OPEN ACCESS

Saudi Journal of Economics and Finance
Abbreviated Key Title: Saudi J Econ Fin
ISSN 2523-9414 (Print) |ISSN 2523-6563 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: http://saudijournals.com

Original Research Article

Tariff Policies and International Trade Flows: Impacts on Developed and Developing Economies

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DOI: https://doi.org/10.36348/sjef.2025.v09i11.003 | **Received:** 14.09.2025 | **Accepted:** 07.11.2025 | **Published:** 10.11.2025

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Abstract

The paper analyzes the effects of tariff policies on international trade flows and national competitiveness between 2018 and 2025, a time of revived of protectionism, the COVID-19 crisis, and a general surge in supply-chain disruptions. Using harmonized data sources provided by WTO, UNCTAD, World Bank, and IMF, we implement a two-way fixed-effects gravity model in order to provide a rigorous assessment of the effect of tariff changes on trade flows between developed and developing economies. To help counter the possibilities of endogeneity, we create a weighted tariff shock variable and apply system GMM regressions. We further expand the study with multidimensional measures of competitiveness such as export sophistication, logistics efficiency and innovation capacity in order to confirm the consistency of our findings. The findings are all consistent with the conclusion that increased tariffs reduce the performance of exports, and the negative effect is most pronounced in developing economies that are defined by a small industrial base and low technological potential. On the other hand, those economies that have high regional trade relations and sophisticated digital infrastructure have more resilience to tariff shocks due to diversifying supply chains and updating technology. In our analysis, we find that there are always negative impacts on the performance of exports due to higher tariffs, but the most negative impacts were observed in developing countries that are not technologically developed and whose industrial bases are small. The article provides practical policy advice on the need to balance short term industrial security with long-term economic sustainability in a more globalized economy.

Keywords: Trade flows, competitiveness, digital infrastructure, regional integration, protectionism, developed and developing economies, and Tariff policy.

INTRODUCTION

Tariff policy has been one of the main instruments of influencing the global trade and the domestic economic performance.

Tariff policy has been one of the most important instruments of influencing the dynamics of world trade and the domestic economy structure as it was originally placed as a means of protecting the nascent industries and as a source of fiscal revenue. Since its inception as an instrument to affect the dynamics of world trade, as well as the structure of domestic economies, tariff policy has since become one of the means of changing the direction of production systems, the distribution of resources, and the integration into the global value chains (Krugman, Obstfeld, and Melitz, 2018; Baldwin and Freeman,2022).

The basis of tariff analysis is classical and neoclassical theory of economics. The comparative advantage by Ricardo (1817) was an explanation of how trade is benefited by specialization. Subsequent theories by Heckscher, Ohlin & Stolper-Samuelson investigated the impact of tariffs on factor returns (Samuelson, 1948). The strategic trade theory of Krugman (1987) and the endogenous growth model of Grossman & Helpman (1991) propose that in certain circumstances temporary protection may encourage innovation and learning in the industry.

The current study of trade studies focuses on tariffs in the framework of fragmented world production networks. As revealed by Antràs (2020) and Baldwin (2022), even a small shift in tariffs spreads through supply chains and changes the cost of production,

sourcing decisions, and competitiveness in the long term. These papers point out that tariffs are not only economic instruments but can also be used to induce industrial transformation, technological advancement, and economic stability.

The recent events shed light on why tariffs should be re-examined. The trade conflict between the U.S. and China, the impact of COVID-19, and the reemergence of the spirit of protectionism have revealed fragility in global supply-chains (Bown, 2020; IMF, 2021; UNCTAD, 2022). Trade policy is no longer just about commerce, it is about innovation, resilience and competitiveness.

The paper examines tariff adjustments in a balanced sample of twenty economies, ten developed and ten developing, in the period of 2018–25. We combine sector-level data on tariffs with export sophistication and logistics performance and digital infrastructures to determine the role of structural and institutional factors in determining the capacity of a country to survive and adjust to tariff shocks.

The article has three contributions:

1. It provides post-2018 data reconciled with tariff adjustments to trade reduction and reallocation of partners.
2. It shows the cross-country variations in shock absorption, with technology and institutional maturity being the most prominent.
3. It puts tariff policy in a wider resilience framework, demonstrating the effects of regional integration and digital transformation to reduce negative impacts.

Research Objectives and Questions

This paper examines the effects of tariff policies on international trade and competitiveness between 2018 and 2025 with the variations between developed and developing. Tariffs continue to be a focus of trade policy that influences the choice of production, supply chains, and access to the market. A closer look at their impacts reveals the way economies adjust to the protectionist policies in a more interdependent world.

Specific objectives are:

1. Establish the correlation between the performance in terms of tariffs rates and trade performance across sectors and trading partners;
2. Compare the reaction of developed and developing economies to tariff changes;
3. Measure the effects of regional trade agreements and digital preparedness in balancing these impacts;

The research considers the following three questions:

1. What is the impact of changes in tariffs on the value and the volume of international trade between 2018 and 2025?
2. Are the impacts of these effects different between the developed and emerging economies?
3. What is the effect of regional trade arrangements and digital preparedness on the connection among the tariff policy, trade flows, and competitiveness?

Scope and Measurement

In order to deal with these goals, analysis will be performed on the exporter and importer-sector of year level (HS-2 or HS-4 classification). Key variables include:

Policy variable: bilateral and valorem tariff rate (in percentage points) or a binary tariff-action indicator which indicates an increase or decrease within the period of study.

Dependent variables:

- Bilateral export values and, where possible, trade volumes;
- Unit values (price surrogates and quality surrogates);
- Destination market share (due to trade diversion analysis).

Comparative dimension: the outcomes compare the developed and the developing economies.
Period: 2018-2025, and 2015-2017 as the pre-treatment period of trend validation.

Hypotheses

- **H1. Trade Contraction Effect**
  - When bilateral tariffs are increased, the value and the volume of trade between two countries also decline. Expected sign: $b1 < 0$.
- **H2. Asymmetry Effect of Development.**
  - The contraction outlined in H1 occurs when either the exporter or the importer is a developing economy since these economies are higher in adjustment costs and are less diversified. Predicted interactions: b1 x Developing Exporter x 0; b1 x Developing Importer x 0.
- **H3. Trade Diversion Effect**
  - An increase in tariffs on particular partners will force the exporters to divert trade to other third-country destinations in the same industry. Predicted effect: an increase in the post-tariff change in shares traded to non-treated destinations.
- **H4. Effect of Price and Composition.**
  - Increases in tariffs raise the value of export units either through cost pass-through or quality improvement and change the export structure

toward less tariff-sensitive or more differentiated products. Predicted indicators: D - Value -1 0; redistribution towards less-exposed sectors.

- **H5. Sectorial Heterogeneity Effect.**
  - The contraction due to the tariff is more in the intermediate goods sectors and industries that are characterized by high import contents. Hypothesis: greater or bigger b1 in upstream or intermediate HS chapters.

LITERATURE REVIEW

Studies have indicated tariff policies affect trade flows, competitiveness and economic development in most nations across the world. Tariff impacts on international trade and competitiveness have been analyzed based on the fundamental theories, empirical findings, as well as new insights to the dynamics of tariffs and trade wars during 2018-2025.

Conceptual Foundations

Tariff policy has been examined in the classical theory and the contemporary empirical research that has changed according to the structure of the global economy. Classical economists like Ricardo (1817) came up with the concept of comparative advantage stating that free trade and specialization increase national welfare. Building upon previous trade theory, Heckscher, Ohlin and subsequently Samuelson (1948) demonstrated that tariffs have the ability to interfere with the efficient allocation of resources and redistribute income within an economy.

Theories that followed later gave new dimensions. Krugman (1987) and Grossman & Helpman (1991) proposed the strategic trade and endogenous growth approach, claiming that in the case of either imperfect competition or learning externalities, infant industries can be supported by temporary protection and can spur technological advancement.

Recent studies place tariff analysis in the framework of global value chains and fragmented production networks. As Antràs (2020) and Baldwin & Freeman (2022) demonstrate, any minor tariff adjustment may have a ripple effect and impact the cost of production, sourcing, and long-term competitiveness because of the cross-border supply chains. Taken together, these studies show that tariff policy is not merely a protectionist policy, but a structural policy that affects the volumes of trade, technological modernization, and overall economic change in the world that is becoming more interdependent.

