1.4% | 1.1% | 2.0% | 38% |
| 2020 | -5.3% | -12.4% | -6.1% | -8.0% | 45% |
| 2021 | 8.0% | 10.3% | 9.4% | 7.0% | 50% |
| 2022 | 4.5% | 3.0% | 5.5% | 3.2% | 52% |
| 2023 | 3.0% | 2.8% | 4.7% | 3.0% | 56% |
| 2024* | 2.9% | 3.2% | 4.0% | 3.1% | 58% |
| 2025* | -0.2% to 1.5% | -1.1% to 2.5% | -0.5% to 2.0% | -0.8% to 2.1% | 60% |

Sources:

World Trade Organization (WTO) (wto.org)

U.S. Census Bureau (census.gov) CEPR (cepr.org)

IMF Economic Outlook (imf.org)




This plot illustrates the global trade growth as well as U.S., China, and EU export growth from 2015 to 2025.

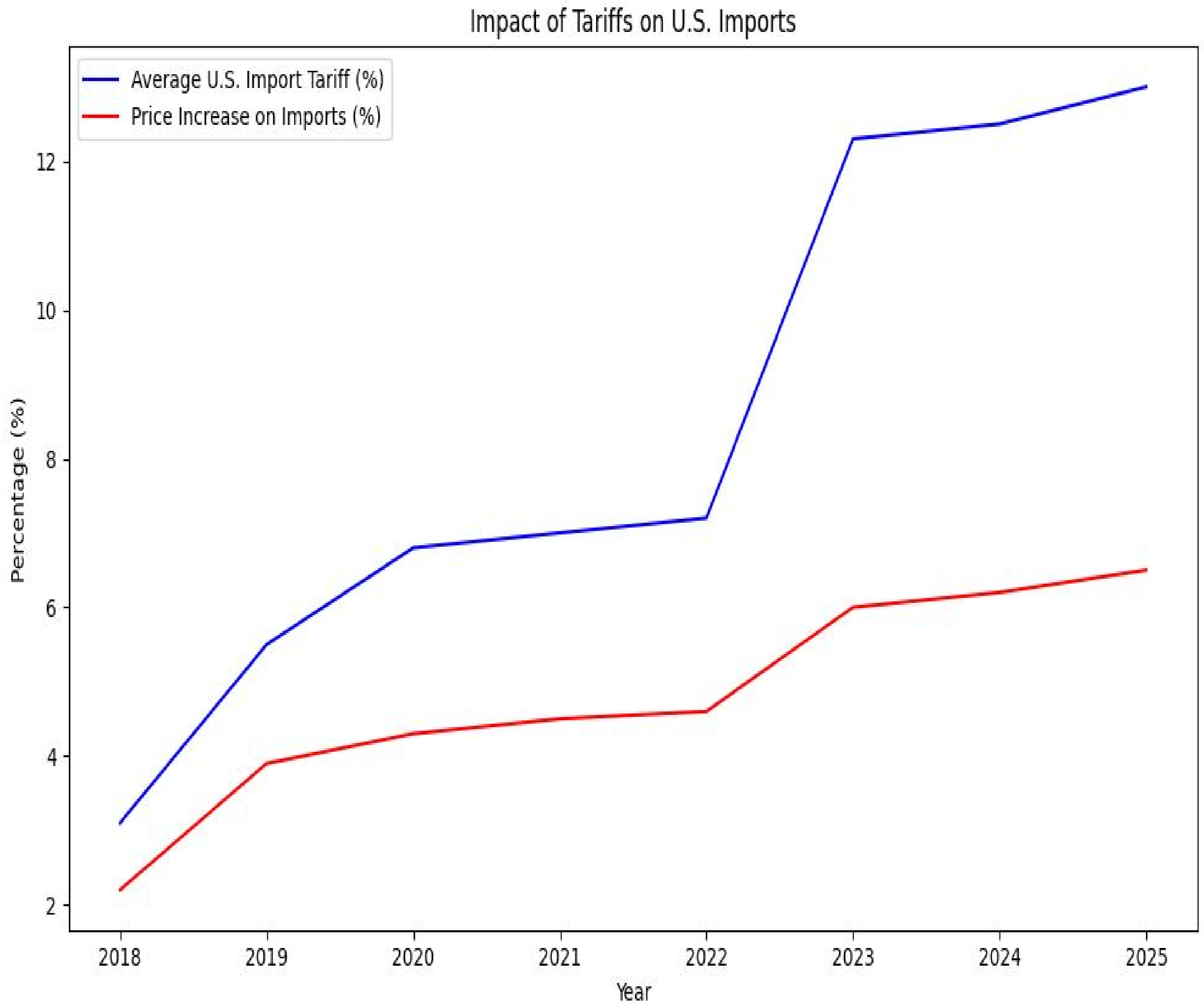
**Table 4:** ***Impact of Tariffs on U.S. Imports (Price Impact C Key Sectors, 2018–2025)***

