



DOES REAL EXCHANGE RATE COMPETITIVENESS MATTER FOR INDIA'S EXPORT GROWTH? EVIDENCE FROM ALTERNATIVE REER MEASURES

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Abstract: This paper investigates the effect of real exchange rate competitiveness on the short-term export growth of India from 2005 to the long-term export growth of India, 2005-2024. The paper employs export-growth regressions using annual data incorporating changes in the real effective exchange rate (REER) along with global economic activity and trade openness. Both contemporaneous and lagged REER impacts are analysed. The robustness of the results was examined using trade-weighted and export-weighted REER methods. The results indicate that increases in REER are negatively related to export growth, but the effect is not statistically significant either contemporaneously or with lags. By contrast, export growth is strongly positively associated with global GDP growth and trade openness. The results are robust to different REER metrics. Taken together, the evidence indicates that short-run fluctuations in India's aggregate exports are more connected with global demand and trade integration than with variations in exchange rate competitiveness alone.

Keywords: Export Growth; Real Effective Exchange Rate; Exchange Rate Competitiveness; Trade Openness

1. Introduction

India's export performance is generally linked to international competitiveness, exchange-rate management, global demand conditions and trade integration. A general theoretical argument around the open-economy theory is that a real depreciation improves export competitiveness by lowering the foreign-currency price of domestic goods. The Real Effective Exchange Rate (REER) is widely used as an indicator of international price competitiveness. It incorporates exchange-rate movements and relative price differentials across trading partners. Yet the empirical importance of exchange rate for aggregate exports is not dominant in international trade literature. This is because of the fact that the exporters face even substantial non-price competitiveness constraints. Therefore, changes in REER may not translate proportionately or immediately into changes in export growth (Goldberg & Knetter, 1997). In emerging economies like India, the magnitude and timing of the exchange-rate effect may remain as an important empirical question.

The availability of consistent REER Data is essential for understanding the importance of movements in real exchange-rate competitiveness and their short-run influence on India's exports. But the REER data are available only from 2005, is therefore limiting the scope for longer historical analysis. The present study, therefore, examines the short-run effect of real exchange-rate movements on India's aggregate export growth during 2005–2024. The analysis distinguishes between contemporaneous and lagged

REER effects, while controlling for world GDP growth and trade openness. The trade weighted and export weighted REER measures are used to evaluate the robustness of the results

2. Objective and Methodology

The central objective of the study is to assess the relative importance of exchange-rate competitiveness as compared to global demand and trade integration in explaining India's short-run export growth. The study is based on annual secondary data. The data on India's exports, macro-economic factors and trade openness are compiled from the national and international databases including, World Bank, RBI, IMF and Ministry of Commerce and Industry.

3. Review of Related Literature and the Research Gap

The relationship between exchange rate changes and export performance has been a perennial topic in international economics. The standard theoretical argument is that a real depreciation increases the international price competitiveness of domestic goods, and thereby encourages exports, whereas a real appreciation may weaken competitiveness and hurt export performance. The REER has also been monitored by the Indian government and the Reserve Bank of India (RBI) in the past to hold the rupee at a level that enhances export competitiveness without endangering macroeconomic stability. In empirical applications, the REER is commonly used to capture this dimension of competitiveness because it incorporates exchange-rate movements together with relative price changes across trading partners. For an emerging economy such as India, the relevance of this relationship is particularly important because export performance is influenced not only by domestic production conditions but also by movements in international prices, exchange rates and global demand.

Several studies find a negative relationship between REER appreciation and exports. For example, Srinivasan & Wallack (2003) found that real appreciation of the exchange rate had a significant negative relationship with India's export growth. Similarly, Kaushal (2022) found negative elasticity of export demand in relation to REER. fluctuations in REER had a negative impact on manufacturing competitiveness of India during 2001-2020 (Ganai et al. 2024). These results are consistent with the standard price competitiveness mechanism, whereby appreciation of the domestic currency raises the relative cost of the Indian exports in international markets.

The size and importance of the exchange-rate effect vary a great deal across studies. The impact of exchange rate movements on exports could be affected by a number of factors, for example the composition of the export sector, the markets to which exports are directed, the level of import dependence and the degree of competition faced by exporters on factors other than price. The limited responsiveness of exports to exchange rate movements shows that export competitiveness depends on factors beyond exchange rate competitiveness alone (Veeramani, 2008). Kapur & Mohan (2014) argued that external demand has a stronger role than exchange rates in some specifications. Exchange rate competitiveness is only one component of export performance; supply-side bottlenecks matter much more than that (IMF, 2015).