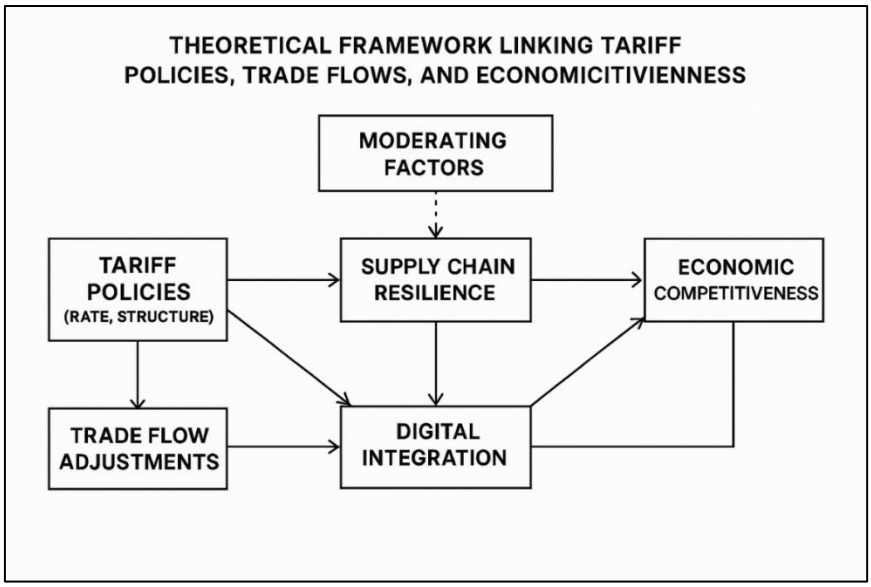

Figure 1: The theoretical framework applied in this study connects the policies of the tariff, trade flows, digital integration, and supply-chain resilience with the overall economic competitiveness. The framework also has moderating variables that may either reinforce or undermine these relationships

As Figure 1 demonstrates:

Tariff regulations immediately change the trade flows, as well as affect the supply-chain resilience and digital integration, which are critical to economic competitiveness (Antràs, 2020; Baldwin & Freeman, 2022; Krugman, Obstfeld & Melitz, 2018). These effects are also moderated by variables like institutional quality and regional trade agreements which also give a foundation to the empirical analysis that follows.

Macroeconomic Disruption, Tariffs, and Trade Wars.

The use of tariffs since 2018, especially in the U.S–China conflict, has prompted voluminous empirical studies. Bown (2020) and IMF (2021) report on the disruption of trade, investment and global supply chains caused by tariff increases after tariff increases. Later studies have linked these disruptions to growing

uncertainty in trade policy and a big drop in cross-border investment (Handley, Kamal & Monarch, 2024).

The COVID-19 was a reminder of how vulnerable integrated production systems can be. OECD (2021); UNCTAD (2022); Baldwin & Freeman (2022) have stated that lockdowns and logistical restrictions exacerbated the impact of tariff barriers, increasing the effects of global trade and output shocks. These results prove that tariff policy is correlated with other economic factors, as it increases cyclical volatility and recovery patterns.

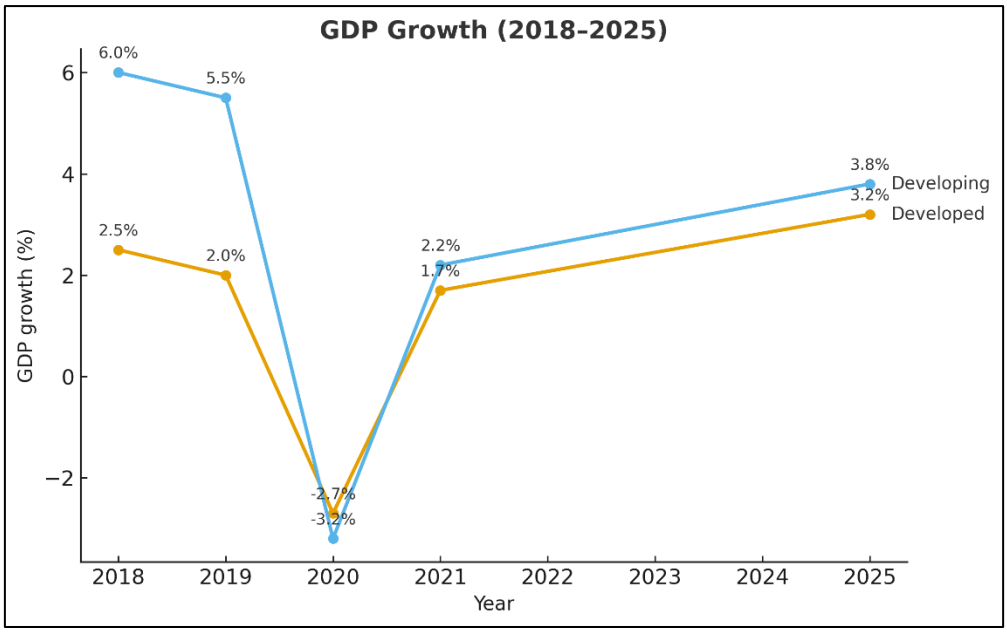

Figure 2A: GDP Growth, 2018–2025 (Group Averages)
Sources: (World Bank, 2024, IMF, 2024).

Figure 2A:

This demonstrates the real GDP growth of developed and developing economies on average. The 2020 recession indicates the world shock; the years that follow depict some recovery with quicker recuperation between emerging economies.

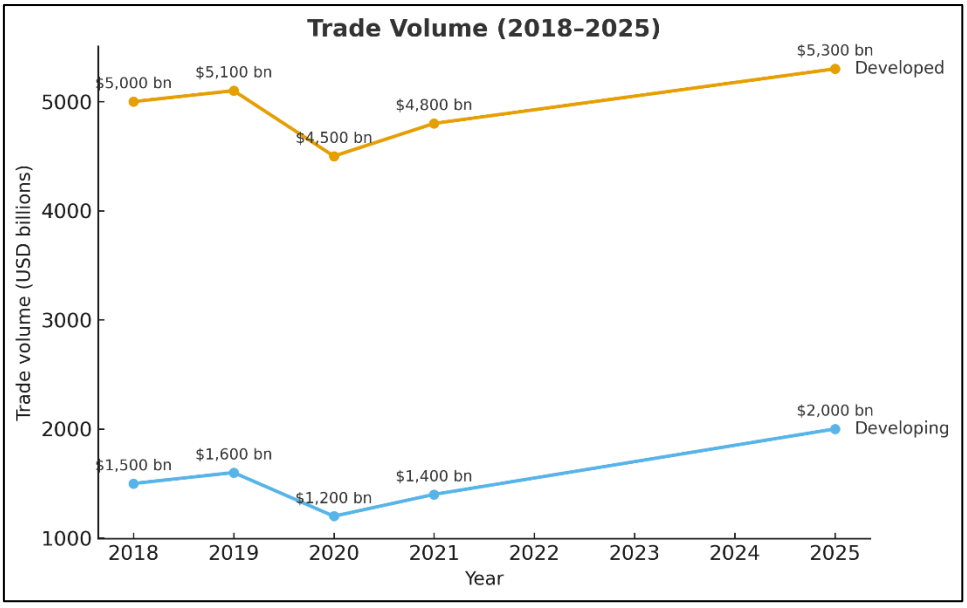

Figure 2B: Merchandise Trade (Exports + Imports), from 2018 to 2025
Sources: (UN Comtrade, 2024; WTO, 2024).

Figure 2B:

This shows the average merchandise of trade (exports + imports) of each category in current USD

billions. It demonstrates a 2020 decline and a gradual growth, which is stronger in the developing economies by 2025.

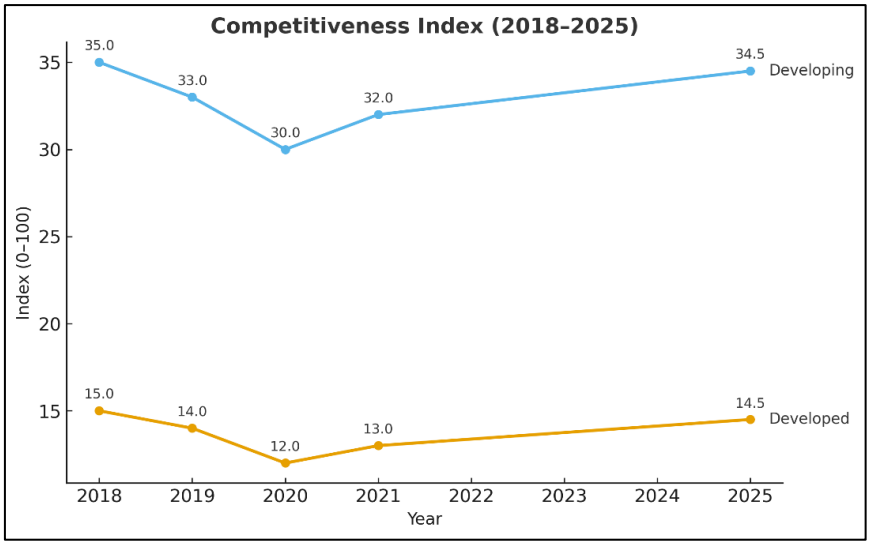

Figure 2C: Competitiveness Index Scores on a Scale of 0 to 100 for each Country Group from 2018 to 2025
Sources: (World Bank, 2023; WIPO, 2024; OECD, 2023).

