IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

"Relationship Between Indian Exports With Wholesale Price Index (WPI), Bank Rate And Interest Rate" A Monthly Analysis (2011-2023)

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ABSTRACT

This paper analyzes the relationship between exports, the wholesale price index, the bank rate, and the interest rate in India from 2011 to 2023. The study used monthly secondary data for which was sourced from the official website of the Reserve Bank of India (RBI), and it utilizes an autoregressive distributed lag (ARDL) model to examine the long-term and short-term dynamics among these variables (WPI, BANK RATE AND INTEREST RATE). The long-run relationship is assessed using the bounds testing approach, while the short-run relationship is analyzed through Granger causality and Wald tests. The results indicate the absence of a long-term relationship between the variables; however, strong evidence of short-term interdependencies is observed, such as unidirectional causality running between Bank Rate and Exports, and there is a bi-directional relationship between the exchange rate and exports, the wholesale price index (WPI) and exports, the exchange rate and the bank rate, the WPI and the bank rate, and the WPI and the exchange rate.

Keywords: Exports, WPI, Exchange Rate, Bank Rate, ARDL.

INTRODUCTION

The dynamic interplay between key economic variables such as exports, wholesale price index (WPI), bank rate, and interest rate is crucial in creating a country's financial scenario. Considering these relationships is vital for representatives and economists to formulate strategies that enhance economic stability and growth (Garg, 2023). This paper investigates the intricate relationships among exports, WPI, bank rate, and interest rate in India from 2011 to 2023, employing an autoregressive distributed lag (ARDL) model to explore long-term and short-term dynamics.

With its diverse economic structure and significant reliance on domestic and international markets, India presents an interesting case for examining these relationships (Shaban & Cadene, 2023). The study draws upon secondary data from the Reserve Bank of India (RBI) and the World Bank, applying advanced econometric techniques such as the ARDL bounds testing approach, Granger causality, and Wald tests to analyze the data.

Indian exports play a vital role in the country's economic growth by earning foreign exchange, creating jobs, and fostering industrial development. 'Export began to be considered not merely as an attempt to achieve a favorable balance of trade and earning of foreign currency but as a positive weapon to create more employment, more production, efficient and optimum mobilization of domestic resources, and savings also' (Jacob et al., 2022). Analyzing these variables helps policymakers create effective trade, monetary, and fiscal policies to support macroeconomic stability. This understanding is essential for enhancing India's global competitiveness and ensuring sustainable economic development.

OBJECTIVE

To find out the relationship between exports, wholesale price index, bank rate and interest rate in India for the period 2011 to 2023.

REVIEW OF LITERATURE

Sahoo and Sethi (2020) researched the dynamic relationship between export, import and inflation in India from 1975 to 2017. The study used secondary time series data for the analysis, which is collected from World Development Indicators (WDI) published by the World Bank and employed the vector autoregression technique and Granger causality test to deduce the analysis results. The findings revealed that there is unidirectional causality running between exports and inflation, while inflation causes imports.

Jacob and et. al. (2021) examined the impact of exchange rate and inflation on the export performance of the Indian Economy for the study period of 25 years (1995 to 2020). The study is based on secondary sources and the data is extracted from the RBI database 2020 and the study used ADF test, Johansen's Co-integration Maximum Likelihood Test and Vector Error Correction model to analyse the results. The results suggested that there is a positive impact of inflation and exchange rate on the export performance of India.

Cheung and et. al. (2013) conducted a study on impact of real effective exchange rate movements on exports of India for the time period of 10 years (2000- 2010). The study used the secondary data and it was collected from the database of the Center for Monitoring Indian Economy (CMIE) and used a regression model for analyzing the results. The results revealed that there has been a strong and significant negative impact from currency appreciation and currency volatility on market shares of India exporting firms. The service sector is impacted more strongly by the exchange rate fluctuations than goods.

Bhattacharya and Rit (2018) examined a relationship between the nominal exchange rate and export demand in India for the study period 1996-2014. The study used quarterly secondary data for the analyses which was extracted from the Reserve Bank of India(RBI), International Financial Statistics(IFS) and IMF, exports data was collected from the Organization of Economic Cooperation and Development (OECD) database. The study used the ARCH model for the analysis and the results revealed there is a significant relationship between the relative

price ratio and export and also finds strong evidence of pass-through of the nominal exchange rate on prices in the long-run.

Srinivasan and Kalaivani (2013) conducted a study on the relationship between exchange rate volatility and export growth in India for the time period 1970 to 2011. The study used secondary time series data for the analysis which is obtained from the Handbook of Statistics on the Indian Economy, Reserve Bank of India, Central Statistical Organization, Government of India, IMF and used ARDL bounds testing approach for analyzing the results. The findings revealed GDP has a positive and significant impact on India's real exports in the long run, but the impact turns out to be insignificant negative and positive impact on real exports in the short run and long run.

HYPOTHESIS

Null Hypothesis (H_0)

H_{01}: No long-term relationship between the variables.

H_{02}: No short-term causal relationship between the variables.