REER is essentially an average of bilateral real exchange rates weighted by trading-partner shares and is widely used as a measure of overall international price competitiveness (IMF, 2015). A change in the REER may not result in a proportional change in aggregate exports. This variability helps to explain why some empirical studies have found relatively weak or statistically insignificant exchange-rate effects, although the theory suggests that a stronger currency should be associated with lower exports.

In Indian context, a number of studies have tried to establish long run correlations between exchange rates and exports. For this purpose, the Autoregressive Distributed Lag (ARDL) bounds testing approach has been extensively applied. Nema and Sahu (2026) applied the ARDL-ECM model on monthly data for the period 2005-2024. Similarly, Srinivasan and Kalaivani (2013) employed ARDL models to separate short run and long run impacts with annual data. Besides, various other researches have employed VECM and DOLS to examine the long-term linkages between exchange rates and exports, including investigations into different manufacturing sub-sectors. These studies suggest that the impact of exchange rates may vary according to the time dimension considered.

The presence of a long-run equilibrium relationship between exchange rates and exports does not mean that year-to-year changes in exchange-rate competitiveness will have immediate and significant impacts on export growth. Also, the distinction between short-run and long-run effects is related to possibility of asymmetric adjustment. The J-curve hypothesis describes the dynamic adjustment of the trade balance following a currency depreciation, whereby the trade balance may initially deteriorate before improving as export and import quantities respond to changes in relative prices (Magee, 1973). Nema and Sahu (2026) report the existence of alternating exchange-rate effects in the Indian context. Subsequent studies report structural breaks that could have affected the link between exchange rates and trade efficiency. The results indicate that the timing of exchange-rate effects is relevant to analyze instead of assuming an instantaneous reaction.

The increased use of disaggregated data to examine how exchange-rate movements affect different categories of exports are also to be highlighted. The aggregate response of exports may conceal substantial differences across sectors because industries vary in their dependence on imported inputs, market power, product differentiation, technological intensity, and exposure to international competition. Kapur and Mohan (2014) found that the magnitude of the effect of appreciation and depreciation differs across manufacturing sub-groups such as chemicals and machinery. Analysing a firm-level longitudinal data from Indian manufacturing firms, Dhasmana (2013), established the importance of industry-specific characteristics and market power in determining the export response to exchange-rate movements. Similar to these findings, manufacturing sectors characterized by lower product complexity are more sensitive to real exchange-rate movements (Goda et al. 2024).

Similar differences have also been reported by researchers in sectors other than manufacturing. Alkhateeb and Sultan (2015) established a long-run cointegrating relationship between exchange rates and agricultural exports. Currency depreciation was found to be associated with export expansion. In the service sector, Upadhyay and Roy (2016) found evidence that depreciation improves the international competitiveness of India's exports of software and services. These results suggest that the effect of exchange rate competitiveness is not uniform across the Indian export basket.

Some of the studies also extended the analysis to commodities and sub-national units. Kaushal (2022) analysed the prospects of India's exports through a stochastic frontier gravity model considering trade agreements and REER levels. Tan et al. (2019) have developed subnational competitiveness indicators to examine the reaction of exports to the exchange rate conditions and volatility. Sohrabji (2024) employed a dynamic fixed-effects estimating methodology to explore the unequal effects of currency rates across

different sectors. Sharma & Pal (2018) and Sharma (2020) also investigated the exchange rate volatility using commodities-level panel data. These disaggregated studies suggest that the role of exchange rate competitiveness may vary across products, industries, and markets. But this heterogeneity also implies a need for evidence at the aggregate level. Thus, aggregate export growth is the sum of such heterogeneous sectoral responses and may be associated with a weaker or more complex relationship with exchange rate changes than the individual sectors.

Despite these insights, there are some important empirical gaps exists in the Indian context. Most of the existing literature is either on long-run cointegration using historical data sets or disaggregated firm-level behaviour. There is a relative scarcity of research dedicated specifically to the short-run aggregate growth response of India's exports in the contemporary period (2005–2024). Although, a number of studies look at the REER in isolation, few consider it in a unified growth rate framework with controls for World GDP growth (as a proxy for external demand) and Trade Openness (as a proxy for structural determinants). There is also little comparative evidence on the impact of different REER constructions, trade-weighted versus export-weighted indices, on the estimated sensitivity of exports.

The present study fills these gaps by examining India's short-run export growth from a robust econometric perspective. In distinguishing between contemporaneous and lagged REER effects, and testing the consistency of results across alternative REER measures, the present research goes beyond the question of whether exchange rates matter in principle. Rather, it provides an exact empirical assessment of the relative importance of price competitiveness vis-à-vis global demand conditions in the modern Indian economy.