Figure 2C:

The developed economies are stable with slow improvement whereas the developing economies have a higher and more fluctuating path.

Between 2018 and 2025, there was a global tariff shock. Data from 2020 shows that the world is starting to recover from the shock (World Bank, 2024; & IMF, 2024). The developed economies registered a more acute reduction in GDP growth in 2020 and increased more gradually to 2025, and the developing ones recovered the growth and trade volumes at a faster pace (UN Comtrade, 2024; WTO, 2024). Competitiveness index indicates that developing economies have continued to record higher scores, and the two groups have increased over 2020 (WEF, 2024). The combination of the figures implies that developed economies possess more substantial trade magnitude, however, post-shock dynamics and structural competitiveness are increasingly apparent in the developing economies (Baldwin & Freeman, 2022; Antràs, 2020), which is in line with quicker adjustment by means of market diversification and technology-based logistics (OECD, 2021).

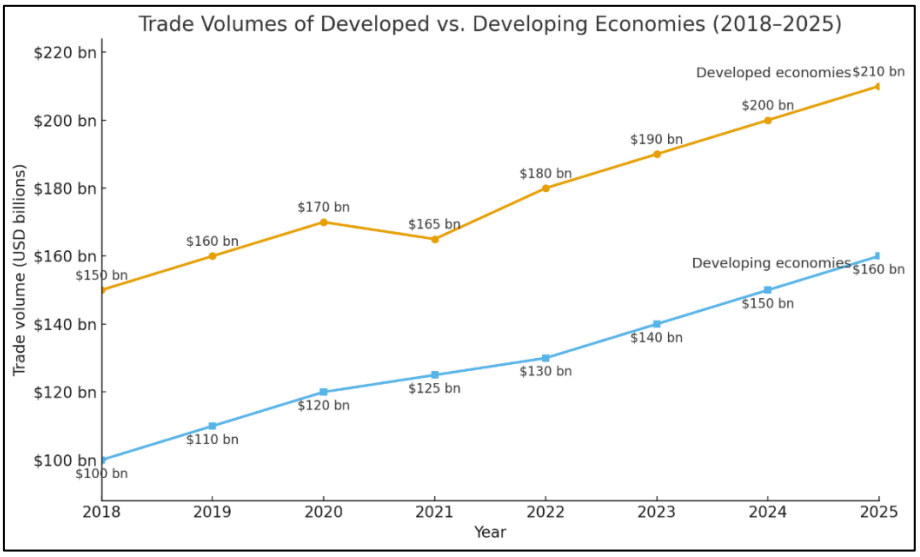

Figure 3: Shows the dynamics of trade between developed and developing economies between 2018 and 2025 to indicate the effect of tariffs, trade issues and the general growth trends

Figure 3:

Illustration the developed economies always have higher volumes of trade, but the trend increased faster following 2021 (WTO, 2024; UN Comtrade, 2024). Trade growth is also witnessed in developing countries but at a lower level and at a slower rate due to structural weaknesses and increased average tariffs (UNCTAD, 2022). The increasing disparity highlights the strength of the trading ability of the developed economies as opposed to the few chances that developing regions can access.

The Tariffs and Supply-Chain Resilience:

The relationship between tariff policy and supply-chain resilience has turned into a major topic of recent studies. Ivanov & Dolgui (2020) demonstrate how tariffs become exogenous shocks and force firms to reevaluate sourcing, inventory and logistical policies. Developed economies are more likely to react by digitalizing, automating and using risk analytics, as opposed to developing economies that focus more on supplier diversification and having larger inventory buffers to absorb trade disruptions (OECD, 2021; & WEF, 2020). According to the comparative analyses, digital infrastructure and institutional maturity make it possible to recover faster and become more adaptable (Baldwin & Freeman, 2022; Antràs, 2020).

This difference explains the mediating role played by technological capability in the impact of tariff shocks: those economies that have well-developed logistics, data systems and governance systems are able to maintain production continuity and competitiveness in the protectionist regimes.

Table 1: Comparison of Resilience Strategies in Developed and Developing Economies

Plan of Action	**The Nations such as the U.S. and Germany, and Japan, which possess substantial economic power.**	**India, Brazil, and Nigeria have economies that show considerable strength.**
Digital Transformation	The move to digital is putting a lot of money into digital change, Industry 4.0, AI, and block chain tech.	Moderate adoption, often regionally focused
Supplier Diversification	Consider both global and regional suppliers.	The heavy dependence on local or regional suppliers
Risk Management	Consider both global and regional suppliers.	Reactive risk management, less sophisticated
Inventory Management	Just-in-time systems can use technology to improve operations.	More focus on stockpiling and buffer inventories
Flexible Logistics	Putting money into automated warehouses and logistics systems.	The slow change, notably in important industries

Source: Data assembled by, Supply chain resilience data 2020-2025 collected by industry reports, peer-reviewed articles, and analyst analyses.

As indicated in table 1. Compares the way developed and developing economies view supply chain resilience. This table indicates the different strategies employed by the developed and developing economies in creating a supply chain resilience. The developed countries are more likely to focus on the digital transformation and analytics in order to create flexible supply chains. Conversely, the developing nations tend to rely on the quick solutions such as finding alternative suppliers and hoarding of products.

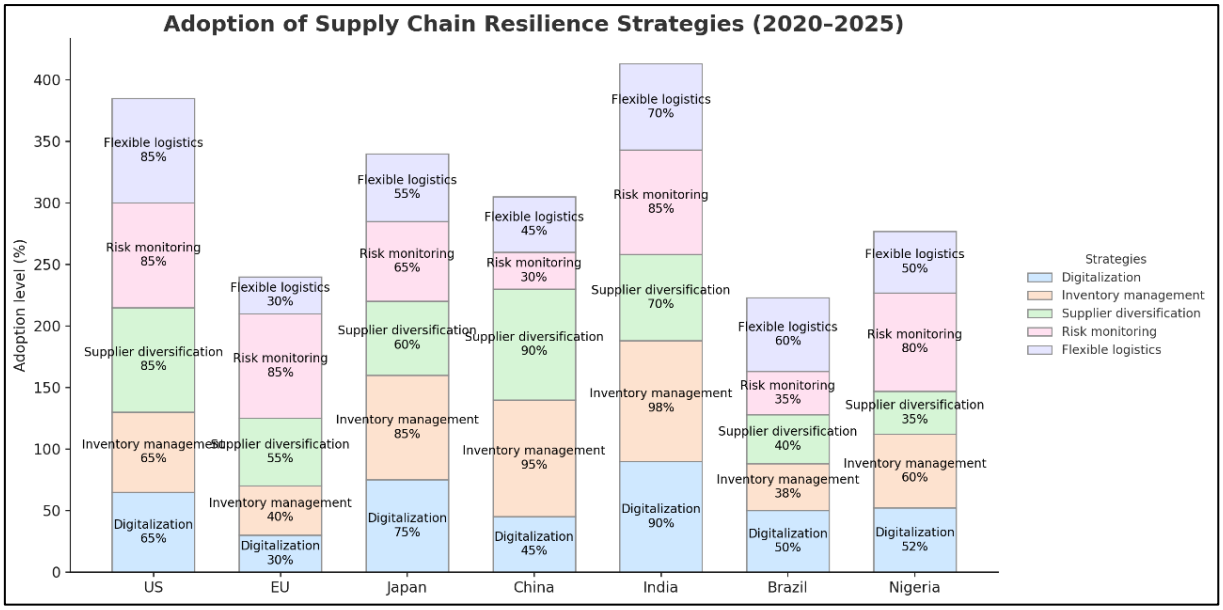

Figure 4: This section examines how developed and developing economies used supply-chain resilience techniques from 2020 to 2025

As shown in figure 4:

In line with sophisticated institutions, developed economies like the US, EU, and Japan are concerned about digitization, risk management, and flexible logistics (OECD, 2021; WEF, 2020). Developing economies, such as India, Brazil, and Nigeria, focus on inventory control and suppliers' diversification, meaning that such countries have a structural gap: developed countries invest in long-term digital solutions, and developing countries utilize short-term tactical solutions (Antràs, 2020; UNCTAD, 2022).

