

U.S. TARIFFS AND INDIA'S ECONOMY: A FINANCIAL IMPACT ANALYSIS

¹Madhumitha R G, ²Dr. V. Deepa Venugopal

¹Student, ²Professor

¹, ²Firebird Institute of Research in Management, Coimbatore, India

Email: ¹madhumitha.rg@firebird.net.in, ²deepa.v@firebird.ac.in

Abstract:

The re-emergence of U.S. tariff-based protectionism after 2018 has raised important questions about its financial impact on partner economies such as India, whose export earnings depend heavily on access to the U.S. market. This study examines how U.S. tariff shocks, the INR–USD exchange rate, and U.S. macroeconomic conditions have shaped India's merchandise export value to the United States over 2010–2024, using a quantitative, secondary time-series design. Annual data on India's exports to the U.S., a tariff-shock dummy (0 = 2010–2017, 1 = 2018–2024), the INR–USD exchange rate, U.S. real GDP growth, and U.S. CPI inflation were analysed using descriptive statistics, an independent-samples t-test, Pearson correlation, and ordinary least squares (OLS) regression. Results show that India's exports to the U.S. more than tripled over the period, rising from USD 25.6 billion in 2010 to USD 87.3 billion in 2024, with the post-2018 mean significantly higher than the pre-2018 mean ($t = -4.65$, $p = 0.001$). The regression model explained 94.6% of the variation in export value ($R^2 = 0.946$, adjusted $R^2 = 0.924$, $F(4,10) = 43.82$, $p < 0.001$), with the INR–USD exchange rate emerging as the strongest and most significant predictor ($B \approx 1,224.27$, $p < 0.001$), while the tariff-shock dummy showed no significant independent effect once exchange-rate and macroeconomic conditions were controlled for. Sectoral analysis of gems & jewellery and pharmaceutical exports showed resilient, if uneven, growth after 2018. The findings suggest that India's post-tariff export expansion has been driven predominantly by rupee depreciation and U.S. demand conditions rather than by the tariff shock itself, carrying implications for exporters, financial institutions, and policymakers managing external-sector risk.

Keywords—U.S. Tariffs; India's Exports; Exchange Rate; Trade Policy; OLS Regression; Financial Impact; INR–USD

I. INTRODUCTION

Global trade in recent years has been marked by a renewed wave of protectionism, with the United States adopting higher tariffs and stricter trade measures against several trading partners. Such policy shifts carry significant implications for emerging economies whose growth and external-sector stability depend heavily on export earnings. India, as one of the world's largest emerging markets and a major U.S. trading partner, is particularly exposed to changes in U.S. tariff policy, since the United States consistently ranks among India's leading destinations for merchandise exports.

Beginning in 2018, the United States implemented a series of tariff actions—including Section 232 duties on steel and aluminium and the withdrawal of India's Generalised System of Preferences (GSP) status—that raised effective tariff rates on key Indian export categories and heightened uncertainty for exporters [4], [9]. Over the same period, India's export performance has also been shaped by movements in the INR–USD exchange rate and by fluctuations in U.S. economic growth and inflation, both of which affect U.S. import demand. Isolating the financial impact of the tariff shock from these broader macro-financial forces is therefore central to understanding India's trade performance in the U.S. market.

This study examines how U.S. tariff shocks, exchange-rate movements, and U.S. macroeconomic conditions have jointly shaped India's merchandise export value to the

United States over the period 2010–2024. Specifically, it aims to: (1) assess whether India's export value to the U.S. differs significantly between the pre-tariff (2010–2017) and post-tariff (2018–2024) periods; (2) examine the relationship between exports and the INR–USD exchange rate, U.S. GDP growth, and U.S. CPI inflation; and (3) quantify the combined and relative influence of these factors through a multiple regression framework, supplemented by a sector-level comparison of gems & jewellery and pharmaceutical exports.

II. LITERATURE REVIEW

A. Tariffs and Trade Protectionism

Tariffs function as a tax on imported goods, raising their landed cost and altering relative competitiveness between domestic and foreign producers [8], [10]. The resurgence of protectionist measures since the 2018 U.S.–China trade dispute has renewed scholarly interest in how tariff shocks transmit through global supply chains and affect third-country exporters such as India [5], [6]. Historical accounts of U.S. trade policy emphasise that tariff escalation is often driven as much by domestic political-economy considerations as by strict economic rationale [9].