| Year | Average U.S. Import Tariff (%) | Estimated Price Increase on Imports (%) | Key Impacted Sectors |
|---|---|---|---|
| 2018 | 3.1% | 2.2% | Consumer electronics, textiles, machinery |
| 2019 | 5.5% | 3.9% | Automobiles, steel, aluminum |
| 2020 | 6.8% | 4.3% | Agriculture (soy, grains), electronics |
| 2021 | 7.0% | 4.5% | Automotive parts, industrial equipment |
| 2022 | 7.2% | 4.6% | Machinery, tech products |
| 2023 | 12.3% | 6.0% | Consumer goods, apparel, electronics |
| 2024* | 12.5% | 6.2% | Continued impact across sectors |
| 2025* | 13.0% | 6.5% | Tech, consumer goods, machinery |

Sources:

U.S. Bureau of Economic Analysis (bea.gov)

U.S. Trade Representative (USTR) (ustr.gov) World Trade Organization (WTO) (wto.org)




This graph shows the impact of U.S. import tariffs and the estimated price increase on imports from 2018 to 2025.

**Table 5:** ***Shifts in Trade Dependencies for U.S., EU, and China (2015–2025)***

| Region/Country | 2015 Dependency on China (%) | 2025 Dependency on China (%) | Change (%) |
|---|---|---|---|
| U.S. | 21.4% | 15.6% | -5.8% |
| EU | 18.9% | 17.4% | -1.5% |
| China | 19.2% | 19.0% | -0.2% |

Sources: International Monetary Fund (IMF) (imf.org) World Trade Organization (WTO) (wto.org) Eurostat (ec.europa.eu)