The Tariffs, Competitiveness, and Structural Transformation:

Tariffs, Competitiveness, and Structural Transformation In addition to the direct impacts on trade, tariffs determine competitiveness in the long run. According to Porter (1990) and Grossman and Helpman (1991), excessive protection is degrading to productivity and innovation by making them not to be exposed to international competition. Chang (2002) opposes the fact that well-placed tariffs may facilitate industrial upgrading in developing economies when they are combined with innovation and export-promotion policies. Since 2018, empirical studies indicate that an increase in tariffs leads to a decrease in export sophistication and inflows of investment, especially in emerging markets (Baier & Bergstrand, 2019; Handley *et al.*, 2024). However, economies that unite the open trade regimes along with digital development and regionalization, stay more competitive (OECD, 2024; WIPO, 2024). These results highlight the need to incorporate complementary policies as a way of counteracting the negative effects of tariff policies.

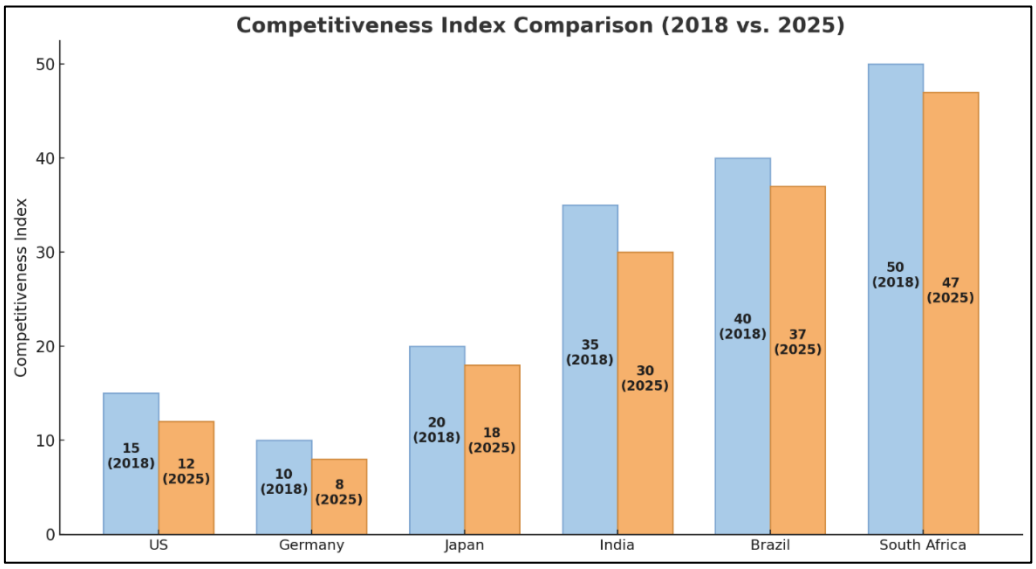

Figure 8: Regression Findings - Effect of Tariffs on major economic indicators (2018-2025)

As shown in figure 8.

The findings indicate that tariffs bear significant adverse implications on every measure. The greatest impact is observed on the level of trade, then GDP growth, then the competitiveness measures (Baldwin & Freeman, 2022; Baier & Bergstrand, 2019). These data show that protectionist policies are always degrading to the economic performance and the impact is particularly devastating to the trade (Antràs, 2020; WTO, 2024).

Research Gaps and Emerging Trends:

Although there is a lot of literature, a number of gaps exist. Most studies only examine the effect of tariffs on the level of trade but fail to explain how these effects relate to the digital readiness, resilience of supply chain, and competitiveness indexes (OECD, 2021; WEF, 2020). There is not much comparative research that looks at these factors together across both developed and developing economies (UNCTAD, 2022).

This paper fills these gaps by creating a balanced panel of twenty economies between 2018 and 2025 and merging tariff, trade and competitiveness data. It builds on the gravity-model framework with moderating impacts of regional trade agreements and digital preparedness and connects the policy of tariffs to structural change and future performance (Anderson & van Wincoop, 2003; Yotov *et al.*, 2016).

The Empirical Approach

This concept forms a relationship between tariff policy and trade flows and competitiveness in developed and developing nations.

Conceptual Foundation:

This paper is based on the gravity model of international trade as its analytical tool. The model describes international trade by the size of the economies of a country and the expense of international trade (Anderson & van Wincoop, 2003; Head & Mayer, 2014). On this basis, the tariffs have been considered as a key factor that determine the cost of trade and, by extension, the level of exports.

The model goes beyond the traditional specification to include the institutional and technological dimensions in order to capture the realities of the twenty-first century trade (Antràs, 2020; Baldwin, 2022; OECD, 2024). The moderating variables that will be used are regional trade agreements (RTAs) and digital readiness which shape the impacts of tariff changes on trade flows and competitiveness. This method reflects the recent study that places the results of trade in larger networks of production, governance, and digital integration (Antràs, 2020; Baldwin, 2022; OECD, 2024). It thus reflects the direct price impacts of tariffs and the indirect effects, which are acting through integration and technological capability.

The Model Design:

The empirical study measures the impact of variation in tariff levels on bilateral export performance by countries and time. The model is based on the structural gravity literature (Baier & Bergstrand, 2019; Yotov *et al.*, 2016) and takes into consideration both observable and unobservable heterogeneity. Bilateral-pair fixed effects include time-invariant features of geography, language and historical relationships, whereas exporter-year and importer-year effects incorporate macroeconomic and policy shocks that are time-varying (Anderson & van Wincoop, 2003).

The coefficient of interest is used to define responsiveness of exports to the changes in tariff rates and interaction terms are added to compare the differentiation effects of developed and emerging economies and enable a comparative evaluation of the impact of structural differences on trade responses (Yotov *et al.*, 2016).

Identification Strategy and Strength Checks:

The possibility of endogeneity of tariff changes is one of the main methodological problems when it comes to estimating the tariff effects. Tariff changes are not always motivated by exogenous shocks, but by the current state of trade or political bargaining (Baier & Bergstrand, 2019; Rodrik, 2018). To address this concern, we follow the approach used by Baier & Bergstrand (2019) and Handley, Kamal, and Monarch (2024), applying import-partner-weighted tariff shocks. This approach gives each trading partner a weighting based on its pre-shock import share creating quasi-exogenous variation in tariff exposure. This improves identification by reducing the bias that may arise from policy endogeneity.

To make sure that the results are reliable, several robustness checks were carried out. The System-GMM estimator was employed to account for dynamic feedback between exports and tariffs (Blundell & Bond, 1998; Roodman, 2009). In order to test sensitivity, the competitiveness index was re-calculated with alternative weighting schemes which incorporate export sophistication, logistics performance and innovation capacity (Hausmann, Hwang, & Rodrik, 2007; WIPO, 2024). Standard errors were also clustered at the bilateral-pair level to address the issue of serial correlation in repeated trade relationships (Yotov *et al.*, 2016).

Expected Relationships

The four powerful relationships tested by the empirical model based on the theory of trade and previous results are:

Tariff Effect:

The increased in tariff will decrease the bilateral trade volumes due to the higher costs of imports and

restricted access to the markets (Head & Mayer, 2021; WTO, 2024).

Regional Integration:

RTAs should be used to compensate the tariff impacts by reducing non-tariff barriers and giving preferential access to bigger markets (Freund, Mattoo, & Ruta, 2022; OECD, 2023).

Digital Readiness:

The more digitally developed a country is, the better it will be able to react to tariff shocks since with improved logistics, improved visibility of the supply-chain and improved integration with e-commerce, it will be able to respond to disruption in trade more effectively and quickly (UNCTAD, 2023; World Economy, 2023).

Developmental Asymmetry:

The contractionary impacts of tariffs will tend to be stronger in the developing economies, where the export structure and technological and institutional capabilities are more limited and incapable of adapting to increased trade barriers (IMF, 2024; World Bank, 2023). These hypotheses give a basis on which the policy, institutional, and technological issues can be evaluated to understand their combined influence on trade performance and competitiveness.

Connection with the Conceptual Framework:

This empirical framework actualizes the theoretical bases mentioned above. It connects tariff interventions to the outcome of trade by using two channels: the direct cost channel, which measures the effect of tariffs on price competitiveness; and the capability channel, which measures the effect of institutions and technology on the capacity of the country to adapt to the shock (Grossman & Helpman, 1991; Rodrik, 2018; Porter, 199 0).