B. Exchange Rate and Export Competitiveness

A substantial body of literature links exchange-rate depreciation to improved export competitiveness, since a weaker domestic currency lowers the relative dollar price of exported goods [10]. For India specifically, INR depreciation against the dollar has historically coincided

with periods of export expansion, complicating any simple attribution of export growth to trade-policy actions alone.

C. India–U.S. Trade Relationship

India's trade relationship with the United States has deepened considerably since the 1990s liberalisation era, with the U.S. now among India's largest single-country export destinations [1]. The withdrawal of India's GSP benefits in 2019 and subsequent Section 301-related tensions have been widely documented as sources of friction in the bilateral relationship [15], [7], even as overall trade volumes have continued to grow.

D. Theoretical Framework

This study draws on standard open-economy trade theory, in which export value is a function of relative prices (captured through the exchange rate), foreign demand conditions (captured through GDP growth and inflation in the destination market), and trade-policy barriers (captured through the tariff-shock dummy) [10], [4]. This framework motivates the multivariate empirical specification adopted in Section III.

III. RESEARCH METHODOLOGY

A. Research Design

This study adopts a quantitative, descriptive-analytical research design based on secondary annual time-series data for the period 2010–2024 ($N = 15$).

B. Data Sources and Variables

Data on India's merchandise export value to the United States (EXPUS, USD million) were compiled from Government of India trade statistics and UN Comtrade records [9(11)], [14]. The INR–USD exchange rate (EXR) and U.S. macroeconomic indicators—real GDP growth (USGDP) and CPI inflation (USCPI)—were drawn from RBI and World Bank databases [12], [16]. A tariff-shock dummy (TS) was constructed, coded 0 for 2010–2017 and 1 for 2018–2024, to capture the structural shift associated with Section 232 tariffs, the GSP withdrawal, and related Section 301 actions.

C. Model Specification

To quantify the joint influence of these factors on India's export value, an ordinary least squares (OLS) regression model was estimated:

$$EXPUS_t = \beta_0 + \beta_1 TS_t + \beta_2 EXR_t + \beta_3 USGDP_t + \beta_4 USCPI_t + \varepsilon_t \quad (1)$$

D. Analytical Techniques

Descriptive statistics, an independent-samples t-test (comparing pre- and post-tariff export means), Pearson correlation analysis, and the OLS regression above were computed using standard statistical software [8], [17], supplemented by a sectoral comparison of average export values for gems & jewellery and pharmaceuticals before and after 2018.

IV. RESULTS AND DISCUSSION

A. Descriptive Statistics

Table I presents descriptive statistics for India's export value to the United States over 2010–2024. India's export value more than tripled over the sample period, rising from about USD 25.6 billion in 2010 to USD 87.3 billion in 2024 (mean = USD 54,100.84 million, SD = USD 19,716.12 million). The INR–USD rate exhibited a sustained depreciation trend over the period, moving from the mid-40s to the mid-80s rupees per dollar.

TABLE I. DESCRIPTIVE STATISTICS OF INDIA'S EXPORT VALUE TO THE U.S. (2010–2024)

N	Minimum (USD M)	Maximum (USD M)	Mean (USD M)	SD (USD M)
15	25,553.30	87,338.08	54,100.84	19,716.12

B. Export Performance Across Tariff Phases

Table II compares average export values between the pre-tariff (2010–2017) and post-tariff (2018–2024) sub-periods. The mean export value rose from about USD 39.8 billion per year in the pre-tariff phase to roughly USD 70.4 billion in the post-tariff phase, with the standard deviation nearly doubling, indicating both a higher level and greater volatility of export earnings after 2018.

TABLE II. GROUP STATISTICS: EXPORT VALUE BEFORE AND AFTER U.S. TARIFF SHOCKS

Period	N	Mean (USD M)	SD (USD M)
Pre-Tariff (2010–2017)	8	39,801.09	8,067.45
Post-Tariff (2018–2024)	7	70,443.41	15,711.71

C. Independent-Samples t-Test

Levene's test indicated unequal variances between the two periods ($F = 8.94$, $p = 0.010$), so the Welch (unequal-variance) t-test was used. The result ($t = -4.65$, $df = 8.69$, $p = 0.001$) confirms that the increase in average export value in the post-tariff period is statistically significant, with a mean difference of about $-30,642.33$ (95% CI: $-45,626.38$ to $-15,658.27$).