4. Data and Methodology

The empirical analysis examines the short-run determinants of India's aggregate export growth over the period 2005–2024. Annual data are used throughout the analysis. The dependent variable is India's export growth, measured as the annual change in the logarithm of real exports. REER is the principal explanatory variable. Two alternative measures of REER, a trade-weighted REER and an export-weighted REER are used. The trade-weighted REER assigns weights according to India's broader trade relationships and therefore provides a measure of competitiveness in relation to its overall trading partners. The export-weighted REER, in contrast, places greater emphasis on countries that constitute India's export markets. The latter may therefore provide a more directly export-oriented measure of the competitive conditions faced by Indian exporters. Changes in the logarithm of the REER are used in the empirical models. World GDP growth, which serves as a proxy for global demand conditions, and trade openness, measured as the ratio of the sum of exports and imports to GDP, are the two additional explanatory variables are incorporated in the model.

The baseline model is specified as:

$$D_LEXP_t = \alpha + \beta_1 D_LREER_t + \beta_2 D_LGDPWORLD_t + \beta_3 D_LTO_t + \varepsilon_t$$

The coefficient β_1 captures the contemporaneous short-run association between real exchange-rate movements and export growth. Under the conventional price-competitiveness hypothesis, real appreciation is expected to be associated with lower export growth and therefore β_1 is expected to be negative. To examine whether the effect of exchange-rate movements is delayed, a second specification incorporates a one-period lag of REER growth:

$$D_LEXP_t = \alpha + \beta_1 D_LREER_t + \beta_2 D_LREER_{(t-1)} + \beta_3 D_LGDPWORLD_t + \beta_4 D_LTO_t + \varepsilon_t$$

The coefficient on the lagged REER variable captures whether exchange-rate movements in the preceding year have an additional short-run association with current export growth. The inclusion of the lagged variable is motivated by the possibility that exporters may require time to adjust prices, production, contracts and international market strategies following exchange-rate changes. However, the present analysis is not intended to estimate a full long-run adjustment mechanism; rather, it tests whether evidence of an immediate or one-year-delayed response can be detected within the available annual data.

5. Results and Discussions

5.1 Descriptive Statistics and Stationarity Analysis

The descriptive statistics given in table 1 shows that the variables exhibit meaningful year-to-year variation, possibly due to the changing external environment faced by the Indian economy during 2005–2024. The average growth rate of India's exports (D_LEXP) during 2005–2024 was approximately 6.8 per cent per year, although considerable fluctuations were observed, as reflected by a standard deviation of 0.0887.

World GDP growth (D_LGDP_WORLD) recorded an average annual growth rate of 2.8 per cent. Changes in trade openness (D_LTO) exhibited substantial variability, this shows significant fluctuations in India's trade integration during the study period. The variation observed in the REER indicates that India's real exchange-rate competitiveness also changed over the study period.

Table 1: Descriptive Statistics of Growth Variables (2005–2024)

Variable	Mean	Median	Minimum	Maximum	S.D	Skewness	Kurtosis
D_LEXP	0.0681	0.0615	-0.0721	0.2593	0.0887	0.2545	2.5420
D_LREER	0.0079	0.0116	-0.0915	0.0813	0.0442	-0.2996	2.8277
D_LGDP_WORLD	0.0280	0.0307	-0.0294	0.0622	0.0198	-1.5182	5.7928
D_LTO	0.0032	-0.0008	-0.1544	0.1848	0.0993	0.1488	2.0362

Source: Author's computation using R.

The study observe that export growth is positively correlated with world GDP growth with a correlation coefficient of about 0.714. The correlation with trade openness is much larger, about 0.892. The relatively strong correlation between export growth and world GDP growth is in accordance with the importance of foreign demand for India's export performance. The substantially high correlation between the growth of exports and trade openness implies that India's level of integration with the international markets is strongly linked to the performance of exports.

Table 2: Correlation Matrix of Growth Variables

Variable	D_LEXP	D_LREER	D_LGDP_WORLD	D_LTO
D_LEXP	1.0000	0.4019	0.7136	0.8917
D_LREER	0.4019	1.0000	0.2217	0.5485
D_LGDP_WORLD	0.7136	0.2217	1.0000	0.4912
D_LTO	0.8917	0.5485	0.4912	1.0000

Source: Author's computation using R.

The correlation between export growth and REER growth is positive at approximately 0.402. The multivariate regression results are important because they evaluate the REER effect conditional on global demand and trade openness. The correlation results also do not suggest a serious multicollinearity problem among the explanatory variables.