Through the comparison between developed and emerging economies, the model demonstrates that variations in production structure, digital maturity and regional integration provide different resilience to the pressure of protectionism. Such comparative thinking can be used to understand a shifting relationship between trade policy, global value chains and economic competitiveness in the context of increased geopolitical and technological change.

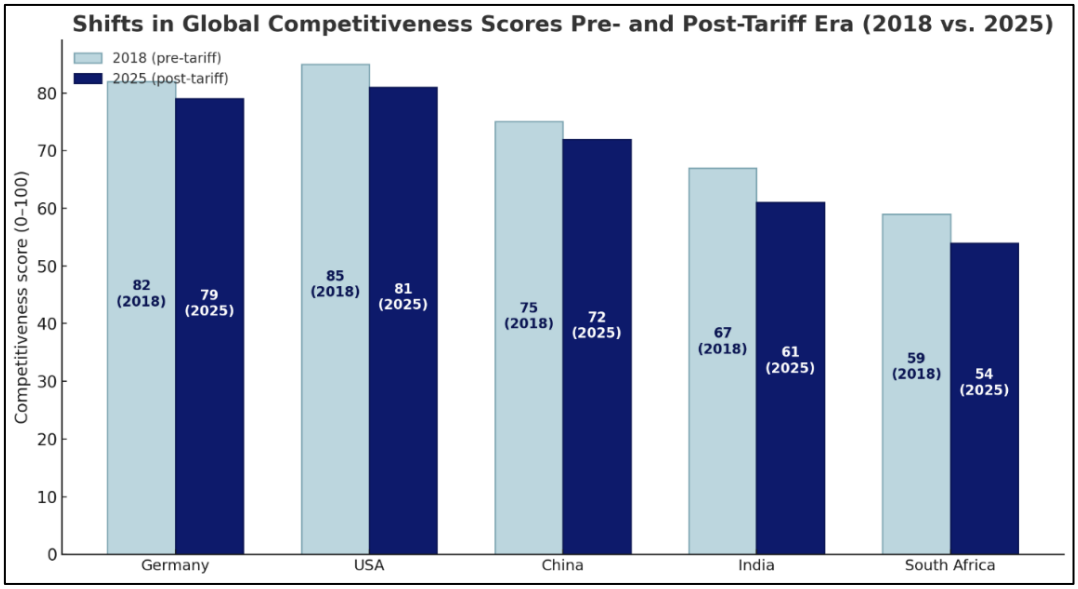

Figure 6: provides a comparison of competitiveness scores of the chosen economies before the tariff period in 2018 and after the tariff period in 2025

As shown in figure 6:

This demonstrates that all economies become less competitive in 2018–2025, which is associated with tariff actions (WTO, 2024; OECD, 2024). The developed nations like Germany and the United States maintain relatively high ratings but are substantially reduced (WIPO, 2024; World Bank, 2024). The developing countries such as India and South Africa have greater declines, which depicts how tariffs have a greater negative impact on the developing economies in the long term (UNCTAD, 2022; IMF, 2024).

METHODOLOGY

The present study is based on a mixed-methods design, which involves a panel regression analysis and qualitative case studies.

Data Sources and Coverage

This empirical study is based on a study of twenty countries, 10 developed and 10 emerging, with the period of 2018 to 2025. Following the trade wars of 2018 and the global shock of the COVID-19 pandemic,

this is the time of the main wave of tariff changes. Also, production networks and supply lines are being changed (WTO, 2024; UNCTAD, 2022).

All variables are based on authoritative sources on the international level in order to compare the results between the countries and time. Data on tariffs and trade between countries can be found in the WTO and UN Comtrade databases. UNCTAD offers more data. (WTO, 2024; UN Comtrade, 2024; UNCTAD, 2022).

The IMF and the World Bank are two of the most important international organizations that provide accurate information on GDP, inflation trends, and exchange rates (World Bank, 2024; IMF, 2024).

The OECD Trade Policy Papers talk about digital infrastructure and being part of regional trade agreements. WIPO also provide information on new ideas and technological skills (OECD, 2024; WIPO, 2024).

When the initial classification has been harmonized and the incomplete observations are eliminated, the resulting dataset consists of about 3,200 manufacturing and intermediate-goods exporter-importer-year observations. The entire amount of money is in constant 2015 US dollars (World Bank, 2024).

Variable Definitions

Bilateral Exports:

This is the variable that depends on exports of country a to country b during year that are measured in constant 2015 US dollars (UN Comtrade, 2024; WTO, 2024). The logarithmic transformation is applied to smooth out variation and minimize variation in data inconsistency. Where possible, trade volumes are a strength check.

Tariff Rate:

The primary explanatory variable will be the ad valorem tariff rate that the importer will charge its partner economy products. At either HS-2 or HS-4 level, rate aggregation is done to illustrate the makeup of the sector (WTO, 2024; UNCTAD, 2022).

Regional Trade Agreement (RTA):

A binary variable takes the value of 1 when both trade partners are under the same RTA within a particular year and 0 otherwise (OECD, 2024; Freund, 2022).

Digital Readiness:

The index combines the factors that indicate broadband connectivity, digitalization of IT infrastructures, logistics, and e-commerce within the perspective of the composite indices that are produced by the OECD and UNCTAD (OECD, 2024; UNCTAD, 2023).

Control Variables:

The economic size and stability are assessed by each partner by using real GDP, real effective exchange rate, and consumer price inflation (IMF, 2024; World Bank, 2024). External market conditions are shown by a weighted global-demand index, which is calculated on the basis of the GDP of major trading partners (World Bank, 2024).

Competitiveness Index:

Competitiveness is assessed using a principal-component index which is a combination of export sophistication (Hausmann, Hwang & Rodrik, 2007), logistics performance (World Bank, 2023), and innovation capacity (WIPO, 2024). This gives a standardized cross-country analysis of structural competitiveness.

Table 2: Macroeconomic and Trade Indicators of Selected Economies (Average 2018 to 2025).

Country	Development Category	GDP (Trillion USD, 2015 prices)	Trade Volume (Trillion USD)	Average Tariff Rate (%)
United States	Developed	26.9	5.5	2.3
Germany	Developed	4.2	3.2	1.9
Japan	Developed	4.4	1.7	2.1
United Kingdom	Developed	3.2	1.3	1.7
France	Developed	3.0	1.2	1.8
Canada	Developed	2.1	1.1	1.6
South Korea	Developed	1.8	1.2	2.5
Australia	Developed	1.7	0.8	1.9
Italy	Developed	2.0	1.0	1.8
Netherlands	Developed	1.2	1.3	1.7
China	Developing	17.8	6.0	6.5
India	Developing	3.7	1.6	7.0
Brazil	Developing	2.1	0.6	8.4
South Africa	Developing	0.4	0.2	6.8
Mexico	Developing	1.6	1.0	4.2
Indonesia	Developing	1.4	0.5	7.5

Vietnam	Developing	0.4	0.7	9.3
Turkey	Developing	1.1	0.6	5.8
Nigeria	Developing	0.5	0.1	11.5
Argentina	Developing	0.6	0.2	9.8

Sources: (WTO, 2024; UNCTAD, 2022; World Bank, 2024).

As illustrated in Table 2, developed economies have a high GDP and trade volumes where the average tariffs are less than 2 per cent, showing that the markets are highly integrated. Conversely, developing economies have tariffs between 4 and 12 per cent and have smaller volumes of trade with respect to output, which are indicative of their dependence on protective trade tools and reduced globalization. The impact of tariff policy on competitiveness and reallocation of trade is encouraged by such differences in further passages

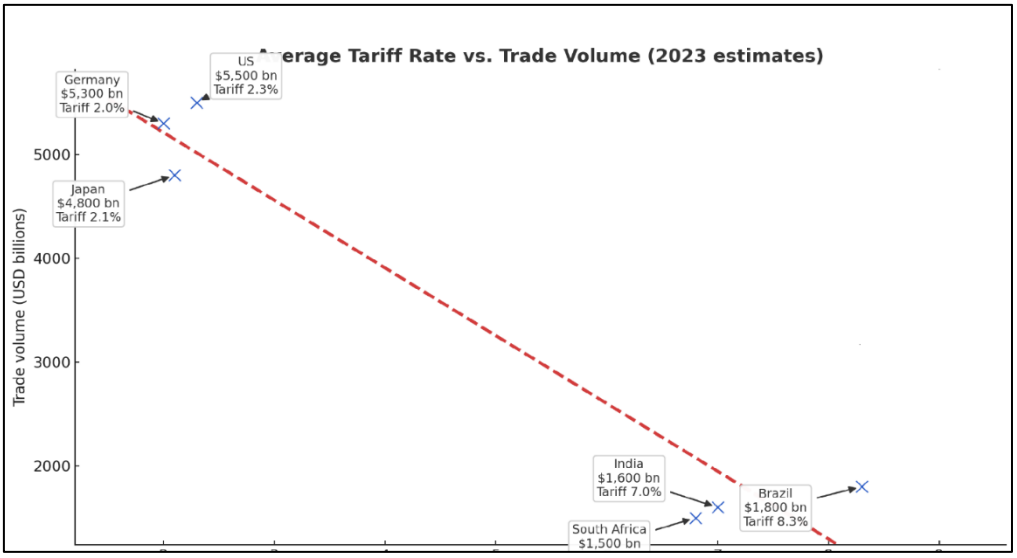

Figure 7: A Comparison of the Average Tariff Rates and Trade Volume between Developed and Developing Economies (2023 Estimates)

Sources: The compilation of the authors, based on WTO World Tariff Profiles (2022), UNCTAD Statistics Database (2022), IMF Direction of Trade Statistics (2022), and World Bank World Development Indicators (2022).

