

Economic Wellbeing and Peace During Turbulence and Trade War: Evidence from India

Rinki Bisht

MSc Applied Economics | University College Dublin | Intern- India Think

Abstract

Global trade uncertainty has become a significant source of macroeconomic instability, particularly for developing economies integrated into the global trading system. This study analyzes the impact of global trade uncertainty on India's economic wellbeing during 2005–2025. Quarterly data were sourced from the OECD Data Explorer, Federal Reserve Economic Data (FRED), the World Uncertainty Index Portal, and the Reserve Bank of India. Descriptive statistics and unit root tests were conducted to examine the characteristics of the data. Johansen's cointegration test, the Vector Error Correction Model (VECM), Impulse Response Functions (IRFs), and Forecast Error Variance Decomposition (FEVD) were employed to ascertain long run and short run relations among the variables. The empirical findings indicate the existence of a stable long-run relationship, with global trade uncertainty exerting a negative effect on India's economic wellbeing. A complementary analysis of the Global Peace Index suggests that periods of heightened global uncertainty are associated with weaker peace outcomes in India. The findings highlight the importance of strengthening macroeconomic resilience and adopting stable trade and economic policies to mitigate the adverse effects of global trade uncertainty on India's economic wellbeing.

Keywords: Global Trade Uncertainty, Economic Wellbeing, VECM, GPI India.

JEL Classification: C32, F13, F43, O53

1. Introduction

Over the last few decades, India has transitioned toward a highly liberalised and globally integrated economy. The total share of trade in the Indian economy has nearly doubled over the past 25 years to reach about 45 percent of GDP in 2025. The nation has also seen the rise in capital flows— with inflows reaching USD 135.4 billion in FY25, India remained the world's largest recipient of remittances. Most economists and policy makers attribute the growth in trade and capital flows to economic deregulation, specifically the reduction of trade tariffs and capital restrictions. India began the process of comprehensive economic reform in mid-1991. The government eased tariff rates and non-tariff barriers to promote international

trade and globalisation. Similarly, the government also began to gradually relax controls on capital inflows while enabling domestic corporations to access international financial markets more easily. These reforms and trade openness accelerated India's GDP growth, transforming the country into one of the fastest-growing major economies in the world and the sixth-largest economy globally, with a nominal GDP exceeding USD 4 trillion.

Increasing integration not only fuels economic growth and national prosperity but also introduces exposure to global uncertainty. Empirical evidence suggests that global economic crises and trade-related turbulence impose substantial welfare costs on both participating and non-participating countries through higher prices, reduced trade flows, and declining real incomes. Recent systemic disruptions, such as the US–China trade conflict, the COVID-19 pandemic, and renewed protectionist trade policies, have demonstrated how quickly shocks originating in one part of the world transmit across economies through trade, investment, and financial channels. In the past, the financial crisis of 2008, triggered by the collapse of the United States housing bubble led to the wave of multiple economic shocks including Lehman Collapse, Stock Market Crash, banking crises and the Great Recession. These shocks largely impacted the third world developing countries and took several years to recover. The main reasons behind the vulnerability of developing worlds are their weak institutional infrastructure, political instability, and low economic resilience. Therefore, a thorough evaluation is mandated to analyse the impact of turbulence and trade wars on economic wellbeing and peace under the shadows of global economic uncertainty. Against this backdrop, this research investigates the impact of global trade uncertainty and turbulence on India's economic wellbeing over the period 2005–2025.

Although the impact of trade-related uncertainty primarily affects economic activity through commercial and financial channels, episodes of geopolitical and domestic unrest can have negative consequences on investment, business confidence, and, ultimately, long-run economic resilience. Prolonged geopolitical tensions, international conflicts, terrorist activities, and unresolved domestic issues can deteriorate production efficiency, hinder private investment, and add to macroeconomic uncertainty. Consequently, this study complements its empirical analysis with a descriptive assessment of India's peace environment using the Global Peace Index (GPI), providing broader context for understanding the economic consequences of global turbulence.

The link between trade and economic growth has been discussed by many researchers over

the years. However, relatively few studies have specifically examined the macroeconomic consequences of global trade uncertainty in the Indian context. To the best of my knowledge, this study is among the first to investigate the effects of global trade uncertainty on India's economic wellbeing using a Johansen cointegration framework, a Vector Error Correction Model (VECM), impulse response functions (IRFs), and forecast error variance decomposition (FEVD). Economic wellbeing is proxied by real GDP, whereas the World Trade Uncertainty Index, oil prices, the US Effective Federal Funds Rate, the Real Effective Exchange Rate, and inflation are used as key macroeconomic determinants. Additionally, the study provides a descriptive analysis of India's peace environment using the Global Peace Index in order to evaluate the effect of major geopolitical events and trade related disruptions in the country's peace environment.

2. Literature Review

Trade openness has long been regarded as an important determinant of economic growth and economic wellbeing. Classical and endogenous growth theories argue that greater openness promotes economic performance by facilitating specialization, technological diffusion, capital accumulation, and productivity improvements. Trade liberalisation enables countries to improve resource allocation and raise long-run living standards through increased access to international markets and foreign technologies.

Despite these theoretical benefits, the empirical literature provides mixed evidence regarding the link between trade openness and economic performance. Proponents of trade liberalisation argue that openness enhances growth through efficiency gains and knowledge spillovers (Grossman & Helpman, 1991; Rivera-Batiz & Romer, 1991). Contrary to this, several studies contend that excessive openness may expose economies to greater external vulnerability. Clark (1973) argue that exchange rate uncertainty prevents exporters from accurately forecasting foreign prices, which in turn introduces unpredictable volatility into foreign earnings and Hooper and Kohlhagen (1978) demonstrated that although exchange rate risk substantially alters international trade prices, its adverse impact on actual trade volumes remains statistically insignificant. Similarly, Rodrik (1999) argues that developing economies with relatively weak institutions become increasingly vulnerable to external shocks as trade integration deepens, thereby limiting the growth-enhancing effects of liberalisation.

