GAME THEORY IN BUSINESS AND TRADE WARS: A COMPREHENSIVE ANALYSIS OF RECENT US TRADE POLICY DEVELOPMENTS

Mr. Naman Kamra
Student, Sri Guru Gobind Singh College of Commerce, Delhi University

Ms. Akshita Sharma
Student, Sri Guru Gobind Singh College of Commerce, Delhi University

ABSTRACT

The global trade environment between 2024 and 2025 has been characterized by renewed tariff escalation and unilateral policy actions led by the United States, significantly affecting international business strategy and global supply chains. This paper examines recent U.S. trade policy developments through the lens of game theory to explain why trade conflicts persist despite their adverse economic consequences. Using concepts such as the Prisoner's Dilemma, Nash equilibrium, and repeated strategic interaction, the study argues that trade wars represent managerial and policy- level coordination failures in which rational actors settle into suboptimal but stable outcomes.

Drawing on empirical evidence from U.S. trade actions involving China, India, and key allies, the analysis highlights how retaliatory tariffs, policy uncertainty, and weakened multilateral institutions have increased operational risk, disrupted supply networks, and constrained strategic decision-making for firms. The paper contributes to management literature by linking macro-level trade policy dynamics with firm-level implications, emphasizing the need for strategic flexibility, diversification, and scenario planning in an increasingly fragmented global trade system.

INTRODUCTION

The Death of Multilateralism

For seven decades, the General Agreement on Tariffs and Trade (GATT) and subsequently the World Trade Organization (WTO) fostered a global

consensus: trade is a positive-sum game. However, the period from 2020 to 2025 marked the definitive collapse of this order. The United States, driven by a domestic political mandate to reverse deindustrialization and correct chronic trade deficits, pivoted to a strategy of "Weaponized

Interdependence."

The defining feature of this new era is the use of national security statutes—specifically Section 232 of the Trade Expansion Act of 1962 and the International Emergency Economic Powers Act (IEEPA)—to bypass WTO dispute mechanisms. In 2025 alone, the US Average Effective Tariff Rate (AETR) surged from a historic low of 2.2% to a protectionist 22.5%, a level unseen since the Smoot-Hawley Act of 1930.

The Game Theoretic Lens

Traditional macroeconomic models often view tariffs as static policy levers. They ask: "What happens to GDP if tariffs rise by 10%?" This approach is insufficient because it assumes ceteris paribus—that other nations will not react.

Game Theory rejects this static view. It posits that trade policy is a dynamic interaction between "Players" (nations) whose outcomes depend not just on their own choices, but on the anticipated reactions of their rivals. This paper argues that the US, China, and India are locked in a Prisoner's Dilemma, where the rational pursuit of self-interest by each player leads to a collective outcome where everyone is worse off.

Research Objectives

1. To evaluate the theoretical validity of "Optimal Tariff Theory" in the presence of retaliation.

2. To quantify the macroeconomic impact of the 2025 tariff escalation on global and US GDP.

3. To analyze the India-US trade relationship as a specific "Sub-Game" of asymmetric power.

4. To provide actionable strategies for de-escalation and corporate survival.

LITERATURE REVIEW

The application of Game Theory to international trade connects classical economic thought with modern strategic modeling.

2.1 Classical vs. Strategic Trade Theory

Adam Smith (1776) and David Ricardo (1817) established the foundation of *Comparative Advantage*, arguing that free trade is Pareto Optimal—it

maximizes total global wealth. However, Strategic Trade Theory (Brander C Spencer, 1985) introduced the concept that in imperfectly competitive markets, governments can use tariffs and subsidies to shift profits from foreign to domestic firms, theoretically increasing national welfare at the expense of others.

2.2 Optimal Tariff Theory

The theoretical backbone of the current US policy is Optimal Tariff Theory, formalized by Harry Johnson (1953). Johnson argued that a large country

(one with market power) can improve its "Terms of Trade" (the ratio of export prices to import prices) by imposing a tariff.