TABLE III. INDEPENDENT-SAMPLES T-TEST FOR EXPORT VALUE

Test	t	df	Sig. (2-tailed)	Mean Diff.
Equal variances assumed	-4.85	13	<.001	-30,642.33
Equal variances not assumed	-4.65	8.69	0.001	-30,642.33

D. Correlation Analysis

Pearson correlations (Table IV) show a very strong, significant positive association between exports and the INR–USD exchange rate ($r = 0.924$, $p < 0.001$), a moderate positive correlation with U.S. GDP growth ($r = 0.549$, $p = 0.034$), and a strong positive correlation with U.S. CPI inflation ($r = 0.665$, $p = 0.007$).

TABLE IV. CORRELATION OF EXPORT VALUE WITH KEY PREDICTORS

Variable	r	Sig. (2-tailed)
INR per USD (avg)	0.924**	<.001
US GDP Growth (%)	0.549*	0.034
US Inflation CPI (%)	0.665**	0.007

E. Multiple Regression Analysis

The OLS model in Eq. (1) explains 94.6% of the variation in India's export value ($R = 0.973$, $R^2 = 0.946$, adjusted $R^2 = 0.924$), with a highly significant F-statistic ($F(4,10) = 43.82$, $p < 0.001$), as shown in Table V.

TABLE V. MODEL SUMMARY AND ANOVA

R	R ²	Adj. R ²	SE	F	df1,df2	Sig.
0.973	0.946	0.924	5,419.85	43.82	4, 10	<.001

Table VI reports the estimated coefficients. The INR–USD exchange rate is the strongest and most significant predictor ($B \approx 1,224.27$, $p < 0.001$): a one-rupee depreciation is associated with an increase of roughly USD 1.22 billion in exports, holding other factors constant. U.S. CPI inflation is also significant ($B \approx 2,710.79$, $p = 0.038$), while U.S. GDP growth ($B \approx 764.89$, $p = 0.347$) and the tariff-shock dummy ($B \approx -265.17$, $p = 0.959$) are not statistically significant once the other variables are controlled for.

TABLE VI. ESTIMATED COEFFICIENTS FOR THE EXPORT REGRESSION MODEL

Predictor	B	SE	t	Sig.
(Constant)	-38,042.03	11,627.36	-3.27	0.008
Tariff Shock (TS)	-265.17	5,085.70	-0.05	0.959
INR per USD (EXR)	1,224.27	198.38	6.17	<.001
US GDP Growth (%)	764.89	774.94	0.99	0.347
US Inflation CPI (%)	2,710.79	1,137.73	2.38	0.038

These results indicate that the direct, independent effect of the 2018 tariff shock on aggregate export value is not statistically identifiable once exchange-rate and macroeconomic conditions are controlled for, even though the simple pre-/post-tariff comparison in Section IV(C) shows a significant level increase. This suggests that the post-2018 export expansion reflects the combined influence of rupee depreciation and U.S. demand conditions rather than the tariff shock itself.

F. Sectoral Sensitivity

To complement the aggregate analysis, average export values were compared for two tariff-exposed sectors—gems & jewellery and pharmaceuticals—before and after 2018 (Table VII). Gems & jewellery exports rose from an average of USD 8,498.75 million (2010–2017) to USD 9,797.14 million (2018–2024), an increase of about 15%. Pharmaceutical exports rose more sharply, from USD 7,507.50 million to USD 12,823.57 million, an increase of about 71%, consistent with relatively stable and inelastic U.S. demand for essential healthcare products.

TABLE VII. AVERAGE SECTORAL EXPORT VALUE BEFORE AND AFTER U.S. TARIFF SHOCKS

Sector	Pre-Tariff Avg. (USD M)	Post-Tariff Avg. (USD M)	Change (%)
Gems & Jewellery	8,498.75	9,797.14	+15.3%
Pharmaceuticals	7,507.50	12,823.57	+70.8%

G. Discussion

Taken together, the results indicate that India's export value to the United States rose significantly after 2018, but that this rise is more closely associated with rupee depreciation and favourable, inflationary U.S. macroeconomic conditions than with the tariff shock itself. The sectoral evidence further shows that this expansion was not uniform: pharmaceuticals grew markedly faster than gems & jewellery, pointing to heterogeneous, sector-specific resilience to tariff pressure within an overall pattern of export growth.

V. IMPLICATIONS OF THE STUDY

A. Implications for Policymakers

For Indian policymakers, the findings underscore the value of pairing trade-policy engagement with macro-financial strategies that support a competitive and stable exchange-rate environment. Continued efforts to diversify export markets, strengthen logistics infrastructure, and support value-added production can help exporters withstand external tariff shocks while capitalising on favourable global demand conditions.