Evidence from an ARDL model of India by Hye and Lau (2015) conclude that trade openness

boosts economic growth in the short run but exerts a negative impact in the long run. The authors argue that long-term gains from trade openness depend upon domestic absorptive capacity. Highlighting human capital and physical investment is essential to maintain steady economic growth. Further supporting this argument, Wani (2022) employs an ARDL bounds testing approach for the period 1992–2019 and finds that trade openness negatively affects economic growth in both the short and long run. The study concludes by emphasizing that structural developments in human capital are strictly required for trade openness to be effective in the long run.

The theoretical literature argues that uncertainty influences economic performance primarily through investment, consumption, and employment channels. According to Bloom (2009), uncertainty shocks trigger brief drops in output, jobs, and investment, but the economy quickly rebounds in a V-shape once the uncertainty fades. Several empirical studies show that uncertainty and economic growth are countercyclical. The leading widely cited works in this area include Baker, Bloom and Davis (2016) revealing that high economic policy uncertainty (EPU) causes significant decline in economic growth. Baker et al., (2016) introduces the Economic Policy Uncertainty (EPU) Index and proves that heightened policy uncertainty exerts a strong contractionary effect on output, employment, and capital investment across major economies. Supporting this, Jurado et al. (2015), Leduc and Liu (2016), Bijsterbosch and Guérin (2013), and Caggiano et al. (2014) demonstrate that economic uncertainty operates as a negative demand shock. Their findings show that it triggers long-lasting declines in aggregate output, investment, and consumption alongside rising unemployment. In the Indian context, Sheikh et al. (2021) investigate the relationship between global uncertainty, trade openness, and economic growth using quarterly data within an ARDL framework. Their findings show that while global uncertainty significantly impacts India's short-run business cycles, its long-run effect on economic growth is statistically insignificant. These findings contrast with the present study, which identifies world trade uncertainty as a significant source of long-run fluctuations in India's economic wellbeing.

The recent literature consistently shows that trade wars impose significant welfare costs on participating economies. Handley and Limão (2015) and Caldara et al. (2020) argue that shifting toward power-based negotiations discourages international investments and disrupts supply chain by increasing trade policy uncertainty (TPU) and weakening international trade cooperations. Amiti, Redding and Weinstein (2019) validated foundational models. Their analysis of product-level data finds that the 2018 U.S. tariffs were almost fully passed on to

domestic consumers through higher import prices. The study reports that the tariffs precipitated caused severe consumer welfare losses and acute global supply chain disruptions. Consolidating this empirical evidence, Fajgelbaum and Khandelwal (2021) confirm these immediate effects while highlighting broader global consequences, including altered supply chains, shifted international investment, and significant third-party spillovers. Although these studies provide substantial evidence on the economic consequences of trade wars, most focus on advanced economies, particularly the United States and China. Comparatively little evidence exists regarding how prolonged trade-related turbulence has affected the economic wellbeing of emerging economies such as India.

Liberal theory argues that greater economic interdependence raises the opportunity cost of conflict by increasing the mutual economic benefits derived from trade. Conversely, realist perspectives contend that economic interdependence may generate strategic vulnerabilities and intensify geopolitical competition. Early contributions by Polachek (1980), Oneal and Russett (1999), and Hegre, Oneal, and Russett (2010) provide robust empirical evidence that deeper trade integration lowers the probability of interstate disputes. In contrast, Barbieri (1996, 2002) argues that high levels of interdependence and asymmetrical trade relations can actually increase the likelihood of militarised interstate disputes. Recent empirical evidence by Ling Feng, Qiuyue Huang, Zhiyuan Li, and Christopher M. Meissner (2026) using global bilateral data spanning 1962–2014 and an instrumental-variable gravity framework, provide robust empirical evidence supporting the commercial peace hypothesis. Their empirical findings confirm that higher levels of international trade cause a significant reduction in both the probability and intensity of interstate military conflict. Within the Indian context, Sheikh et al. (2021) argue that India's economic performance is shaped by the interaction of political stability, international oil prices and global economic conditions, referred to as the "POW" trinity. Their findings imply that institutional stability plays an important role in determining how external uncertainty is transmitted to domestic economic activity. Accordingly, rather than modelling peace as an explanatory variable, the present study complements its econometric analysis with a descriptive assessment of India's peace environment using the Global Peace Index (GPI). This provides contextual evidence on how major geopolitical events and changes in peacefulness coincide with periods of trade-related turbulence and economic uncertainty.

Despite the extensive literature on the impact of trade openness, economic uncertainty, and trade wars, there are three key research gaps. First, the impact of global trade uncertainty on

India's economic wellbeing has received only limited attention in the literature. Second, while most papers attempt to estimate long-run relationships, while comparatively little attention has been devoted to impulse response analysis and forecast error variance decomposition to examine dynamic linkages. Third, little is known about the interaction between the periods of international trade turbulence and transformations in India's peace environment. This paper contributes to the literature by exploring the impact of global trade uncertainty on India's economic wellbeing in the long run and the short run using Johansen cointegration analysis and VECM, complemented by a descriptive analysis of India's Global Peace Index.

3. Results and discussions

3.1 Data collection

This study employs the quarterly time series data overing the period 2005Q1–2025Q4. The Real Gross Domestic Product (GDP), used as the proxy for India's economic wellbeing, was collected from the OECD Data Explorer. The World Trade Uncertainty index figures were retrieved from the World Uncertainty Index Portal. Global crude oil prices, United States Effective Federal Funds Rate (EFFR), and India's Real Broad Effective Exchange Rate (REER) were obtained from Federal Reserve Economic Data database maintained by Federal Reserve Bank of St. Louis. The Consumer Price Index (CPI) data was obtained from Reserve Bank of India Database on Indian Economy. The yearly Global Peace Index (GPI) data from the Institute for Economics & Peace (IEP) was incorporated to provide a descriptive assessment of India's peace environment during major episodes of global trade uncertainty.