- The Logic: By restricting demand for imports, the large country forces foreign exporters to lower their prices to maintain market share.

$$\text{Optimal Tariff Rate} = \frac{1}{\varepsilon_s}$$

- The Flaw: Johnson explicitly noted that this theory holds *only if the trading partner does not retaliate*.

2.3 Recent Theoretical Developments (2024–2025)

Recent scholarship has updated these models for the current conflict:

- Garg (2025) in the *Berkeley Economic Review* argues that while tariffs may be individually rational (Nash Equilibrium), they are collectively irrational (Pareto Inefficient). He demonstrates that the 2025 trade war is a "Negative-Sum Game" due to deadweight losses.

- Lee (2025) in *Asia Times* applies the Prisoner's Dilemma to the US- China conflict, noting that the "Shadow of the Future" (the prospect of future cooperation) has been shortened by the paralysis of the WTO Appellate Body, making defection the dominant strategy.

- Chen C Semmler (2025) introduce dynamic modeling, suggesting that short-term welfare losses from tariffs might be accepted by nations like China if they incentivize long-term "Self-Reliance" and innovation (e.g., in semiconductors).

METHODOLOGY

This research employs a Mixed-Methods Approach, combining quantitative data analysis with qualitative game-theoretic modeling.

The Game Structure

We model the trade war as a Non-Cooperative, Repeated Game.

- Players: United States (Player A), China (Player B), India (Player C).

- Strategies:

  - *Cooperate (C):* Maintain low/zero tariffs.

  - *Defect (D):* Impose high tariffs.

- Payoffs: Measured in GDP growth, Terms of Trade, and Political Capital.

Data Sources

- Tariff Data: Global Trade Alert, US International Trade Commission (USITC).

- Economic Indicators: IMF World Economic Outlook (October 2025), Bureau of Economic Analysis (BEA).

- Bilateral Trade: US Census Bureau (Table C5700).

Analysis Phase I: The Macro Game (US vs. World)

The 2025 Escalation Ladder

The year 2025 witnessed a rapid ascent up the escalation ladder, moving from targeted protectionism to systemic barriers.

Table 1: Timeline of US Trade Policy Escalation (2025)

Date	Action	Strategic Intent	Game Theoretical Move
Jan 2025	Status Quo	AETR at 2.2%.	*Cooperative Equilibrium*
Apr 2	First Strike	Proposed 34% tariff on China, 26% on India.	*Defection (Stackelberg Leader)*
Apr 5	IEEPA Baseline	10% Universal Tariff on all imports.	*Changing the Game Structure*
May 15	Ceasefire	US-China agree to 30%/10% rates.	*Negotiated Nash Equilibrium*

Jul 1	Targeted Strike	+40% on Brazil (IEEPA emergency).	*Punishment Strategy*
Aug 27	Geopolitical Link	+25% on India for Russian oil purchases.	*Issue Linkage (Coordination Game)*
Oct 10	Total War Threat	Threat of 100% on China after Rare Earth ban.	*Brinkmanship*

The Failure of Optimal Tariff Theory

The US attempt to extract "Optimal Tariffs" failed due to immediate retaliation.

- Reaction Function: China matched US tariffs largely proportionally, but strategically. When the US targeted consumer electronics, China targeted US agriculture (soybeans, pork)—sectors with high political sensitivity in the US.

- Outcome: Instead of forcing foreign exporters to pay, the costs were passed through.