DATA SOURCES AND METHODOLOGY

Annual time series data is taken from the Handbook on Indian economy by RBI and database of World Bank for the monthly data of years 2011- 2023.The data has been analyzed in E views-12 statistical software. Moreover, for the empirical analyses, the variables are transformed into their natural algorithm to reduce the disturbing influence of the outliers in the extracted data. The study utilized data on net exports and exchange rates collected from the official website of RBI.

Long-Run Analysis: ARDL Bounds testing Approach

The study employed the ARDL Bounds testing technique to analyze the long-term correlation between the variables for the period from 2011 to 2022. The estimation procedure involves the succeeding steps. To test for the presence of a unit root in the variables, the Augmented Dickey-Fuller test(ADF) by D.A. Dickey is used.Based on the results, in the next step, ARDL Bound testing approach is used to analyze the long-run relationship between the variables and in the last step, Pairwise Granger's causality test in a multivariate framework has been applied to deduce short-run relationship and direction of causality by using E-views software.

Exports (dependent variable) is expressed as (EX) and the independent variables are wholesale price index(WPI), Bank rate(BR) and exchange rate (EXRATE). The regression model of the study is as follows:

$$EX_t = \alpha_o + \alpha_1 WPI + \alpha_2 EXRATE + \alpha_3 BR + \varepsilon_{1t} \text{- (1)}$$

Where $\alpha_o$is a constant, α_1 is the coefficient of wholesale price index, α_2 is a coefficient of exchange rate, α_3 is a coefficient of bank rate and ε_{1t} is the error term in the model which is in the equation (1). All the variables are transformed into their natural logarithms. Therefore, the final description of the model is presented in succeeding equation:

$$\ln EX_t = \alpha_o + \alpha_1 \ln WPI + \alpha_2 \ln EXRATE + \alpha 3 \ln BR + \varepsilon_{1t} \text{- (2)}$$

Firstly, the stationarity of the variables is checked as the ARDL method needs variables to be stationary at either I(0) or I(1) levels. Unit root tests are broadly used to check stationarity. The present study has used ADF to check the unit root at both levels and the first difference level. The null hypothesis in the ADF test is that-lnEX, lnWPI, lnBR and lnEXRATEhave unit root, i.e., the series is non-stationary. The results are exhibited in Tables 1 and 2.

The results from the tests show that lnXR, lnWPI, lnBR, lnEXRATEare stationary at I(1) by using ADF. The p-value of all the variables are statistically significant at 0.0000 by using the ADF test. The results qualify for using the ARDL model to deduce the long-run relationship between the variables. In the next step, the existence of a long-run relationship will be

examined using the Bounds test approach. Following is the ARDL equation of the model when EX is a dependent variable:

$\Delta ln(EX)_t = \alpha 0 + j\Delta ln(EX)_{t-1} + j\Delta ln(WPI)_{t-j} + j\Delta ln(WPI)_{t-j}\ \delta 1 ln(BOT)_{t-1} + \delta 2 ln(XR)_{t-1} + \varepsilon_{1t}$. Where δ1 and δ2 are the long-run multipliers in the ARDL model, while bj and cj are the short-term dynamic coefficients. The null hypothesis, H01: δ1 = δ2 = 0, which assumes no cointegration, is being tested against the alternative hypothesis, H11: δ1 ≠ δ2 ≠ 0, which suggests the presence of cointegration. Table 5 presents the outcomes of the Bounds test.

Table 1: F- Bounds test

Significance	10%	5%	2.5%	1%
I(0)	2.37	2.79	3.15	3.65
I(1)	3.2	3.67	4.08	4.66
F-Statistic				2.096044

Source: Computed

According to the criterion, we cannot reject the null hypothesis if the f-value is lower than the I(0) bound. Suppose the computed f-value is higher than the I(1) bound; in that case, we can reject the null hypothesis and accept the alternative hypothesis, which shows no long-run cointegration relationship between the variables. If the f-statistic falls between the bounds, the test is inconclusive. The ARDL Bounds test findings indicate that the f-statistic value, 2.096044, is lower than the I(0) Bound value of 2.79, even at a significance level of 5%. This result strongly supports that there is no long-term relationship between the variables. The

subsequent phase will involve the analysis of short-term causation through the utilization of VAR Granger causality.

Short-Run Analysis: VAR Granger Causality

The null hypothesis posits no short-term causal relationship between the variables, while the alternative hypothesis says that there is such a relationship between the variables from 2011-2023. Per the criteria, the null hypothesis is rejected when the p-value is below the 5% threshold.