3.2 Research process:

The study adopts a multivariate time-series approach to examine the impact of global trade uncertainty on India's economic wellbeing. The empirical analysis is based on the following long-run relationship:

$$\ln GDP_t = \beta_0 + \beta_1 WTUI_t + \beta_2 Oil_t + \beta_3 EFFR_t + \beta_4 CPI_t + \beta_5 REER_t + \varepsilon_t$$

where $\ln GDP$ denotes real Gross Domestic Product, WTUI is the World Trade Uncertainty Index, Oil represents global crude oil prices, EFFR is the U.S. Effective Federal Funds Rate, CPI denotes the Consumer Price Index, and REER is the Real Broad Effective Exchange Rate.

First, the stationarity properties of the variables were examined using the Augmented Dickey–Fuller (ADF) unit root test. Next, the Johansen cointegration test was conducted to verify the existence of a long-run relationship among the variables. Since cointegration was established, the Vector Error Correction Model (VECM) was estimated to capture both the short-run dynamics and the speed of adjustment towards long-run equilibrium through the error correction term. The VECM specification is expressed as:

$$\Delta \ln GDP_t = \alpha ECT_{t-1} + \sum_{i=1}^{p-1} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=1}^{p-1} \beta_{2i} \Delta WTUI_{t-i} + \sum_{i=1}^{p-1} \beta_{3i} \Delta Oil_{t-i} + \sum_{i=1}^{p-1} \beta_{4i} \Delta EFFR_{t-i} + \sum_{i=1}^{p-1} \beta_{5i} \Delta CPI_{t-i} + \sum_{i=1}^{p-1} \beta_{6i} \Delta REER_{t-i} + \mu + \varepsilon_t$$

Where ECT_{t-1} is the error correction term representing the long-run equilibrium, α measures the speed of adjustment, and the differenced variables capture the short-run effects of changes in the explanatory variables on economic wellbeing.

To calculate the overall change in the value of all endogenous variables over time, Impulse Response Functions (IRFs) were then employed to demonstrate the dynamic responses of real GDP to the shocks of the explanatory variables. Lastly, the Forecast Error Variance Decompositions (FEVD) was employed to quantify the relative contribution of each variable to fluctuations in India's economic wellbeing over different forecast horizons. Together, these techniques provide a comprehensive assessment to capture both long and short-run impact of global trade uncertainty on India's economic wellbeing.

4. Results and discussions

4.1 Descriptive Statistics

The descriptive statistics of the variables included in this study are reported in Table 1. The sample consists of 84 quarterly observations, spanning 2005Q1–2025Q4. The variables were found to be stationary around their mean values. Real GDP (lnGDP) showed stable development with a small dispersion around the mean, with a mean of 17.57. In contrast, other variables revealed a significant variation around their means. The World Trade Uncertainty Index (WTUI) had a standard deviation as high as 50.04, and the range of 0 to 275.15. In addition, Brent crude oil price (Oil), EFFR, CPI, and REER had standard

deviations of 22.83, 1.98, 2.79, and 4.79, respectively.

The distribution of the variables revealed that WTUI had a significant positive skewness and leptokurtosis. By comparison, the remaining variables exhibit relatively moderate skewness and kurtosis, indicating more stable distributions over the sample period. Overall, the descriptive statistics unveiled that the growth of India's real GDP is more consistent than the development of other variables particularly global trade uncertainty and oil prices.

Table 1 Descriptive statistics of key macroeconomic variables.

Variable	Mean	Std. Dev.	Median	Min	Max	Range	Skewness	Kurtosis
lnGDP	17.57	0.38	17.60	16.85	18.22	1.37	-0.16	-1.15
WTUI	18.66	50.04	1.08	0.00	275.15	275.15	3.39	11.64
Oil	76.00	22.83	73.62	33.38	122.22	88.84	0.35	-0.93
EFFR	1.81	1.98	0.73	0.06	5.33	5.27	0.69	-1.17
CPI	6.55	2.79	6.12	1.46	15.32	13.86	0.76	0.34
REER	96.79	4.79	97.59	85.14	105.39	20.25	-0.55	-0.59

4. 2 Correlation Analysis

Table 2 presents the correlation statistics of the variables. Most of the variables indicate moderate correlations, and pairwise coefficients did not breach common thresholds for multicollinearity. Real GDP has a positive relationship with REER and WTUI and a negative relationship with inflation (CPI). In turn, inflation has a positive correlation with Brent crude oil prices, while the other variables display relatively weak correlations. Based on the correlation analysis, it cannot be concluded that the dataset contains severe multicollinearity. Formal multicollinearity diagnostics are undertaken in the subsequent econometric analysis.

Table 2 Correlation

Variable	lnGDP	WTUI	Oil	EFFR	CPI	REER
lnGDP	1					
WTUI	0.4369***	1				
Oil	-0.0649	-0.1734	1			
EFFR	0.0767	0.2490**	-0.1016	1		
CPI	-0.4387***	-0.2256**	0.4228***	-0.4230***	1	
REER	0.5768***	0.1529	-0.1783	0.2758**	-0.4712***	1

4.3 Lag Length Selection

VAR lag length criteria were employed to determine the optimal lag order ahead of the

Johansen cointegration test, with the results provided in Table X below. The selection criteria include the Akaike Information Criterion (AIC), Hannan–Quinn Information Criterion (HQIC), Schwarz Bayesian Information Criterion (SBIC), and Final Prediction Error (FPE). The table shows that while AIC and FPE suggest longer lag structures, HQIC points to two lags, and SBIC selected one lag. This study follows HQIC and adopts a VAR (2) specification, corresponding to a VECM with one lag of first-differenced variables for the subsequent analysis.

Table 3: VAR Selection Criteria

Criterion	Optimal Lag
Akaike Information Criterion (AIC)	8
Schwarz Bayesian Criterion (SC/BIC)	1
Hannan–Quinn Criterion (HQ)	2
Final Prediction Error (FPE)	4
Chosen Lag for Johansen Test	2 (HQ)

4.4 Augmented Dickey–Fuller (ADF) Unit Root Test Results

Table 4 reports the results of the Augmented Dickey–Fuller (ADF) unit root tests. The findings indicate all the variables are nonstationary at level, however they become stationary at the first difference. This confirms that they are integrated of order one. Therefore, the data satisfy the prerequisite for applying the Johansen cointegration test and VECM to analyze both short-run and long-run relationships among the variables since they are all integrated of the same order.