Tariff Rate Fluctuation Through 2025
April rate includes estimated 11.5 point IEEPA impact
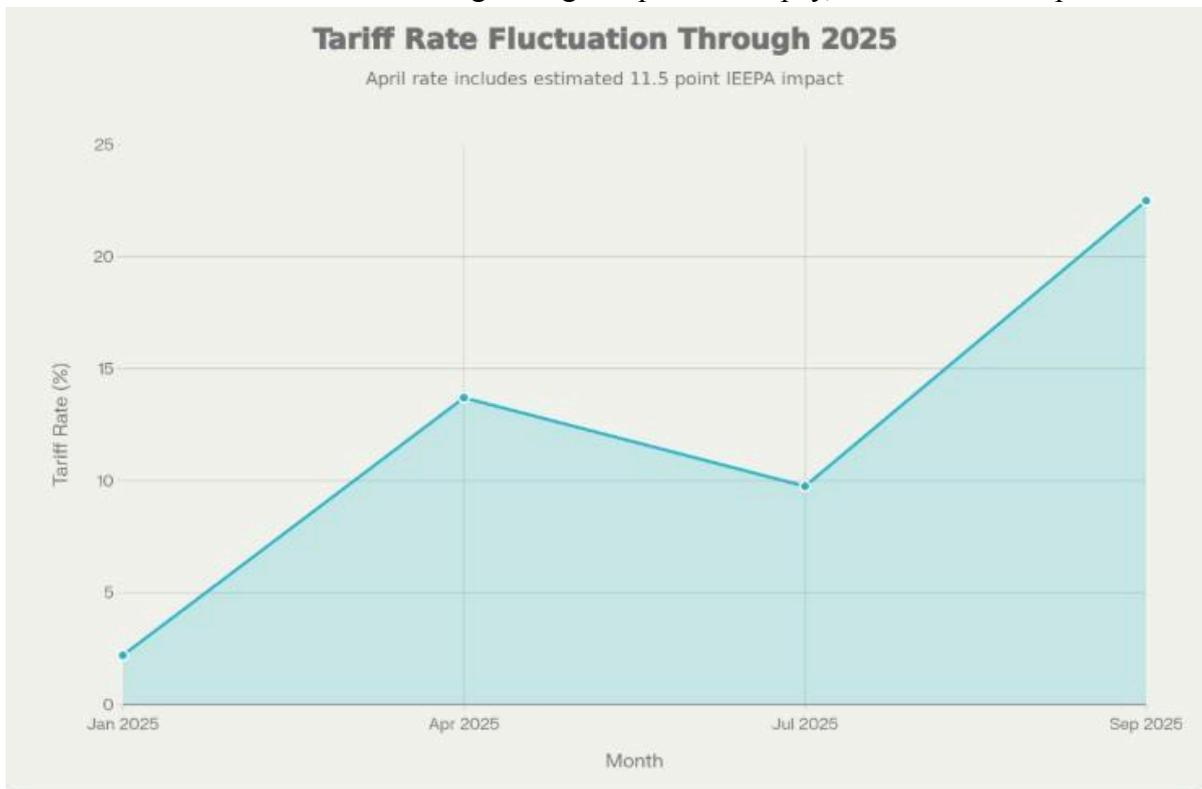
Reuters (Oct 2025) reported that US import prices rose in near-perfect correlation with tariff hikes, indicating that US consumers bore ~90% of the incidence.

US Average Effective Tariff Rate Escalation (2025)

ANALYSIS PHASE II: BILATERAL SUB-GAMES

US-China: The Prisoner's Dilemma

The US-China relationship represents the classic Prisoner's Dilemma.

- Scenario: Both countries benefit most from Free Trade (Payoff: 5,5). However, the US fears China's state subsidies (cheating), and China fears US containment.

- Incentive to Defect: If the US tariffs China while China remains open, the US gains a massive Terms of Trade advantage (Payoff: 7,2).

- Result: Both defect. The equilibrium settles at (3,3)—a "Trade War" where both economies grow slower (US 1.5%, China 4.5%) than their potential.

Current Status (Jan 2026): The "Ceasefire" at 30% tariffs is a fragile equilibrium. It persists only because the alternative (100% tariffs) is viewed as mutually assured destruction.

US-India: Asymmetric Warfare s Mixed Strategies

India faces a different challenge: Asymmetry. It cannot hurt the US economy as much as the US can hurt India's. Therefore, a "Tit-for-Tat" strategy is suicidal.