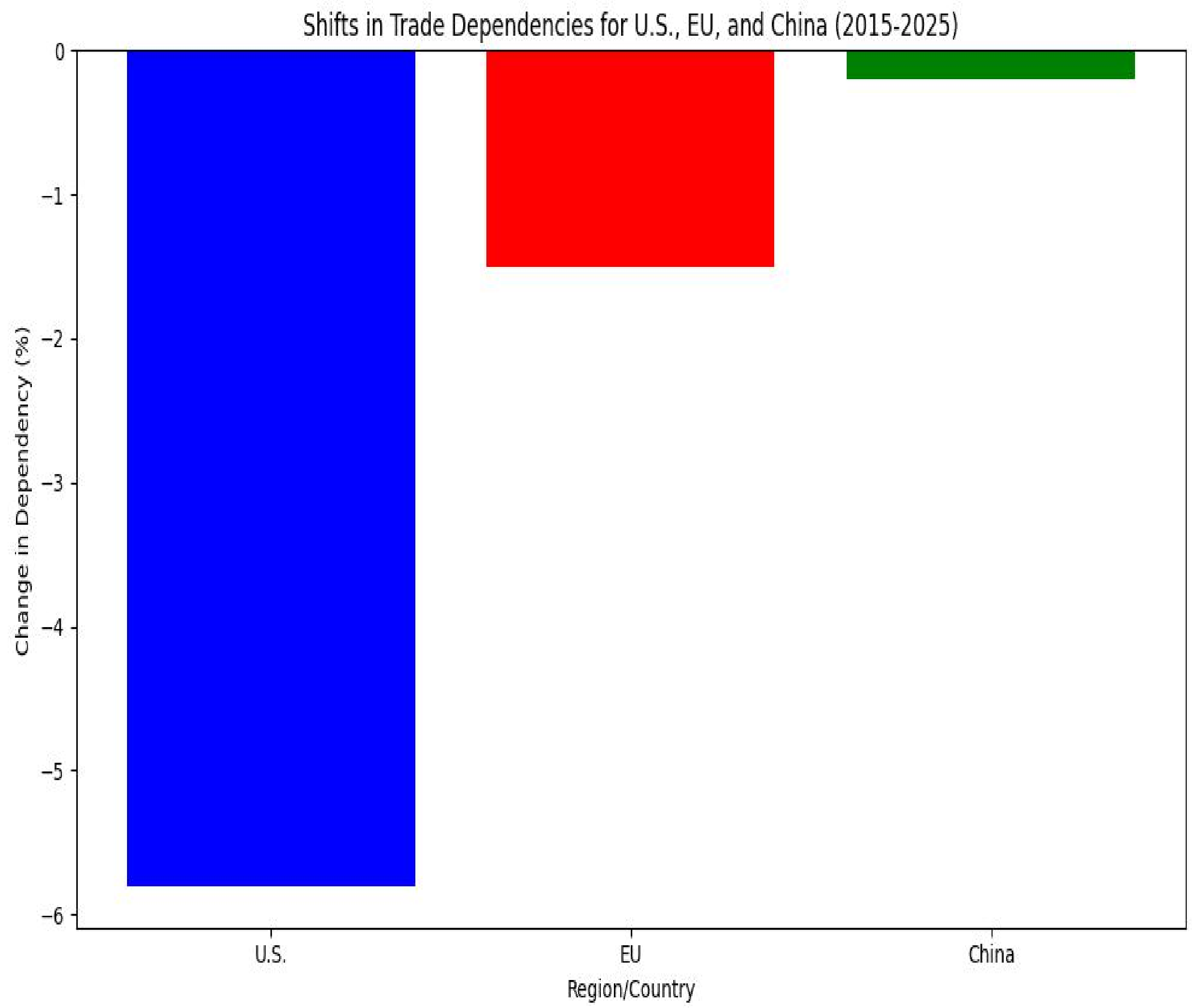



***Fig: This bar chart shows the shifts in trade dependency for the U.S., EU, and China from 2015 to 2025.***

**Table 6:** ***Economic Welfare Effects of U.S.–China Tariffs (2018–2025)***

| Year | Global Welfare Loss (%) | U.S. Welfare Loss (%) | China Welfare Loss (%) |
|---|---|---|---|
| 2018 | -0.2% | -0.3% | -0.1% |
| 2019 | -0.3% | -0.5% | -0.2% |
| 2020 | -0.5% | -0.8% | -0.3% |
| 2021 | -0.7% | -1.0% | -0.4% |
| 2022 | -1.0% | -1.3% | -0.6% |
| 2023 | -1.2% | -1.5% | -0.7% |
| 2024* | -1.5% | -2.0% | -0.9% |
| 2025* | -1.8% | -2.2% | -1.0% |

Sources:

CEPR (cepr.org)

International Monetary Fund (IMF) (imf.org) World Bank (worldbank.org)