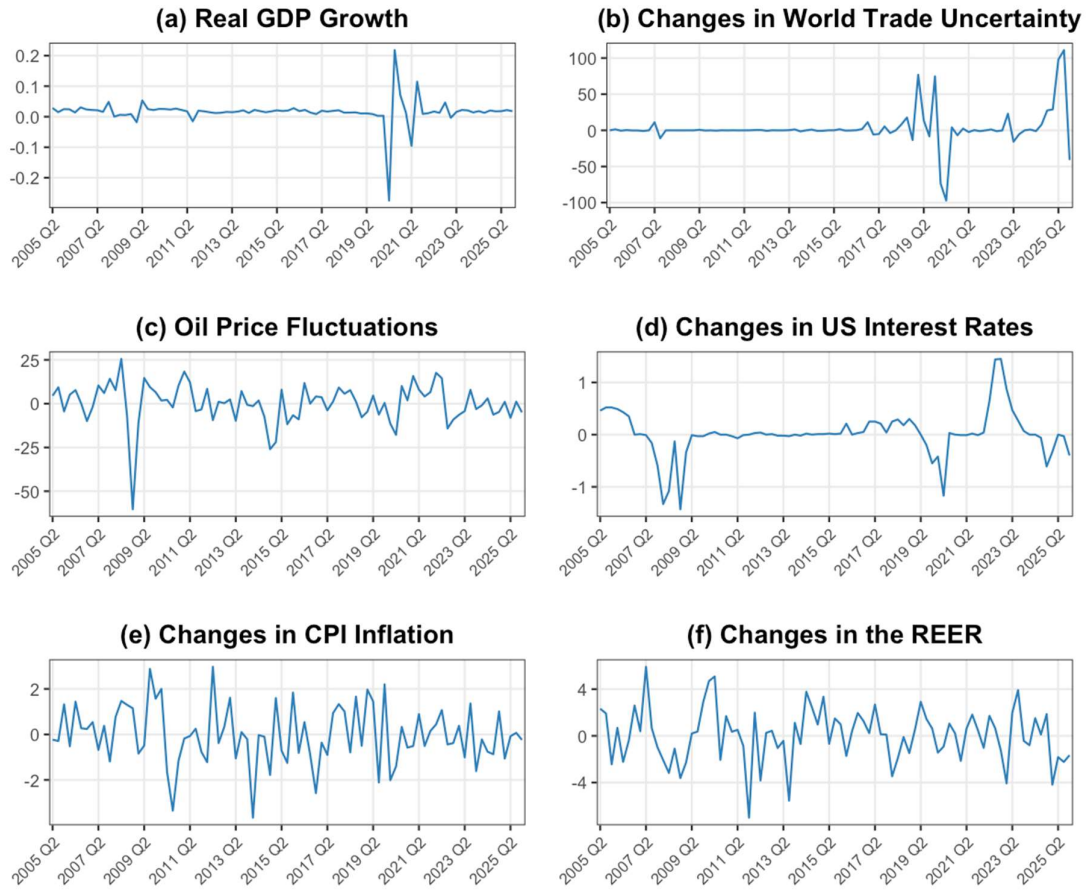
Table 4: ADF Unit Root Test Results

Variable	Level ADF Statistic	p-value	First Difference ADF Statistic	p-value
LnGDP I(1)	-2.649	0.325	-4.131	0.012
WTUI I(1)	-2.449	0.391	-5.342	0.010
Oil I(1)	- 2.597	0.344	-5.148	0.010
EFFR I(1)	-2.364	0.424	-4.685	0.010
CPI I(1)	-2.818	0.244	-4.823	0.010
REER I(1)	-1.690	0.708	-4.505	0.010

4.5 Visual Assessment of Time Series Stationarity

Figure 1 below provides the first-differenced series applied in the analysis. As observed in Figure 1(a), quarterly GDP growth was stable throughout most of the periods studied except for the time of the 2008-2009 Global Financial Crisis. The biggest drop occurred throughout the COVID-19 pandemic in 2020, followed by a rapid growth recovery in the subsequent quarter. However, according to Figure 1 (b), the quarterly changes in the World Trade Uncertainty Index were relatively modest until the end of the sample period, where a significant increase occurred in 2024-2025 due to heightened international trade tensions and geopolitical conflicts. In turn, Figure 1 (c) reveals that oil price changes were the most volatile throughout the entire sample period, specifically during two major crises i.e. 2008-2009 Global Financial Crisis and the COVID-19 pandemic. Changes in the effective federal funds rate were near-zero throughout 2009-2015 according to Figure 1 (d), which implies that the Federal Reserve kept the rate near the zero lower bound with limited fluctuations. Consequently, significant rate changes occurred after the COVID-19 pandemic, which align with the rapid monetary tightening in 2022-2023. Finally, Figures 1 (e) and (f) suggest that changes in India's CPI inflation and Real Effective Exchange Rate do not follow a particular trend, supporting the stationarity of the transformed series. Overall, there is visual evidence that the first-differenced variables are stationary, which coincides with the results from the unit root tests in Table 4.

Figure 1



4.6 Johansen Cointegration Test

Table 5 presents the results of the Johansen cointegration test. After establishing that the variables are integrated of the same order, the Johansen procedure was employed to examine the long-run relationship among India's real GDP, World Trade Uncertainty (WTUI), Brent crude oil prices, the Effective Federal Funds Rate (EFFR), inflation (CPI), and the Real Effective Exchange Rate (REER) (Johansen, 1991). The null hypothesis of the Johansen test states that there is no cointegration relationship among the variables. Confirming cointegration establishes a stable, long-run equilibrium, thereby mitigating the risk of spurious regressions (Hendry & Juselius, 2001)

The initial results suggest that not only the Trace statistic (118.30) but also the Maximum Eigenvalue statistic (45.17) at the 5per cent level rejects the null hypothesis of no cointegration. Since both cointegration tests fail to reject the null hypothesis of at most one (1) cointegrating vector, a unique long-run equilibrium is confirmed. These findings justify the Vector Error Correction Model is appropriate to captures both the short-run dynamics and

the long-run equilibrium relationship.