Table 3: ADF and Phillips-Perron Unit Root Test Results

Variable	ADF Test Statistic	ADF p-value	PP Test Statistic	PP p-value
D_LEXP	-2.7942	0.2698	-18.6990	0.0400
D_LREER	-3.9126	0.0277	-20.9170	0.0191
D_LGDP_WORLD	-3.8974	0.0288	-19.0470	0.0357
D_LTO	-2.7382	0.2911	-16.3380	0.0840

Source: Author's computation using R.

The stationarity analysis is conducted to determine whether the transformed variables used in the short-run regressions exhibit persistent stochastic trends that could produce misleading regression relationships. The results are reported in table 3. The ADF test rejects the null hypothesis of a unit root for D_LREER and D_LGDP_WORLD shows that these variables are stationary in first differences.

For export growth (D_LEXP) and changes in trade openness (D_LTO), the ADF test fails to reject the null. However, the Phillips-Perron test provides evidence of stationarity for D_LEXP at the 5 per cent level and for D_LTO at approximately the 10 per cent level. Since the PP test is generally more robust to heteroscedasticity and serial correlation, we conclude that the transformed variables are sufficiently stationary for short-run analysis.

5.2: Short-Run Impact of REER on India's Export Growth (2005–2024)

To examine the short-run effects of exchange rate movements on India's export growth, two alternative specifications were estimated. In model 1, the contemporaneous effect of changes in the Real Effective Exchange Rate (REER) is incorporated, while in model 2 the lagged REER term is included to reflect delayed exchange rate effects.

Table 4: Short-Run Determinants of India's Export Growth

Variables	Model 1	Model 2
Constant	0.0228(0.0090)*	0.0244(0.0113)*
D_LREER	-0.2017(0.1603)	-0.2778(0.1786)
D_LREER_L1		-0.1726(0.1784)
D_LGDP_WORLD	1.5958*** (0.2848)	1.5238*** (0.3419)
D_LTO	0.6892*** (0.0644)	0.6913*** (0.0756)
R ²	0.9022	0.9114
Adjusted R ²	0.8827	0.8841
AIC	-73.321	-69.691
BIC	-68.599	-64.349
F-statistic	46.14***	33.43***
Observations	19	18

Notes: HCl heteroskedasticity-consistent standard errors are reported in parentheses. *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. D_LREER_L1 denotes the one-period lag of REER growth.

Source: Author's computation using R.

The results indicate that world economic growth and trade openness are the most important determinants of India's export growth. The coefficient of REER changes and the lagged REER changes are negative, as expected from theory. This suggests that an appreciation of the rupee reduces export competitiveness and lowers export growth. However, the coefficient is not statistically insignificant. The residual diagnostic tests performed conclude that the model has no heteroscedasticity, no serial correlation, no multicollinearity and the residuals are approximately normally distributed. The finding suggests that exchange rate movements do not generate a significant delayed effect on India's export growth. Therefore, the results provide little evidence of a J-curve type adjustment mechanism in the short run. Export performance appears to be driven more by global demand conditions and trade integration than by exchange rate fluctuations.

The standardized coefficients provide additional evidence on the relative strength of the explanatory variables. Trade openness records the largest standardized coefficient (0.801), followed by world GDP growth (0.353), whereas contemporaneous and lagged REER changes have considerably smaller standardized coefficients of -0.145 and -0.091, respectively. This pattern suggests that, within the estimated specification, variation in trade openness and global demand is more strongly associated with export growth than short-run movements in the REER. These standardized coefficients should, however, be interpreted as measures of relative association rather than causal effects.

The robust estimates of models produce conclusions identical to those obtained from the conventional OLS model. The coefficients of world GDP growth and trade openness remain positive and highly significant. On the other hand, both contemporaneous and lagged REER changes remain statistically insignificant even after the heteroscedasticity correction.