The Indian Strategy:

1. Selective Compliance: India accepted tariffs on labor-intensive goods (Textiles) but negotiated exemptions for strategic sectors (Pharma).

2. Diversification (Hedging): Accelerating FTAs with the EU and UK to reduce reliance on the US dollar and market.

3. Domestic Resilience: The Production Linked Incentive (PLI) scheme was expanded to "absorb" the tariff shock, effectively subsidizing exporters to keep them competitive.

Table 2: Impact of 50% Tariff on Key Indian Sectors

Sector	Export Exposure ($Bn)	Tariff Status	Strategic Outcome
Textiles C Apparel	$12.5	Full (50%)	*High Impact:* Significant market share loss to Vietnam.
Gems C Jewellery	$9.8	Full (50%)	*High Impact:* Processing shifts to Dubai/Thailand.

| Pharmaceuticals | $8.5 | Exempt (0%) | *Strategic Win:* Critical to US healthcare cost containment. |
| Electronics | $7.2 | Exempt (0%) | *Strategic Win:* Vital for diversifying supply away from China. |
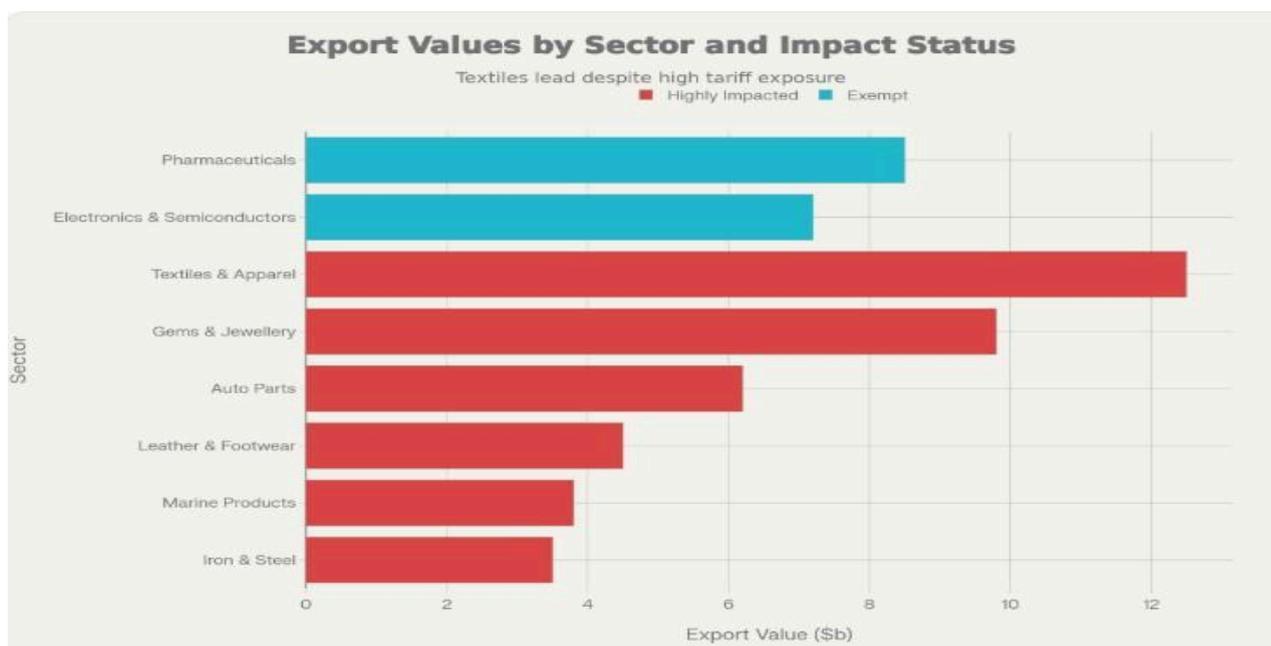
Impact of US Tariffs on Key Indian Export Sectors (2025 Projections)

The "Wedge" Strategy: Allies vs. Rivals

The US successfully utilized a "Divide and Conquer" strategy. By imposing lower tariffs on Allies (UK, Canada) than Rivals (China, India), it induced Trade Diversion.