Table 5 Johansen tests for cointegration

Max Rank	Trace Statistic	5% Critical Value	Max-Eigen Statistic	5% Critical Value
None ($r = 0$)	118.30	102.14	45.17	40.30
At most 1	73.13	76.07	25.91	34.40
At most 2	47.22	53.12	17.83	28.14
At most 3	29.39	34.91	12.15	22.00
At most 4	17.25	19.96	9.76	15.67
At most 5	7.49	9.24	7.49	9.24

4.7 Vector error correction model (VECM) results

Table 6 presents the results of the short-run estimates for the Vector Error Correction Model (VECM). The results reveal that the error correction term ($ECT = -0.00048$, $p < 0.01$) is statistically significant at the 1 per cent level. This finding suggests the presence of a stable long-run relationship between India's economic wellbeing and the considered domestic and global macroeconomic factors. Although the speed of adjustment is relatively slow, deviations from the long-run equilibrium gradually self-correct, demonstrating the Indian economy's resilience in restoring macroeconomic stability after external shocks

Among the explanatory variables, the World Trade Uncertainty Index (WTUI) has a positive and significant short-run impact on economic growth. Increased global trade uncertainty is unlikely to have an immediate negative impact on the country's economic growth. Instead, India appears to benefit from temporary trade-diversion effects driven by the reallocation of supply chains and investment out of nations directly impacted by trade disputes. However, the overall impact of the WTUI variable on economic growth is positive but should be interpreted with caution, as it represents only the short-run gains. In the long run, persistent trade uncertainty may eventually weaken global demand and investment.

The coefficient on lagged GDP growth is negative and highly significant, indicating a process of mean reversion in economic activity. Periods of exceptionally strong economic growth are typically followed by slower growth as the economy returns towards its long-run equilibrium path. This behaviour reflects the cyclical nature of economic growth and highlights the economy's tendency to correct temporary expansions rather than sustain unusually high growth rates indefinitely.

The estimated coefficients for international oil prices, the U.S. Effective Federal Funds Rate (EFFR), Real Effective Exchange Rate (REER) and consumer price inflation (CPI) are statistically insignificant in the short run. This suggests that these macroeconomic variables do not exert an immediate influence on India's quarterly economic performance. The limited short-run impact may reflect several structural features of the Indian economy, including monetary policy responses, exchange-rate management by the Reserve Bank of India, fiscal measures to cushion energy price shocks, and gradual pass-through of international financial conditions to domestic economic activity. Consequently, the effects of these variables are more likely to materialise through longer-term adjustment mechanisms rather than through immediate quarterly changes in output.

The results of the VECM illustrate that out of the selected global macroeconomic forces, only the global trade uncertainty shock is characterised by a statistically significant short-run impact on India's economic wellbeing. Meanwhile, the other forces are associated with long-run effects only, which implies that, despite being an important driver of globalisation, India's economy is relatively protected from short-term geopolitical and macroeconomic forces. The reviewed results suggest that India's long-term economic well-being relies on steady domestic stability rather than short-lived global market shifts.

Table 6 Results of VECM test

Variable	Coefficient	Std. Error	T Statistic
Short run Coint(Eq1)	-0.00048*	0.00014	-3.40
Δ GDP	-0.55932*	0.11140	-5.02
Δ WTUI	0.00082	0.00027	3.05
Δ Oil	0.00063	0.00044	1.42
Δ EFFR	0.00228	0.01050	0.22
Δ REER	0.00196	0.00190	1.03
Δ CPI	0.00008	0.00350	0.02
Constant	-0.21947*	0.06340	-3.46

4.8 Diagnostic Tests

Diagnostic tests were performed on the estimated VECM to check for serial correlation, heteroskedasticity, and residual normality. The results of the diagnostic tests are given in Table 7. Panel A reports no serial correlation ($p = 0.8614$) based on the Portmanteau test, suggesting that the residuals are not autocorrelated. Panel B reports the results of the Jarque-Bera test ($p < 0.001$) and reveals that the dataset is not multivariate normal because the skewness and kurtosis statistics are statistically significant. Panel C presents the results of the multivariate ARCH test. The test shows no evidence of conditional heteroskedasticity ($p = 1$).

It can be concluded that the VECM is not subject to serial correlation and ARCH effects, although the residuals are not normally distributed.

Table 7 Panel A. Serial Correlation Test

Test	LM stat	df	p-value
Portmanteau Test	475.44	510	0.8614

Panel B. Normality Test

Test	LM stat	df	p-value
Skewness	73.92	6	<0.001
Kurtosis	631.44	6	<0.001
Jarque–Bera	705.36	12	<0.001

Panel C. Heteroskedasticity Test

Test	LM stat	df	p-value
Multivariate ARCH Test	1617.00	2205	1.0000

4.9 Impulse response function (IRF)

Tables 8–12 present the impulse response functions illustrating the dynamic effect of a one-standard-deviation shock in trade uncertainty (WTUI), oil prices, the effective federal funds rate (EFFR), the real effective exchange rate (REER), and inflation (CPI) on India's economic wellbeing (lnGDP). The impulse responses are estimated using orthogonalised innovations based on Cholesky decomposition, with 95per cent bootstrap confidence intervals constructed from 1,000 replications.

A positive shock to global trade uncertainty has a positive impact on India's economic wellbeing in the short run. This is evident in the first few periods, as India experiences the effects of trade diversion. However, the positive impact is not statistically significant as the confidence interval includes zero. The positive response of India's economic wellbeing to the rise in global trade uncertainty is reversed over time. Starting from the sixth horizon, the response becomes negative and remains negative thereafter with statistical significance as the confidence bands are below zero. It appears that a permanent rise in global trade uncertainty will eventually harm India's economy. This is because the effects of uncertainty shocks on trade disruptions, weaker external demand, heightened investment uncertainty, and global

supply chain adjustments dominate the initial benefits of trade diversions.