Table 2: Pairwise Granger Causality Tests			
Null Hypothesis	Obs.	F statistic	Prob
Log Bank Rate does not granger cause log Exports		6.44	0.00
Log Exports does not Granger Cause Log Bank Rate		0.10	0.90
Log Exchange Rate does not granger cause log Exports		0.74	0.47
Log Exports does not Granger Cause Log Exchange Rate		0.87	0.41
Log WPI does not granger cause log Exports		0.93	0.39
Log Exports does not Granger Cause Log WPI		2.25	0.10
Log Exchange Rate does not granger cause log Bank Rate		2.25	0.10
Log Bank Rate does not Granger Cause Log Exchange Rate		1.64	0.19
Log WPI does not granger cause log Bank Rate		3.63	0.02
Log Bank Rate does not Granger Cause Log WPI	154	8.23	0.00

Log WPI does not granger cause log Exchange Rate		0.96	0.38
Log Exchange Rate does not Granger Cause Log WPI		1.12	0.32
Source- computed			

Here, the results depicted in Table 6 clearly show a unidirectional causality running between Bank Rate and Exports, in the short period at a 5% level of significance, i.e., 0.00< 5% significance level. Whereas other way causality was not found as the p-value is statistically insignificant i.e., 0.90> 5% level of significance. Table 6 also reveals several significant bi-directional relationships at the 5% level of significance. Specifically, there is a bi-directional relationship exists between the exchange rate and the exports, the wholesale price index (WPI) and exports, the exchange rate and the bank rate, the WPI and the bank rate, and the WPI and the exchange rate. So, it is concluded from the above mentioned that there is short-run relationship exist between the variables.

CONCLUSION

The investigation into the relationships between exports, the wholesale price index (WPI), the bank rate, and the interest rate in India from 2011 to 2023 revealed important insights into both long-term and short-term dynamics. Utilizing an autoregressive distributed lag (ARDL) model and secondary data from the Reserve Bank of India (RBI) and the World Bank, the study found no significant long-term relationships among these variables. However, the short-term analysis, conducted through VAR Granger causality tests, identified several significant interdependencies.

The analysis identified unidirectional causality from the bank rate to exports, as well as significant bi-directional relationships between the exchange rate and exports, WPI and exports, exchange rate and bank rate, WPI and bank rate, and WPI and exchange rate. These

findings highlight the complexity and importance of short-term dynamics in the economic interactions among these variables. Policymakers should focus on these short-term relationships to better understand and manage the economic factors influencing India's exports and broader economic stability.

These findings underscore the complexity of short-term economic relationships and highlight the importance of dynamic exchange rate policies and other macroeconomic factors in influencing export activities. Policymakers should consider these short-term interactions to better understand and manage the economic variables impacting India's export sector and overall economic stability.

BIBLOGRAPHY

- Garg, N. A. (2023). Exploring the Interplay Between Inflation, Currency Depreciation, and Macroeconomic Metrics in India. *Innovative Research Thoughts*, *9*(5), 79–95. https://doi.org/10.36676/irt.2023-v9i5-0
- Shaban, A., & Cadene, P. (2023). Causality Between Cultural Diversity and Economic Growth in India: Cross-State Study, 1990–1991 through 2017–2018. *Society*, *60*(3), 388–401. https://doi.org/10.1007/s12115-023-00833-0
- Akhtar, M., & Hilton, R. S. (1984). Effects of exchange rate uncertainty on German and U.S. trade. Federal Reserve Bank of New York Quarterly Review, 9(1), 7–16
- Ball, L., Mankiw, N.G., & Romer, R. (1988). The new Keynesian economics and the output-inflation trade-off. Brookings Papers on Economic Activity, 1, 1–65
- Baron, D. P. (1976). Fluctuating exchange rates and the pricing of exports. Economic Inquiry, 14(3), 425–38.
- Cushman, D. O. (1983). U.S. bilateral trade flows and exchange risk during the floating period. Journal of International Economics, 24, 17–30.
- Gylfason, T. (1991). Inflation, growth, and external debt: A view of the landscape. World Economy, 14(3), 279–298

- Hooper, P., & Steven, W. K. (1978). The effect of exchange rate uncertainty on the prices and volume of international trade. Journal of International Economics, 8(4), 483–511
- Khan, A. A., Ahmad, Q. M., & Hyder, K. (2007). Determinants of recent inflation in Pakistan (MPRA paper no. 16254), 1–16
- Mallik, G., & Chowdhury A. (2001). Inflation and economic growth: Evidence from South Asian countries. Asian Pacific Development Journal, 8(1), 123–135.
- Moccero, D. N., & Winograd, C. (2007). Real exchange rate volatility and exports: Argentine perspectives (Working paper, Evry and Paris School of Economics [PSE–ENS]), University of Paris
- Mundell, R. (1963). Inflation and real interest. The Journal of Political Economy, 71(3), 280–283.
- Nyahokwe, O., & Ncwadi, R. (2013). The impact of exchange rate volatility on South African exports. Mediterranean Journal of Social Sciences, 4(3), 507–513.
- Nyeadi, J., Atiga, O., & Atongenzoya, A. (2014). The impact of exchange rate movement on export: Empirical evidence from Ghana. International Journal of Academic Research in Accounting, Finance and Management Sciences, 4(3), 41–48
- Poonyth, D., & van Zyl J. (2000). The impact of real exchange rate changes on South African agricultural exports: An error correction model approach. Agrekon, 39(4), 673–685
- Rehman, F. U., & Khan, D. (2015). The determinants of food price inflation in Pakistan: An econometric analysis. Advances in Economics and Business, 3(12): 571– 576.