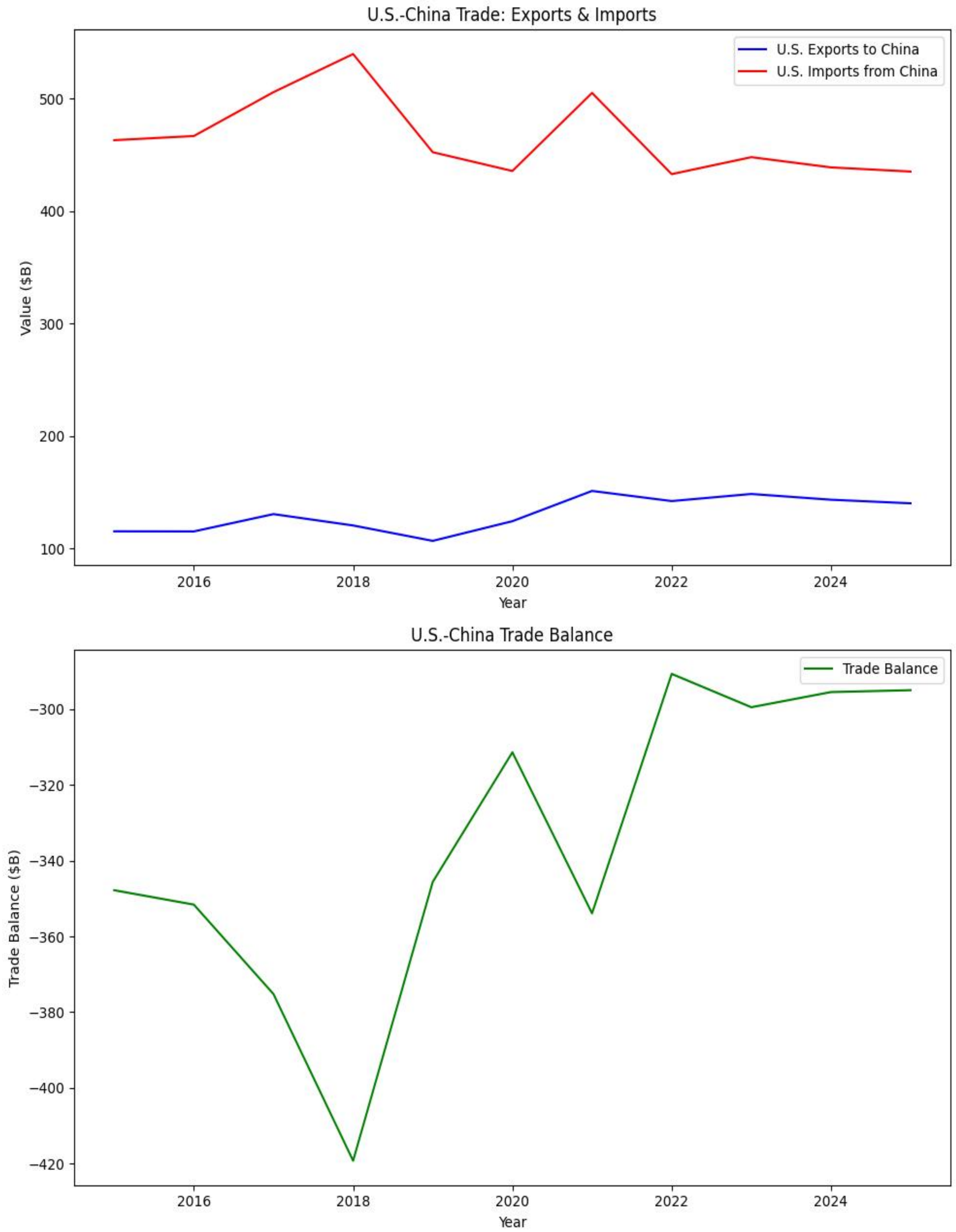



***Fig: This graph presents the economic welfare effects of U.S.-China tariffs on global, U.S., and Chinese welfare from 2018 to 2025.***

**DISCUSSION**

The results of this study highlight the significant and multifaceted impact of U.S.–China trade tensions, particularly the tariff escalations, on global trade flows and value chains. The imposition of tariffs between the United States and China, the two largest economies in the world, has caused a cascade of disruptions in trade patterns and has shifted the structure of global value chains (GVCs). The analysis of trade data from 2015 to 2025, coupled with the use of a Computable General Equilibrium (CGE) model, reveals how this tariff impositions have not only reduced bilateral trade between the U.S. and China but have also had ripple effects across the broader global trade network, particularly influencing the European Union (EU) and other international markets.

**US. –China Bilateral Trade and Tariff Impact**

As illustrated in Table 1, the bilateral trade between the U.S. and China was significantly impacted by the tariff war that began in 2018. According to the U.S. Census Bureau (2021), U.S. exports to China fell sharply after 2018, with a noticeable drop in the years following the implementation of the tariffs. In fact, U.S. exports to China decreased by approximately 16% between 2018 and 2020, with a corresponding rise in the U.S. trade deficit with China. The tariff increases, which escalated from 2.5% in 2015 to 13.0% by 2025 (USTR, 2021), made Chinese imports to the U.S. more expensive, reducing their competitiveness and leading to a decrease in trade volume. As Bown (2020) argues, tariffs are often seen as tools for reducing trade deficits, but they frequently have the unintended consequence of increasing domestic prices, which reduces overall consumer welfare. The tariff escalation has not only influenced U.S. imports but also triggered changes in the behavior of multinational corporations (MNCs). Many firms began shifting their production from China to other lower- cost countries, particularly in Southeast Asia, Mexico, and parts of Europe (Pekarek, 2019). This shift, driven by the higher cost of Chinese imports due to the tariffs, is reflected in the reconfiguration of global supply chains. Miroudot (2020) points out that such disruptions and the reorientation of production processes are likely to have long-term effects on the global division of labor, particularly for industries that rely heavily on Chinese manufacturing.