Oil price shocks also yield a negative response in economic wellbeing over the forecast horizon, capturing the effects of increased production costs, imported inflation, and negative impacts on domestic factors through rising energy prices. In contrast, the US Federal Funds Rate have a small positive response, while REER and CPI shocks show only moderate effects. At the same time, the confidence intervals for all variables generally include zero over the forecast horizon, which suggests that these shocks do not affect India's economic wellbeing consistently enough during the sample period. Thus, the impulse response identifies global trade uncertainty as the major source of fluctuations in growth convergence, while other factors show comparatively weak and statistically less robust.

Table 8. Impulse Response of India's Economic Wellbeing (lnGDP) to a One-Standard-Deviation WTUI Shock

Horizon (Quarters)	Response (%)	Lower 95% CI	Upper 95% CI
1	0.98	-0.09	2.20
3	-0.17	-1.41	1.35
6	-3.07	-4.59	-0.07
12	-4.96	-7.42	-0.38
20	-5.33	-8.70	-0.40

Table 9. Impulse Response of India's Economic Wellbeing (lnGDP) to a One-Standard-Deviation Oil Price Shock

Horizon (Quarters)	Response (%)	Lower 95% CI	Upper 95% CI
1	0.22	-0.30	0.88
3	-0.76	-1.74	0.65
6	-1.65	-3.06	0.75
12	-1.96	-4.09	1.03
20	-2.02	-4.50	1.15

Table 10. Impulse Response of India's Economic Wellbeing (lnGDP) to a One-Standard-Deviation EFFR Shock

Horizon (Quarters)	Response (%)	Lower 95% CI	Upper 95% CI
1	0.57	-0.23	1.63
3	0.46	-0.58	2.05
6	0.57	-0.94	2.80
12	0.76	-2.18	3.93
20	0.80	-2.67	4.75

Table 11. Impulse Response of India's Economic Wellbeing (lnGDP) to a One-Standard-Deviation REER Shock

Horizon (Quarters)	Response (%)	Lower 95% CI	Upper 95% CI
1	-0.10	-0.58	0.56
3	-0.42	-1.42	0.87
6	-0.23	-1.82	1.95
12	-0.18	-2.27	2.48
20	-0.17	-2.49	2.78

Table 12. Impulse Response of India's Economic Wellbeing (lnGDP) to a One-Standard-Deviation CPI Shock

Horizon (Quarters)	Response (%)	Lower 95% CI	Upper 95% CI
1	-0.12	-0.73	0.42
3	-0.01	-1.13	1.05
6	1.27	-0.67	3.02
12	2.00	-0.59	4.43
20	2.14	-0.58	5.00

4.10 Forecast Error Variance Decomposition (FEVD)

Forecast Error Variance Decompositions: FEVD is employed to assess the relative importance of various macroeconomic shocks on the wellbeing of India's economy beyond the impulse response analysis. Table 13 below reports the percentage of forecast error variance in economic wellbeing (lnGDP) attributed to each shock over the forecast horizon.

In the short term, India's economic wellbeing explained by its own innovations, which account for about 89.7per cent of the forecast error variance for the first quarter. Nevertheless, the impact of domestic shocks tends to decrease over time, while the influence of external effects increases. In the twentieth quarter, the main source of variation is global trade uncertainty, which accounts for about 57.4per cent of the forecast error variance, while the share of own shocks decreases to 23.1per cent. Therefore, it can be concluded that trade wars and uncertainty in the global economy in the long run have a significant impact on the economic wellbeing of India through reduced investment, reduced export demand, and disruptions in global supply chains.

Among the remaining factors, oil price shocks are found to contribute the highest to the forecast error variance at around 9.4per cent, which suggests that India is highly exposed to energy import prices and the associated production costs. Inflation shocks, in their turn, explain nearly 8.6per cent of the variance, pointing to the significant impact of domestic pricing mechanisms on the macroeconomy in the long run. Meanwhile, the impact of the shocks to EFR and REER seems to be relatively limited, which implies that the external

forces have a limited impact on India's long-run economic wellbeing compared to trade and oil price related shocks.

In general, the FEVD analysis results reinforce the impulse response analysis findings by under underscoring the significance of trade-related uncertainty as the biggest external factor influencing India's economic wellbeing. This shows that the Indian economy is highly exposed to prolonged geopolitical tensions and trade-related volatility.

Table 13. Forecast Error Variance Decomposition (FEVD) of India's Economic Wellbeing

Horizon	Own Shock (lnGDP)	WTUI	Oil	EFFR	REER	CPI
1	89.67	7.30	0.37	2.47	0.08	0.11
5	65.40	20.49	8.78	2.08	0.69	2.55
10	34.45	46.36	10.31	1.58	0.28	7.02
15	26.22	54.25	9.72	1.47	0.17	8.18
20	23.05	57.38	9.39	1.42	0.13	8.62

5. Trends in India's Global Peace Index (2010–2025)

The figure 2 shows the changes in India's Global Peace Index (GPI) from 2010 to 2026. The changes in GPI are used as an indicator of country peace, the lower GPI, the more peaceful the country is. Therefore, the figure below demonstrates four distinct phases t of peace development in India's peace environment corresponding to major geopolitical and domestic developments.

During 2015 and 2016, there was a mild decline in peace as India's GPI increased from 2.504 to 2.566. The change can be related to the heightened terrorist attacks on India's borders and increased concerns regarding security issues with Pakistan. Indeed, the Global Peace Index 2016 demonstrates that both Ongoing Conflict and Militarisation sub-indexes decreased slightly from 2015 to 2016, which indicates growing tensions with Pakistan and greater military preparedness.

A significant decline was recorded during 2018-2020, as the GPI increased from 2.504 in 2018 to 2.628 in 2020, which was the lowest peaceful period throughout the observed timeframe. Global Peace Index 2019 cited increased tensions between India and Pakistan after the Pulwama terrorist attack and the subsequent military standoff, persistent insurgencies in Jammu and Kashmir and Naxalite areas, a rise in internal conflicts, and higher levels of

militarization in South Asia as factors contributing to the decline. Peace conditions continued to weaken due to pandemic-related disruptions to social and economic activities and heightened geopolitical tensions, particularly the intensifying US-China trade conflict, during the COVID-19 era.