● The Winner: The United Kingdom (+12.3% Relative Advantage).

● The Loser: China (-28.5% Relative Disadvantage).

● Implication: Global supply chains are re-routing through "friendly" jurisdictions, sacrificing efficiency for tariff avoidance.
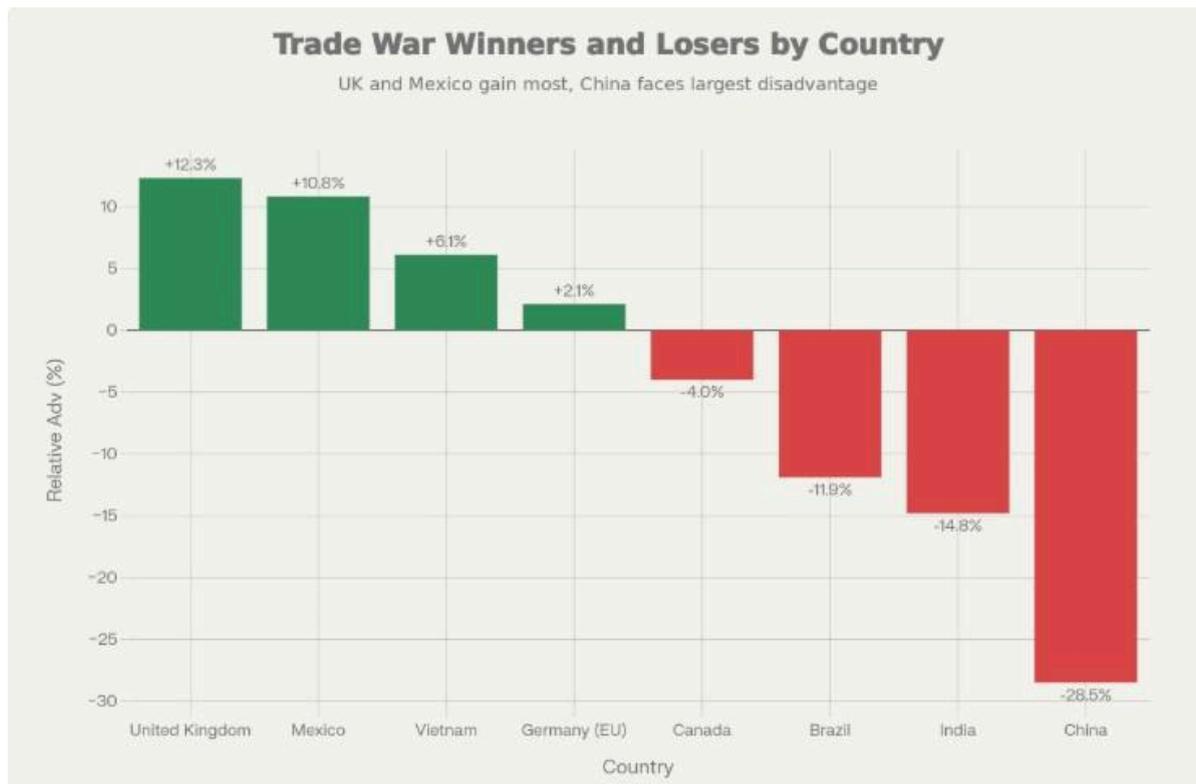
Relative Tariff Advantage by Trading Partner (September 2025)

ECONOMIC IMPACT ASSESSMENT

Macroeconomic Indicators

The transition to a protectionist equilibrium has quantifiable costs:

- Global GDP: The IMF downgraded 2026 growth forecasts to 2.7% (from 3.1%), citing "policy uncertainty" as the primary drag.

- Inflation: The "Tariff Tax" added approximately 1.0% to 1.5% to the US PCE inflation rate.