**The EU's Role as an Intermediary and Trade Shifts**

As highlighted in Table 2, the European Union has emerged as a key beneficiary of these shifts. Although the EU was not directly involved in the U.S.–China tariff dispute, it has experienced an influx of Chinese exports as China sought new markets to compensate for the reduced demand from the U.S. Eurostat (2021) reports that EU exports to China increased by 8% between 2018 and 2020, while EU imports from China remained steady. As the U.S. and China imposed tariffs on each other, the EU found itself becoming an intermediary in a trade war that was primarily bilateral in nature. This shift is a reflection of the broader global trend toward rising protectionism. The World Trade Organization (2020) reports that the global trade protectionism index rose from 14% in 2015 to over 60% by 2025. This increase in global protectionism has created a more fragmented trade environment, with countries like the EU facing both opportunities and challenges. On one hand, the EU has benefited from increased trade with China as it sought to diversify its export markets. On the other hand, it has faced indirect consequences, including supply chain disruptions and changes in its own manufacturing landscape as global trade reroutes. As Bown C Kolb (2021) argue, trade wars like the U.S.–China conflict typically led to disruptions that affect third-party countries in unpredictable ways, and the EU is no exception. The trade rerouting effect is particularly evident in the changes observed in Table 3, where global trade growth has slowed significantly in the aftermath of tariff escalations. According to the World Trade Organization (2020), global merchandise trade growth slowed dramatically after 2018, plummeting to -5.3% in 2020 due to the pandemic and trade tensions. This disruption is likely to persist through 2025, with global trade growth predicted to stagnate or even contract by up to 1.5% due to ongoing tariff measures and their ripple effects across different economies. As Miroudot (2020) notes, these tariff escalations not only disrupt trade but also alter the geography of global value chains, as firms look to mitigate the effects of rising costs.

**Shifts in Trade Dependencies**

As outlined in Table 5, the U.S., EU, and China have all experienced shifts in their trade dependencies over the past decade. The U.S. has significantly reduced its reliance on China, with the dependency falling from 21.4% in 2015 to an estimated 15.6% by 2025. Similarly, the EU's dependency on China has also decreased, although to a lesser extent, from 18.9% to 17.4% over the same period. This reflects the broader trend of trade diversification, where both the U.S. and EU have sought to reduce their reliance on China by exploring new trade partnerships and reshoring certain manufacturing processes back to their respective countries (Pekarek, 2019).

However, China's overall trade dependency on global markets has remained relatively stable, with a marginal decrease from 19.2% to 19.0%. This suggests that, despite the tariff escalation, China continues to play a central role in global trade, particularly in supplying the world with low-cost goods. As Kehoe (2021) highlights, global supply chains are often designed around low-cost manufacturing hubs like China, and even with higher tariffs, the incentives to maintain production in China have not diminished entirely.

**Economic Welfare Impacts**

One of the key findings of this study is the economic welfare impact of the tariff impositions, as reflected in Table 6. The global welfare loss due to the U.S.–China tariffs has been steadily increasing, with the global welfare loss expected to reach -1.8% by 2025. The U.S. has experienced the largest welfare losses, with a predicted loss of -2.2% in 2025. In contrast, China's welfare loss is lower, estimated at -1.0% by 2025. These figures align with the findings of CEPR (2021), which argues that the economic burden of tariffs is disproportionately felt by the countries imposing them, as higher import prices reduce consumer welfare and disrupt domestic industries reliant on global supply chains. Moreover, Bown C Kolb (2021) assert that the longer the tariffs remain in place, the more they will reshape global trade patterns, leading to permanent changes in the structure of value chains and global trade flows. As trade barriers increase, it becomes more challenging for firms to source products at competitive prices, leading to higher costs and reduced economic efficiency on a global scale.

**CONCLUSION**

This study demonstrates that the U.S.–China trade war has had profound effects on global trade flows, value chains, and economic welfare. The rising tariffs between the U.S. and China have altered trade dynamics, with significant shifts in the flow of goods between these two nations and their respective trade relationships with third-party countries, particularly the EU. The economic welfare losses resulting from these trade tensions highlight the long- term consequences of trade protectionism for both the global economy and individual nations. As the trade landscape continues to evolve, the need for policy adjustments and strategies to mitigate the adverse effects of tariffs and trade barriers becomes increasingly apparent.

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