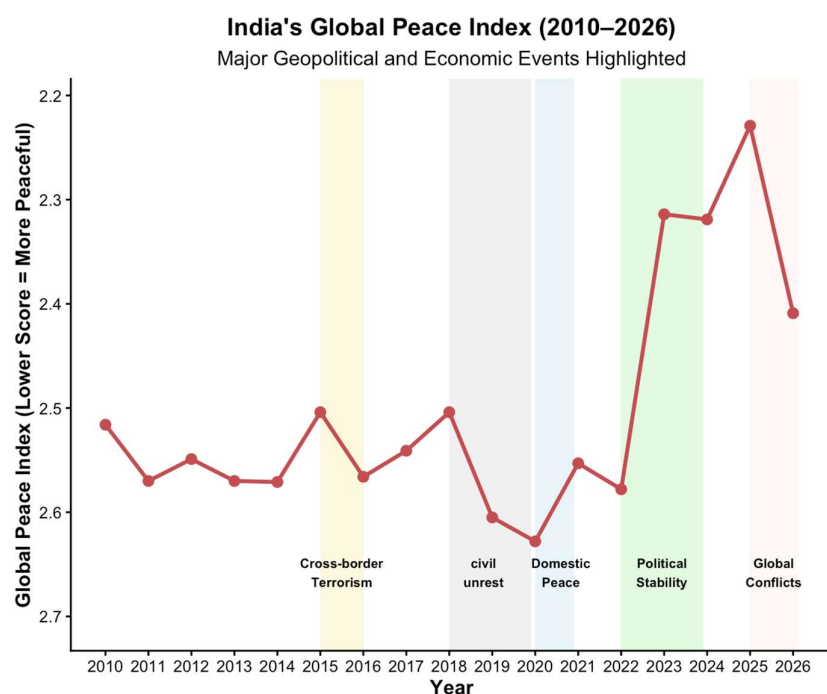
From 2021 onwards, India's peace environment improved considerably. The GPI declined from 2.553 in 2021 to 2.229 in 2025, indicating a sustained improvement in peacefulness. The Global Peace Index 2021 attributes the initial recovery primarily to improvements in the Ongoing Conflict domain, particularly a reduction in the intensity of internal conflicts, with India recording one of the largest global improvements in the Internal Conflicts Fought indicator. Subsequent GPI reports indicate that continued reductions in ceasefire violations along the India–Pakistan border, easing tensions with China along the Line of Actual Control (LAC), lower political instability, declining social unrest, and reductions in violent crime strengthened the Societal Safety and Security domain, contributing to the sustained improvement observed during 2022–2025.

The trend was partially reversed in 2026 as the GPI increased to 2.409. The Global Peace Index 2026 attributes the deterioration primarily on renewed geopolitical tensions, including the four-day military standoff between India and Pakistan in May 2025, regarded as the most serious armed exchange between the two countries since 1971. The conflict was accompanied by the suspension of the Indus Waters Treaty and bilateral trade, worsening relations with neighbouring countries, ethnic clashes in Manipur, and overall regional geopolitical tensions that deteriorated the Ongoing Conflict domain.

Figure 2 generally illustrates the fluctuations in India's peacefulness broadly correspond to major episodes of domestic conflict and geopolitical tensions. In particular, the decrease in the peace score in 2018 – 2020 can be associated with heightened interstate tensions, persistent internal security challenges, and the COVID-19 pandemic, while the improvement from 2022 to 2025 demonstrated that the gradual strengthening of peace indicators due to the reduction of internal conflicts, fewer ceasefire violations along the India-Pakistan border, eased tensions with China, and an overall improvement in societal safety and security according to the Global Peace Index. These gains were partially reversed in 2025, highlighting the sensitivity of peace outcomes to both domestic security conditions and cross-border geopolitical developments.

In general, the research results indicate that, although India may be relatively stable against short-term fluctuations of international trade and geopolitical risks, long-run exposure to such factors may have adverse effects on the country's economic wellbeing. The current level of economic development allows us to mitigate some of the negative supply- and demand-side effects, but many critical points still need to be addressed to make India less susceptible to future trade disruptions. In particular, it is necessary to ensure that domestic manufacturing and exports can rely on alternative sources and suppliers, thereby maintaining overall economic stability. Moreover, India should strive to minimise its geopolitical risks in the long run, which would provide a better macroeconomic environment and attract more investors. These strategies will make India more resilient to future disruptions while also helping it grow stronger economically.

Figure 2



Note: Lower Global Peace Index (GPI) values indicate higher levels of peace.

6. Conclusion and Policy Implications

The results reveal that there is a long-run equilibrium relationship among the variables. The error correction term is negative and statistically significant which implies that deviations from long-run equilibrium are corrected over time, demonstrating the economy's capacity to adjust to external disturbances. In the short-run, world trade uncertainty is the only external

shock that has a statistically significant impact on the economy's wellbeing, whereas oil price, US monetary policies, exchange rates, and inflation have relatively minor impacts. According to the impulse response analysis, although trade uncertainty seems to have a positive effect on the economy in the short run, reflecting trade diversion, in the long run, it starts to have a significantly negative impact on economic wellbeing. Consistent with this result, we can see from the forecast error variance decomposition that world trade uncertainty becomes the dominating source of disturbance to India's economic wellbeing in the long run, whereas oil price shocks seem to have relatively smaller impacts, and the impacts of the other variables are limited.

Beyond the econometric results presented in the research, the analysis of the GPI for India provides insight into the geopolitical landscape in which the country's economy operates. Specifically, the descriptive analysis reveals trends in GPI that correlate with changes in geopolitical circumstances affecting international economic interactions. The evidence indicates that periods of deteriorating peacefulness, particularly in 2015-2016, 2018-2020, and 2026 suggests that international terrorism, geopolitical tensions, internal unrest, and regional wars undermine economic growth. In contrast, improvement observed in 2022-2025 reflects internal and external economic and political stability conducive to trade, investment, and overall economic growth.