- Investment: Business investment contracted by 0.3% in Q1 2025 as firms delayed Capex due to uncertain supply chain costs.

Supply Chain Fracturing

The efficiency of the "Just-in-Time" model has been replaced by the resilience of "Just- in-Case."

- Friend-Shoring: Manufacturing is fleeing China not for the US, but for Vietnam, Mexico, and India (despite tariffs, India remains cheaper than US production).

- Tech Decoupling: The "Chip War" has led to a bifurcation of technology standards. China's export ban on Gallium and Germanium (Oct 2025) has
delayed US semiconductor production, proving that Interdependence works both ways.

STRATEGIC RECOMMENDATIONS

Based on the Game Theoretical analysis, we propose the following strategies for key stakeholders.

For Policymakers (US s Allies)

- Abandon Pure Unilateralism: The "Optimal Tariff" assumption is dead. Retaliation is swift and effective. Policymakers must return to Coalition-Based Pressure. A united front (US + EU + Japan) against Chinese subsidies is more effective than a US-vs-World tariff wall.

- Graduated Reciprocity (Forgiving Tit-for-Tat): In repeated games, the most successful strategy is to punish defection immediately but forgive just as quickly. The US should establish clear "Off-Ramps"—automatic tariff reductions triggered by specific Chinese reforms.

- Revive Dispute Resolution: The "Shadow of the Future" must be lengthened. Reforming and engaging with a neutral arbiter (WTO or a new "Democracies Trade Council") reduces the risk of miscalculation.

For Emerging Economies (India, Brazil)

- Strategic Autonomy: Do not rely on US benevolence. Aggressively diversify export markets to the Global South (Africa, SE Asia).

- Leverage Critical Minerals: Follow Indonesia's nickel model. Use control over critical inputs (e.g., India's mica or rare earths) as a bargaining chip to secure tariff exemptions.

- Internal Reform: Use the crisis to reduce domestic logistics costs. If tariffs add 20% to cost, domestic efficiency must reduce cost by 20% to stay competitive.

For Corporate Leaders

- The "China Plus Two" Strategy: "China Plus One" is no longer enough. Supply chains must have triple redundancy: one low-cost hub (Vietnam), one massive scale hub (China/India), and one "safe" hub (Mexico/Eastern Europe).

- Political Risk Audits: Every supplier must be audited not just for quality, but for "Tariff Risk." Is this supplier in a country likely to be targeted by the next IEEPA order?

- Lobby for Exemptions: The data shows that "Strategic" sectors get exemptions. Positioning your product as "Critical to National Security" (e.g., medical, defense, dual-use tech) is the best hedge against tariffs.

CONCLUSION AND FUTURE OUTLOOK

Synthesis

The 2025 trade war was not an accident; it was the logical outcome of a global system where the

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rules of cooperation were eroded. Game Theory explains why this happened: when the enforcement mechanism (WTO) fails, the dominant strategy shifts from

cooperation to defection. The US pursued short-term leverage through tariffs, but the long-term result was a Nash Equilibrium of mutual harm.

The Future: Tech Wars and Climate Clubs

The trade war is evolving.

- Phase 1 (2018-2024): Trade Deficits (Steel, Aluminum).

- Phase 2 (2025): Broad Decoupling (Universal Tariffs).

- Phase 3 (2026+): Existential Competition. The next frontier is not tariffs, but Export Controls and Standards. The formation of "Climate Clubs" (via
mechanisms like the EU CBAM) will create new barriers, dividing the world into "Green" and "Dirty" trade blocs.

Final Verdict

We are witnessing the "End of the Flat World." The global economy is fragmenting into competing stacks. For businesses and nations, the era of optimizing for pure efficiency is over. The new era requires optimizing for Resilience, Alliance, and Survival. As our analysis of the India-US case shows, those who play the game with nuance—mixing
cooperation with hedging—will survive. Those who rely on the old rules of 2010 will not.

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