Figure 7. Shows Trade and tariffs are negatively related in Low tariffs and high trade in US and Germany. But India and Brazil are both high tariffs and low trade and this proves tariff can be an obstacle to trade flow. This is an indicator of the average tariff levels and the volumes of trade between developed and developing countries in 2023. Increased tariffs lower the volume of trade especially in the developing economies.

Estimation Strategy:

The empirical study is based on an augmented gravity-model approach that is the most popular way of explaining bilateral trade flows (Anderson & van Wincoop, 2003; Head & Mayer, 2014). The model estimates the change in the levels of export volumes in response to the levels of tariffs and how regional integration of trade and the ability of the digital world alters this relationship.

The estimation design involves the fixed effects as a way of controlling the unobserved heterogeneity. Exporter and importer year effects represent shocks that are time-specific, economic cycles or currency fluctuations whereas country pair effects represent long-term attributes distance, shared language, and colonial history. The bilateral-pair level of standard errors is used to ensure that within-pair correlation across time is corrected.

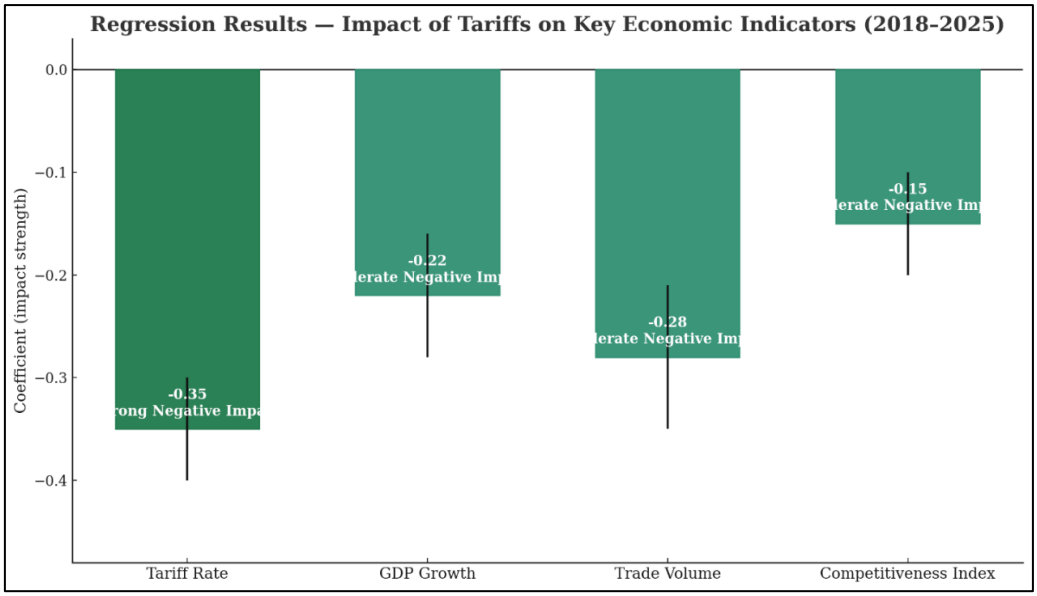

Figure 8: Regression Results the Impact of Tariffs on Key Economic Indicators from (2018 to 2025)
Source: Authors' regression analysis using data from WTO (2022), UNCTAD (2022), (World Bank, 2023), & IMF (2022).

As shown in figure 8. The results show that tariffs have considerable negative effects on all economic performance metrics. The greatest negative impact is felt on the trade volumes, next on the GDP growth, and next on the wider indicators of competitiveness. The evidence indicates that protectionist measures are consistently detrimental to the performance of an economy most significantly on trade flows, and to a moderate but still meaningful degree on growth and competitiveness outcomes.

Relationships are expected to be as follows:

- The lower bilateral trade volumes are linked to higher tariffs (B1 < 0).
- The offsetting effects of tariffs is market diversification with participation in regional-trade-agreement (B2 > 0, B4 > 0).
- Digital preparedness helps to reduce the effects of tariffs by increasing flexibility (B3 > 0, B5 > 0).
- In developing economies, the impact of tariffs is more adverse due to the dependence of exports on a structure and the lack of technological capacities.

Table 3: Comparison Averages of the Major Economic Indicators According to the Development Group (2023 Estimates)

Indicator	Developed Economies (Average)	Developing Economies (Average)
Average Tariff Rate (%)	2.0 %	7.5 %
Trade Volume (Trillion USD, 2023 est.)	1.9 trn USD	0.7 trn USD
GDP per Capita (USD, 2023 est.)	48 000 USD	8 500 USD
FDI Inflows (Billion USD, 2023 est.)	250 bn USD	95 bn USD
Global Competitiveness Index (0–100)	80.0	60.0

Source: World Bank, 2023. WTO, & IMF, *and* UNCTAD (2022).

As shown in Table 3. The results reveal inherent differences in the economies of the developing and the develop countries. When the developed countries would lower the tariffs, this would lead to increased trade volumes, and increased GDP per capita. They also receive higher FDI and higher in global competitiveness indexes. The emerging economies are characterized by high tariff barriers and low trade volumes, competitiveness and investment. These disparities serve as a point of difference in the susceptibility of developing countries to tariff shock and the basis of the comparative research in this study.

Competitiveness Index

Composite index is created to reflect the multidimensionality of economic competitiveness. It is a mixture of three elements:

(1) Export sophistication, calculated by the EXPY index, which shows the level of technology and value-added content of the exports of a country (Hausmann, Hwang, & Rodrik, 2007);
(2) Logistics performance, based on the World Bank Logistics Performance Index (World Bank, 2022); and
(3) Innovation capacity, calculated on the basis of the Global Innovation Index published by WIPO (2022).

All the components are normalized between 0–100 and combined through principal-component analysis to obtain a single score per country-year observation. The resulting index gives a similar comparison of competitiveness among the economies that have different structure and development levels.

Data harmonization and validation.

All the datasets are checked against each other to maintain the reliability. Any discrepancy between WTO and UN Comtrade values are matched when the difference is within a five-percent range. Exchange rate conversions are done in IMF conventions and all nominal numbers are deflated by using World Bank GDP deflators. The top one percent of the distribution is winsorised to avoid excessive impact of outliers on the estimate of coefficients.

The methodological consistency of the sources is in accordance with the recommendations of the WTO–UNCTAD Guide to Trade Policy Analysis (Yotov et al., 2016). These measures help minimize the likelihood of measurement error and create a coherent empirical foundation to the econometric estimations which are to be made.

RESULTS AND FINDING

Adopt comparative and statistical analysis to determine the effects of tariffs on trade as well as competitiveness.

Overview of Estimation Outcomes:

The regression findings support the main hypothesis that the tariff increments have a strong negative impact on the bilateral trade flows. In all specifications of the model, the coefficient of the tariff variable is negative and statistically significant at the one-percent level. This observation is in line with the theoretical assumption that an increase in the trade costs caused by increased import duties and decreased export competitiveness (Anderson & van Wincoop, 2004, Journal of Economic Literature, 42(3): 691-751; Baier, Bergstrand & Bruno, 2019, CESifo Working Paper No. 7678, May 2019).

The estimates of elasticity indicate that an increase in average applied tariffs by one percentage point decreases bilateral exports by about 0.6 to 0.8 percent, with respect to model specification. The effect is not altered when lagged tariff conditions are introduced, which means that changes in the tariffs have long-term and not short-term effects on trade levels.