Overall, the findings suggest that while India's economy possesses the capacity to absorb temporary external disturbances, prolonged global trade uncertainty and geopolitical instability impose substantial long-run costs on economic wellbeing. Strengthening domestic manufacturing capabilities, diversifying export markets and global value chains, promoting investment in resilient supply chains, and maintaining sound macroeconomic fundamentals remain essential for reducing vulnerability to future trade disruptions. At the same time, sustaining internal peace, strengthening regional diplomatic engagement, and promoting political and institutional stability can reinforce investor confidence and support a more resilient economic environment. Together, these measures will enhance India's ability to withstand future episodes of global trade turbulence while supporting sustainable economic growth and improving overall economic wellbeing

References

- Amiti, M., Redding, S. J., & Weinstein, D. E. (2019). The impact of the 2018 trade war on U.S. prices and welfare. *Journal of Economic Perspectives*, 33(4), 187–210. <https://doi.org/10.1257/jep.33.4.187>.
- Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, 131(4), 1593–1636. <https://doi.org/10.1093/qje/qjw024>
- Barbieri, K. (1996). Economic interdependence: A path to peace or a source of interstate conflict. *Journal of Peace Research*, 33(1), 29–49. <https://doi.org/10.1177/0022343396033001003>
- Barbieri, K. (2002). *The liberal illusion: Does trade promote peace?* University of Michigan Press.
- Bijsterbosch, M., & Guérin, P. (2013). Characterizing very high uncertainty episodes. *Economics Letters*, 121(2), 239–243. <https://doi.org/10.1016/j.econlet.2013.08.021>
- Bloom, N. (2009). The impact of uncertainty shocks. *Econometrica*, 77(3), 623–685. <https://doi.org/10.3982/ECTA6248>
- Caggiano, G., Castelnuovo, E., & Groshenny, N. (2014). Uncertainty shocks and unemployment dynamics in U.S. recessions. *Journal of Monetary Economics*, 67, 78–92. <https://doi.org/10.1016/j.jmoneco.2014.07.006>
- Caldara, D., Iacoviello, M., Molloy, P., Prestipino, A., & Raffo, A. (2020). The economic effects of trade policy uncertainty. *Journal of Monetary Economics*, 109, 38–59. <https://doi.org/10.1016/j.jmoneco.2019.11.002>
- Clark, P. B. (1973). Uncertainty, exchange risk, and the level of international trade. *Economic Inquiry*, 11(3), 302–313. <https://doi.org/10.1111/j.1465-7295.1973.tb01063.x>
- Fajgelbaum, P., & Khandelwal, A. (2021). The economic impacts of the US–China trade war. *Annual Review of Economics*, 14, 587–613. <https://doi.org/10.1146/annurev-economics-051420-110410>
- Feng, L., Huang, Q., Li, Z., & Meissner, C. M. (2026). *The "peace dividend" of international trade: A new empirical approach* (NBER Working Paper No. 35078). National Bureau of Economic Research.
- Grossman, G. M., & Helpman, E. (1991). *Innovation and growth in the global economy*. MIT Press.
- Handley, K., & Limão, N. (2015). Trade and investment under policy uncertainty: Theory and firm evidence. *American Economic Journal: Economic Policy*, 7(4), 189–222. <https://doi.org/10.1257/pol.20140068>
- Hegre, H., Oneal, J. R., & Russett, B. (2010). Trade does promote peace: New simultaneous estimates of the reciprocal effects of trade and conflict. *Journal of Peace Research*, 47(6), 763–774. <https://doi.org/10.1177/0022343310385995>

- Hooper, P., & Kohlhagen, S. W. (1978). The effect of exchange rate uncertainty on the prices and volume of international trade. *Journal of International Economics*, 8(4), 483–511. [https://doi.org/10.1016/0022-1996\(87\)90001-8](https://doi.org/10.1016/0022-1996(87)90001-8)
- Hye, Q. M. A., & Lau, W.-Y. (2015). Trade openness and economic growth: Empirical evidence from India. *Journal of Business Economics and Management*, 16(1), 188–205. <https://doi.org/10.3846/16111699.2012.720587>
- Institute for Economics and Peace. (2016). *Global Peace Index 2016: Ten years of measuring peace*.
- Institute for Economics and Peace. (2019). *Global Peace Index 2019: Measuring peace in a complex world*.
- Institute for Economics and Peace. (2021). *Global Peace Index 2021: Measuring peace in a complex world*.
- Institute for Economics and Peace. (2023). *Global Peace Index 2023: Measuring peace in a complex world*.
- Institute for Economics and Peace. (2026). *Global Peace Index 2026: Measuring peace in a complex world*.
- Jurado, K., Ludvigson, S. C., & Ng, S. (2015). Measuring uncertainty. *American Economic Review*, 105(3), 1177–1216. <https://doi.org/10.1257/aer.20131193>
- Leduc, S., & Liu, Z. (2016). Uncertainty shocks are aggregate demand shocks. *Journal of Monetary Economics*, 82, 20–35. <https://doi.org/10.1016/j.jmoneco.2016.07.002>
- Oneal, J. R., & Russett, B. (1999). The Kantian peace: The pacific benefits of democracy, interdependence, and international organizations, 1885–1992. *World Politics*, 52(1), 1–37. • <https://doi.org/10.1017/S0043887100020013>
- Polachek, S. W. (1980). Conflict and trade. *Journal of Conflict Resolution*, 24(1), 55–78. <https://doi.org/10.1177/002200278002400103>
- Rivera-Batiz, L. A., & Romer, P. M. (1991). Economic integration and endogenous growth. *The Quarterly Journal of Economics*, 106(2), 531–555. <https://doi.org/10.2307/2937946>
- Rodrik, D. (1999). Where did all the growth go? External shocks, social conflict, and growth collapses. *Journal of Economic Growth*, 4(4), 385–412. <https://doi.org/10.1023/A:1009863208706>
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5, Part 2), S71–S102. <https://doi.org/10.1086/261725>
- Sheikh, M. A., Malik, M. A., & Masood, R. Z. (2021). Uncertainty, trade and growth: An Indian experience. *The Indian Economic Journal*, 69(4), 531–555. <https://doi.org/10.1177/00194662211035261>
- Wani, N. U. H. (2022). Trade openness, capital formation, and economic growth. *Eurasian Journal of Business and Economics*, 15(29), 35–55. <https://doi.org/10.17015/ejbe.2022.029.03>