B. Implications for Exporters and Financial Institutions

Exporting firms should prioritise currency-risk management—through hedging instruments and pricing strategies—alongside close monitoring of U.S. business-cycle indicators. For banks and financial institutions serving export-oriented clients, the results suggest that exchange-rate movements, more than tariff developments alone, should inform trade-finance, working-capital, and credit-risk assessments for firms exposed to the U.S. market.

VI. LIMITATIONS AND FUTURE RESEARCH

This study is based on a relatively small annual sample ($N = 15$), which limits the degrees of freedom available for the regression model and the range of diagnostic tests that can be applied. The tariff-shock variable is modelled as a simple binary dummy and does not capture variation in tariff intensity across products or time. The analysis also relies on a standard OLS specification rather than more advanced time-series techniques such as cointegration or vector error-correction models, owing to sample-size constraints. Future research could employ higher-frequency quarterly or monthly data, construct trade-weighted or sector-specific tariff indices, and incorporate firm-level data to examine pricing and market-diversification responses in greater detail.

VII. CONCLUSION

This study examined the financial impact of U.S. tariff shocks on India's export value to the United States over 2010–2024, alongside the roles of the INR–USD exchange rate and U.S. macroeconomic conditions. India's exports to the U.S. rose significantly in the post-2018 period, both in level and volatility, and this difference was confirmed as statistically significant by the independent-samples t-test. However, once the exchange rate and U.S. macroeconomic variables were included in a multiple regression model, the tariff-shock dummy did not show a statistically significant independent effect, whereas the exchange rate and U.S. inflation remained strong, significant predictors. Sectoral evidence for gems & jewellery and pharmaceuticals pointed to resilient but uneven export growth after 2018. Overall, the study concludes that while the 2018 tariff shock marked an important policy turning point, India's export performance vis-à-vis the United States has been driven predominantly by exchange-rate dynamics and U.S. demand conditions rather than by the tariff shock alone.

VIII. ACKNOWLEDGMENT

The author wishes to thank Dr. V. Deepa Venugopal, Professor, for valuable guidance and constructive feedback throughout this research, as well as the Firebird Institute of Research in Management, Coimbatore, for its academic support.

REFERENCES

- [1] M. S. Ahluwalia, "India's external sector: Past performance and future challenges," *Economic and Political Weekly*, vol. 54, no. 11, pp. 35–43, 2019.
- [2] A. Bhattacharjee, "Tariffs, trade wars and the WTO: Implications for India," *Economic and Political Weekly*, vol. 53, no. 45, pp. 32–39, 2018.
- [3] C. P. Bown, "The 2018 US–China trade conflict after forty years of special protection," *World Economy*, vol. 42, no. 1, pp. 195–210, 2019.
- [4] C. P. Bown and M. Kolb, "Trump's trade war timeline: An up to date guide," Peterson Institute for International Economics, 2020.
- [5] Congressional Research Service (CRS), *India–U.S. Trade Relations*. Washington, DC: CRS, 2024.
- [6] D. N. Gujarati and D. C. Porter, *Basic Econometrics*, 5th ed. New York: McGraw Hill, 2009.
- [7] D. A. Irwin, *Clashing over Commerce: A History of U.S. Trade Policy*. Chicago, IL: University of Chicago Press, 2019.
- [8] P. Krugman, M. Obstfeld, and M. Melitz, *International Economics: Theory and Policy*, 11th ed. Boston, MA: Pearson, 2018.
- [9] Ministry of Commerce and Industry, *Export–Import Data Bank: India's Merchandise Trade by Country and Commodity, 2010–2024*. New Delhi: Government of India, 2025.
- [10] Reserve Bank of India (RBI), *Handbook of Statistics on the Indian Economy*. Mumbai: RBI, 2024.
- [11] D. Rodrik, *Straight Talk on Trade: Ideas for a Sane World Economy*. Princeton, NJ: Princeton University Press, 2018.
- [12] United Nations Comtrade, *United Nations Commodity Trade Statistics Database (India–U.S. Bilateral Trade, 2010–2024)*. New York: United Nations, 2024.
- [13] United States Trade Representative (USTR), *India's Status under the Generalized System of Preferences (GSP)*. Washington, DC: USTR, 2019.
- [14] World Bank, *World Development Indicators: Macroeconomic Time Series for India and the United States*. Washington, DC: World Bank, 2024.
- [15] J. M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 5th ed. Mason, OH: South-Western Cengage Learning, 2013.