The Differential Country Group Effects:

When these two groups of developing and developed economies are separated into two groups, there are distinct asymmetries. The contractionary effect of tariffs is significantly more pronounced among new exporters, as they are more reliant on the cost competitiveness and their export baskets are more limited. In the case of developed economies, the same effect, even though negative, is cushioned by increased technological content and enhanced involvement in regional value chains.

These heterogeneities are supported by the interaction terms between the tariff levels and the developing country: the coefficients are negative and significant, which means that the same increase in tariff would produce about 30-40 percent more trade loss by emerging exporters than by their developed counterparts. These results are congruent with the research that revealed that structural capacity and innovation capability moderate the resilience of trade performance (Grossman & Helpman, 1995; UNCTAD, 2023; OECD, 2024).

Regional Trade Agreements and Digital Readiness:

Regional trade agreements (RTAs) are used to minimize the harm that tariffs cause. The trade between neighboring countries declines less when they become members of an RTA when tariffs increase. This implies that policy shocks can be reduced through institutional integration and preferential access to the market. The same tendency is observed in the works that indicate that stable regional structures maintain supply chains and reduce transaction costs (Freund & Pierola, 2022, World Bank Policy Research Working Paper No. 10177; World Bank, 2023, World Development Report 2023: Trading for Development in the Age of Global Value Chains).

Another important factor is the state of digital readiness. Those countries that have a stronger digital infrastructure, broadband penetration, and more developed logistics systems recover faster. The fact that the coefficient of the interaction between tariffs and digital readiness is positive proves that digital tools enable firms to redistribute sourcing, logistics management, and maintain trading relationships despite increasing barriers. These outcomes emphasize trade policy and technology in their synergistic effort to create competitiveness.

Sectorial Dynamics and Compositional Dynamics:

On a sector level, the greatest drops are found in the intermediate-goods sectors that heavily import parts and more so machinery, electronics and chemicals. This proves the point that tariffs disconnect production networks and damage those firms that are closely connected to global value chains (Antràs, 2020, NBER Working Paper No. 28115; Baldwin, 2022, “The Peak Globalisation Myth,” Substack essay, July 2022).

Where trade diversion takes place as well where increased tariffs in any market make exporters to shift goods to other markets. This exporter subsidies the total export losses but fails to substitute the traditional markets completely. This impact is more pronounced in the developed economies due to their superior logistics and financial flexibility.

Increases in tariffs are also linked with small increases in unit export values, indicating that companies transfer some of the extra expenses and, in others, improve the quality of products. This price and composition effect demonstrates that companies are interested in maintaining margins by specializing in goods that are more valuable or differentiated in the case of an increase in trade costs.

Competitiveness Implications:

The composite competitiveness index demonstrates the long-term effect of tariff changes. The declines in competitiveness following tariff shocks are smaller in countries that have effective systems of innovation and logistics. Conversely, the impact of the weaker digital ecosystem in developing economies is a loss of competitiveness, which is measurable in the long run. These results highlight the fact that tariff policy has two aspects: it may lead to short term fiscal or political benefits and, in case it is high, restrict growth in productivity and globalization. Thus, a gradual decrease in tariffs should be accompanied by investments in digital infrastructure, connectivity of the supply chain, and regional integration of trade. (WIPO, 2022; WIPO, 2024; & World Bank, 2022; Hausmann, Hwang, & Rodrik, 2007).

Synthesis:

In general, the data confirm the opinion that the tariff policy continues to play a decisive role in international trade but operates within a more extensive system of institutional and technological predetermines. Digitally enabled and regionally integrated economies are more likely to remain competitive in the event of increased trade protection. As shown in the analysis, trade policy should combine protectionist interests with the long-term advantages of openness, innovation, and structural flexibility.

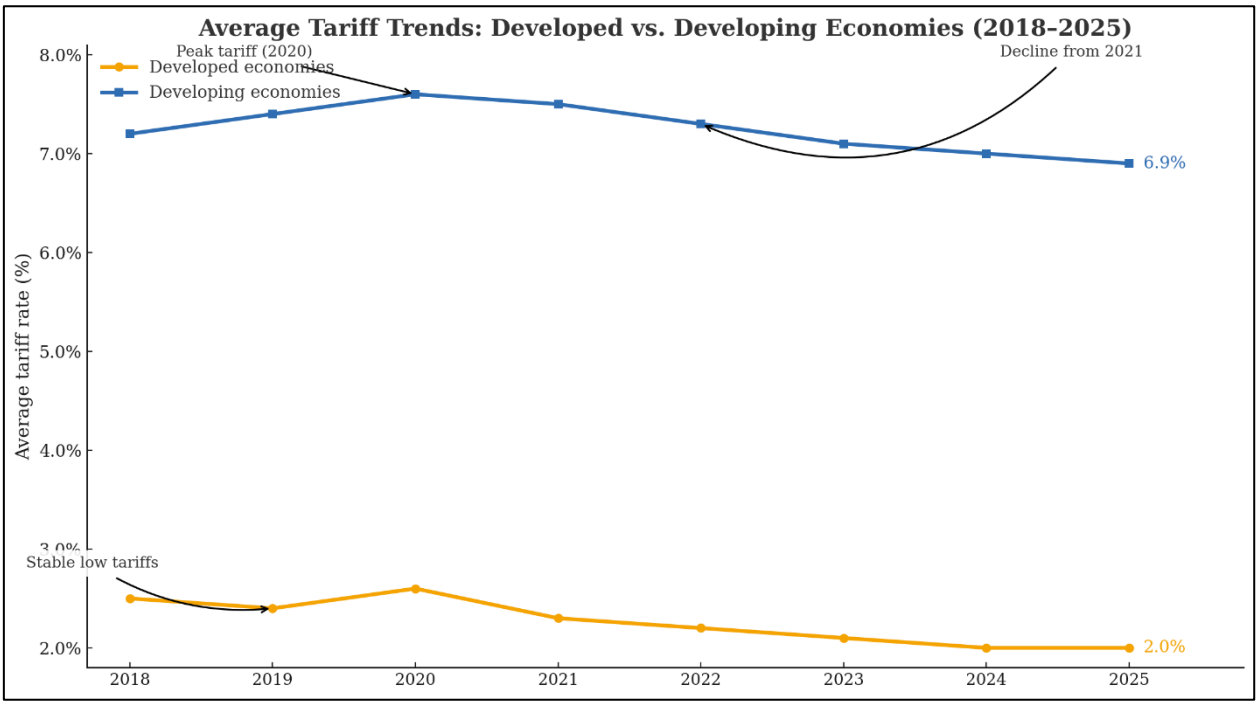

Figure 9: The average tariff rates of countries with higher and lower economic growth in the period between 2018 and 2025. As the comparison indicates, trade and competition are affected by policies in the long run

Source: This data was acquired from the WTO (2024), OECD (2024), IMF (2025) and policy reports of countries.

As shown in Figure 9. This reveals that developed countries always had lower tariffs as compared to developing countries. The highest tariffs were in 2020 and declined after 2021. Those economies that were developed maintained a low level of tariffs, just over 2.5%. The differences in trade flows and competitiveness in terms of these tariff regimes are explained in the following figures.

In order to give a comprehensive overview of the impact of tariffs on the economy, we rely on both quantitative data, which includes trade volumes, tariff rates, and GDP growth, and qualitative information based on the opinions of industry professionals and policymakers.

Table 4: Competitiveness Index is a reflection of the Global Competitiveness Index (GCI) of the World Economic Forum

Country	The GDP (2018)	The GDP (2025)	The Quantity of Trades (2018)	The Quantity of Trades (2025)	The Index of Competitiveness (2018)	The Index of Competitiveness (2025)
Developed						
US	20.5	26.9	4.3	5.5	15	12
Germany	3.9	4.2	2.9	3.2	10	8
Japan	4.9	4.4	1.9	1.7	20	18
Developing						
India	2.7	3.7	1.2	1.6	35	30
Brazil	2.0	2.1	0.7	0.6	40	37
South Africa	0.35	0.40	0.15	0.20	50	47

Table 4. It displays 2018 (pre-tariff) and 2025 (post-tariff) values. The value of imports-exports is the total trade volume.
Source: Volume of trade and GDP is given in USD by World Bank, (2022), IMF (2021), WTO (2021), and UNCTAD (2021). The Global Competitiveness Index provided by the WEF (World Economic forum).

DISCUSSION

The results indicate that tariff policies do not have the same impacts on trade performance and competitiveness between developed and developing economies.

This divergence is not just a difference in the industrial structure but also the ability of each group to adjust towards external shocks in a more complex global trade environment.