Table 5: Comparison of Alternative REER Specifications

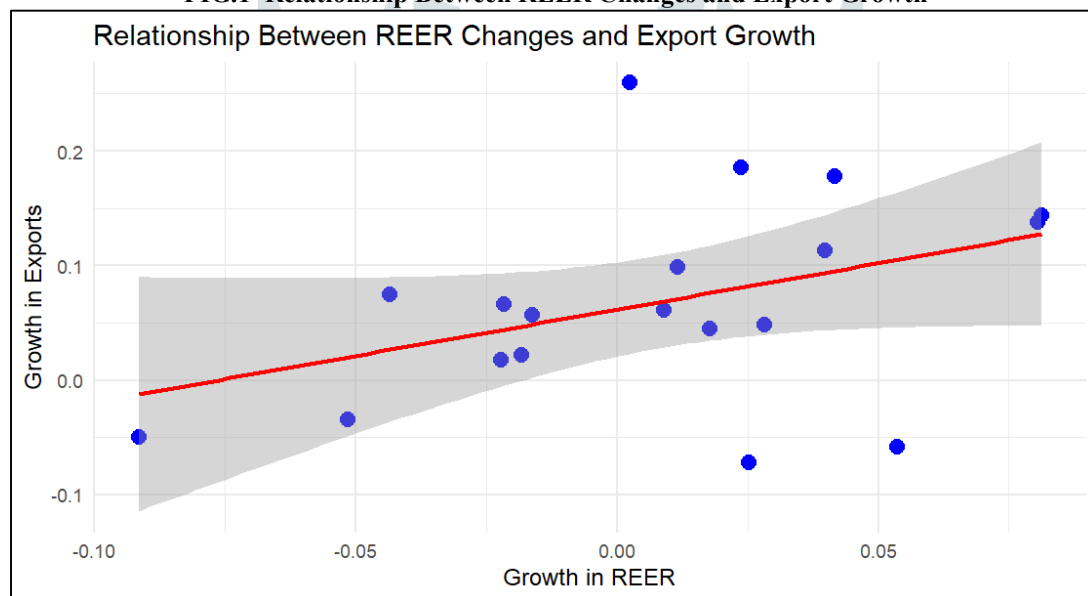
Variables	Trade-weighted REER	Export-weighted REER
REER growth	-0.2778(-0.1786)	-0.2178(-0.176)
Lagged REER growth	-0.1726(-0.1784)	-0.1302(-0.1737)
World GDP growth	1.5238***(-0.3419)	1.5144***(-0.3534)
Trade openness growth	0.6913***(-0.0756)	0.6834***(-0.0833)
R ²	0.9114	0.9064
Adjusted R ²	0.8841	0.8776
AIC	-69.691	-68.709
BIC	-64.349	-63.367
Observations	18	18

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. *D_LREER_L1* denotes the one-period lag of REER growth.
Source: Author's computation using R.

The export-weighted REER specification produces results that are highly consistent with those obtained from the trade-weighted REER model. In both models, the coefficients of contemporaneous and lagged REER changes are negative, indicating that an appreciation of the real effective exchange rate tends to reduce export growth. However, neither coefficient attains statistical significance, suggesting that exchange rate movements do not exert a strong short-run influence on India's export performance during the study period.

By contrast, world economic growth and trade openness remain positive and statistically significant across both specifications. The magnitude and significance of these coefficients are remarkably stable, indicating that India's export growth is primarily driven by external demand conditions and the degree of trade integration rather than by short-run exchange rate fluctuations.

FIG.1 Relationship Between REER Changes and Export Growth



Source: Author's computation using R.

Model comparison based on the AIC and BIC shows that the trade-weighted REER model provides a marginally better fit to the data. Consequently, the trade-weighted REER specification is retained as the preferred model, while the export-weighted REER model serves as a robustness check confirming the stability of the empirical findings.

The diagnostic tests indicate that the alternative model satisfies the major assumptions of classical linear regression. The Breusch-Pagan test (2.189 with p value 0.701) confirms the absence of heteroscedasticity. The Shapiro-Wilk test (0.959 with p-value 0.591) confirms that the residuals are approximately normally distributed. Likewise, the Durbin-Watson statistic is close to two (2.027) indicate no evidence of serial correlation in the residuals. Therefore, the estimated coefficients can be considered reliable and unbiased.

The robust standard error estimates confirm the conclusions obtained from the conventional OLS estimation. Whereas, both contemporaneous and lagged REER change coefficients are statistically insignificant, the influence of world GDP growth and trade openness on export growth continue to exert strong positive influences. The robustness of the empirical results across conventional and heteroscedasticity-robust estimators also reinforces confidence in the empirical findings.

6. Concluding Remarks

This paper investigates the short-run causes of India's export growth for the period 2005–2024, with a special focus on the role of the REER. The analysis used growth-rate regression models to study the contemporaneous and lagged effects of REER changes, allowing for world economic growth and trade openness.

The empirical results suggest that REER changes and export growth are negatively correlated as indicated theoretically. However, there were no statistically significant contemporaneous and lagged REER coefficients. The results imply that short-run changes in exchange rate competitiveness are not a major driver of the growth in exports from India during the sample period.

In contrast, world GDP growth and trade openness were found to be important and statistically significant drivers of export performance. The good impact of world GDP growth reflects the role of external demand circumstances. The important positive role of trade openness reflects the role of trade integration in promoting the expansion of exports. The examination of standardized coefficients also confirms that the trade openness is the most influential factor of export growth in the set of explanatory factors.

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