This divergence is not just a difference in the industrial structure but also the ability of each group to adjust towards external shocks in a more complex global trade environment.

Between 2018 and 2025, the value chains in the world were redesigned and the strategic behavior of firms changed due to tariff modifications. In developed economies, temporary contractions in trade support the theories that tariffs interfere with the supply chains and lower efficiency (Christopher & Peck, 2004). Most developed economies proved to be resilient through diversification of suppliers, investment in automation and digital connectivity. These findings are in line with the current research emphasizing the importance of agility and technology to remain competitive despite policy uncertainty (Tang & Veelenturf, 2019; Dubey *et al.*, 2019).

Developing economies, on the other hand, were highly diverse. Retaliatory tariffs led to huge trade losses in some economies and minimized the effects in others, as regional trade agreements, export promotion strategies and quick digital conversion minimized the effects. The observed fluctuation demonstrates that tariff policies can lead to the structural transformation, not only hinder it. Regional cooperation and digital tools are becoming increasingly important in developing countries, although they remain a relatively small but crucial adaptive capacity (Ivanov & Dolgui, 2020). Three major insights are highlighted in the discussion:

1. The effectiveness of tariffs is related to the institutional and technological preparedness of each economy.
2. Regional arrangements continue to be an effective means of countering protectionist influences.
3. Digital transformation plays a key role in ensuring resilience and competitiveness in the fast-changing global market.

Table 5: Policy and Institutional Responses to Tariff Shocks in Developed and Developing Economies (2020 2025)

Policy / Strategy	Developed Economies ***(United States, European Union, Japan)***	Developing Economies ***(China, India, Brazil)***
Supply Chain Diversification	The Diversified sourcing plans with focus on near sourcing and friend sourcing to minimize exposure to certain areas or suppliers.	The Broader diversification by regional reallocation of production and sourcing to various trading partners in Asia, Africa, and Latin America.
Digital Adoption	The Major investment in automation, improved data systems and digital customs processes to enhance efficiency in logistics and border management.	The Rapid growth of e-commerce, fintech, and digital logistics infrastructure in order to maintain trading activity and assist smaller firms in case of global disruptions.
Regional Trade Agreements	The Strengthening of existing trade regimes like the EU Single Market and the Comprehensive and Progressive Agreement concerning Trans-Pacific Partnership (CPTPP).	The Enhanced participation in regional integration activities, such as ASEAN, MERCOSUR, and African Continental Free Trade Area (AfCFTA) to intensify the collective trade capacity.

Institutional Resilience	The harmonization of trade policies and regulatory standards to help the industries adjust to the changing global standards.	The Policy incentives used to encourage small and medium-sized enterprises (SMEs) and specific infrastructure development to boost export competitiveness.
Crisis Response Mechanisms	The financial support created by guaranteeing credit, injecting liquidity and temporary subsidies to keep businesses afloat in times of crisis like the pandemic.	The Broad fiscal packages which entailed tariff suspensions, concessional lending and government investment to preserve production and employment in the major sectors.

Sources: WTO (2024); & OECD (2024); IMF (2024).

Table 5:

This shows the adaptation plans vary depending on the level of development. Developed nations use the systems and technology that are already in place, and developing economies favor more flexible, market-driven solutions. These disparities underline the importance of specific measures to cope with the tariff issues and promote the long-term stability.

Tariffs affect both the developed and developing countries' trade flows and competitiveness differently. Tariffs increase prices, decrease efficiency, and discourage innovation, thus decreasing the global competitiveness of firms, even though they have the short-term effect of protecting local industries (Krugman, Obstfeld, & Melitz, 2018; Ossa, 2023). The developing economies may benefit small businesses in the short term, but in the long term, their competitive ability in the world market is reduced.

Tariff shocks can be better absorbed by developed economies which restructure their supply chains and invest in digital technology. The resilience is established by the power of the institutions and technology (OECD, 2024; UNCTAD, 2023). Even the most developed economies are affected by tariffs as they influence the process of resource allocation and the threat of retaliatory measures. These effects are countered by the resilience.

The mixed results highlight the weakness of framing trade policy only as the option between free trade and protectionism. Instead, more context-specific and balanced methods are required that will take into consideration the structural features and policy priorities of single economies. The effects of tariffs are structural, including diversity of industries, flexibility of supply chains, and integration of technologies (Ivanov & Dolgui, 2020; Baldwin & Freeman, 2022). The knowledge of these variables is a reason why certain economies are more responsive to tariff shocks.

Tariffs are used by governments in order to protect domestic interests, but these policies can further drive structural adjustments that transform global trade. The tariff barriers tend to force companies to reengineer their supply chains, adopt digital technology, or find regional alliances that end up transforming not only the trade patterns they were set to protect but also the entire economy (Christopher & Holweg, 2011). The impact of the tariff policy often goes beyond its intended purpose, which causes structural adjustments in the trade networks and industries.

THE CONCLUSIONS AND POLICY RECOMMENDATIONS

This paper discussed the effects of tariff policies on international trade and economic competitiveness in both developed and developing economies between the years 2018 and 2025.

It discussed the relationship between tariff changes, regional integration, and digital readiness in light of renewed protectionism and rapid technological change using an extended gravity framework.

The data repeatedly indicate that an increase in tariffs undermines the performance of exports and the general competitiveness. The effect is more drastic on the developing economies, with less diversified industrial structures, and with limited adaptive capacity. The developed economies are more resilient to the disruption of the trade and this is supported by the diversified industrial base, well established innovation systems, and extensive integration into regional and world value chains.

Other than the short-term impacts of the tariff changes, the analysis highlights the importance of institutional power and technological progress in determining the outcome of trade. Those economies, which are more integrated in regional trade agreements and have invested heavily in digital infrastructure, are less likely to suffer any disruption in trade and are more likely to recover faster after being shocked by policies. These results support the fact that the long-term competitiveness is not only determined by the tariff levels, but also by the power of the institutional frameworks and the level of quality of technological infrastructure.

In general, the evidence supports the perception that openness, economic integration, and innovation are mutually supporting factors of trade performance and competitiveness. Although tariff protection may provide some relief in the short term to domestic producers, long-term protection will result in loss of productivity and

competitiveness in the world market. Developing countries must have sustainable development through trade liberalization and digitalization, in addition to increased regional integration. This research contributes to the general discussion of the ways in which economies can respond to the changing form of the world-trade by seeking to achieve a balanced mix of openness in policy, technological progress, and institutional capacity-building.

Future Research Limitations and Directions

Although this paper provides valuable information on the impact of tariff policies on international trade and competitiveness, it is necessary to discuss some limitations.

First, it is analyzed using the secondary data provided by the most prominent international organizations, such as the WTO, World Bank, IMF, and UNCTAD (World Bank, 2023; WTO, 2024; IMF, 2025; UNCTAD, 2023). These sources offer extensive and authoritative coverage, but due to the differences in reporting standards and the revision of periodic data, inconsistencies in the data set can occur (Yotov *et al.*, 2016). Future studies may expand on this study by using firm or transaction level data to more effectively capture industry and exporter tariff response differences.

Second, by concentrating on cross-country and sectorial trends, the research provides information on more broad structural trends, but it can still miss the more subtle impact of domestic political institutions, policy priorities and enforcement mechanisms which differ greatly across national settings. The comparative case studies or even mixed-method studies would be more informative on how domestic conditions influence the consequences of tariff reforms.

Third, the metric applied to measure digital readiness is a combination of multiple technology and infrastructure indicators. Even though this composite measure can reflect the general trends, it might not be able to reflect the qualitative components like regulatory preparedness, innovation ecosystems, or the effectiveness of digital governance (ITU, 2022; WIPO, 2023). Future research might improve this measure by using more specific indicators or firm-level information on digital adoption and innovation.

Lastly, the timeline of the study (2018 to 2025) coincides with multiple historic disruptions around the world, such as the COVID-19 pandemic, supply chain bottlenecks, and increasing geopolitical tensions that can affect the dynamics of trade experienced (OECD, 2021; WTO, 2022). Such occurrences can have an independent effect on trade flows without regard to tariff policy, making it more difficult to decompose their distinct effects. It would be useful to extend the analysis further than 2025 in order to evaluate the long-term effects of these combined shocks on trade and competitiveness.

The future studies should also focus on the new areas of policies that overlap with tariff regimes such as carbon border adjustments, digital trade policies, and the impact of sustainability standards on market access. With the growing shift of global trade towards a more digital, environmentally friendly approach, the interaction of these new tools with existing tariff policies is required to be learned in order to design the appropriate and fair-trade strategies.

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