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Impact of WPI and IIP on Exchange Rate and International Trade- A Casual Study

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ABSTRACT

India is one of the emergent nations in the globe. It is fundamental things for growing economy is maintained the growth of international trade and stability of forex rate. To improve export-import i.e. international trade it is required to have industrial growth (IIP) and other side exchange rate have significant impact with country risk i.e. inflation rate (here we have used WPI as a inflation) to maintain growth of IIP and stability in WPI. With respect to above we try to analyses the impact of WPI and IIP on exchange rate and international trade. To analyze the objective we have used monthly data from April 2012 to November 2017 of WPI, IIP, Export, Import, USD, SDR, Pound sterling and Euro. The result indicates that WPI and IIP have significant impact on Exchange rate and international trade. It has also observed with the help of Granger Causality IIP and WPI is the cause of Export and Import in India.

Introduction

India has appeared as the wildest rising economy in the world and India has huge capabilities to maximize the industrial output and minimize the risk associated in the market by diversified the resource across the sectors. There were dissimilarities in the literature for the direction and impact of WPI and IIP on international trade and exchange rate for developing economy like India.

It has been thought that international trade (Export and Import) performance of a nation is one of the major factors of any developing economies. It is observed that growth of export and import may directly or indirectly made an impact on exchange rate. It is also, observed that foreign trade and index of industrial production as indicator of economic growth are positively related to each other as well as inflation and exchange rate also positively related each other.

But in the developing nation, it is very important to have identified the impact of core area of domestic economic i.e. growth of industrial production and risk associated in the nation through inflation [1] measuring performance for international trade and exchange rate.

Both Consumer Price Index (CPI) and Wholesale Price Index (WPI) are decreased in year 2015-16 because reduce the gap between urban and rural economies as well as food products

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[1] Inflation is the rate at which the general level of prices for goods and services is rising and, consequently, the purchasing power is falling.

in the same segment across the country. But in the recent year WPI increases on YoY bases as number of initiatives taken by Govt. to India to maintain the stability in different areas of economies, which has create appropriate impact in forex rate, foreign trade and domestic output with increase in domestic savings as well as balanced growth of all sectors.

Literature Review

Internationally, there is a large no. of empirical studies done on impact of different economic variables under study viz., Inflation, Index of Industrial production (IIP), exchange rate and international trade of India. Most of the studies has highlighted the same conclusion – that increase in exchange rate volatility cause of uncertain impacts for various economics both domestic and foreign investment aspects, foreign trade, and other technical and non-technical sources of economic progress which may affect domestic inflation and production output. The few empirical studies of forex prices have displayed that there are impartially generous and ongoing variances between foreign and domestic price fluctuations for the same or closely related products.

Irving B. Kravis, Robert E. Lipsey (1977) has identified that there was disagreements and between export and domestic prices as well as exchange rate changes on export and domestic prices.

Sherzod Yarmukhamedov (2007) suggested that the in Sweden it showed that there is negative impact of exchange rate instability on export and import both in short run period, whereas in long run case respect to preceding period with reveals positive relationship.

Parida and Shahoo (2007) analyzes export driven development hypothesis for four creating nations of South Asia like India, Pakistan, Bangladesh and Sri Lanka, utilizing Pedroni's board comix system. The outcomes adjusts legitimacy of fare drove development hypothesis. Crosssectional studies accommodates blended conduct of fares on financial development.

There was long– run bidirectional causality between exports and industrial outputs in Bangladesh suggested (Md. Gazi Salah Uddin and et al. (2011)). They have analyzed the result by using monthly data for the period from 1973 M7 to 2006 M8, through Granger causality tests and error correction model (ECM).

Md. Ariful Islam (2013) identified that there was positive correlation between import and domestic inflation, but negative correlation was significantly affect in Bangladesh. He has also highlighted that inflation not create a huge pressure on the import because other various reasons affected viz., Government policies, inflation rate in foreign country and relationship with the exporting country, etc.

Pathania Rajni (2013) suggested that there was uni-directional causality between capital formation and import and export in India through Co-integration and Granger causality for the period of 1991 to 2010.

Industrial output and export has bidirectional causality in long run and short run both as well as both the variables were co-integrated in emerging economies in the world including India, Bulgaria Czech Republic and Poland Gurmeet Singh (2015) the same result also supported by Titus O. Awokuse (2015).

Methodology, Data and Variables

The objective of present study to investigate the causal relationship of WPI (base year 2011-12) and IIP (base year 2011-12) with International Trade (Export and Import) and Exchange rate (Pound Sterling, USD, SDR and Euro) in India by using monthly data from April 2012 to November 2017, includes the 68 observations.

All necessary data for the sample period are obtained from Reserve Bank of India (www.rbi.og.in). All the variables are taken in their natural logarithms to avoid the problems of heteroscedasticity.

The estimation methodology employed in this study is causality. The entire estimation process consists of three steps: first, correlation, second, unit root test and third, granger causality.

The paper is based on the following hypotheses for testing the causality between WPI and IIP with International trade and exchange rate in India whether there is bi-directional, unidirectional or no causality between the variables under study.

Correlation Matrix

This section describes the variations in time-series data using descriptive statistics and correlation analysis between variables under study. Before applying correlation and other econometric test we have analyzed normality test and it shows all series is normal.

Table-1: Person Correlation coefficient Matrix

	Euro	Export	IIP	Import	Pound	SDR	USD	WPI
Euro	1							
Export	0.5236	1						
IIP	-0.1058	0.4626	1					
Import	0.1478	0.4966	0.0842	1				
Pound	0.6017	0.1765	-0.2107	-0.1923	1			
SDR	0.7344	0.4774	0.3506	-0.1259	0.5932	1		
USD	0.1660	0.3108	0.7139	-0.2033	0.2058	0.7701	1	
WPI	0.2585	0.1697	-0.3811	0.3913	-0.3449	-0.2783	-0.6182	1

Source: Author calculations

Above table shows the liner correlation between export and other variables. The correlation coefficient is positive and statistically significant between IIP and import, export, SDR and USD whereas negative correlation with euro. On the other hand WPI has positive correlation between Export, import and Euro whereas negative relation with USD, SDR and pound. From the analysis come to know that international trade has positive relation with WPI and IIP whereas exchange not. The result indicates that inflation having negative impact with exchange rate, it shows that increasing inflation may cause of exchange rate.

Unit Root test

Before testing the Granger Causality test, it is essential to test the stationarity; for each individual variables under study.

Three different unit root tests are used to test the null hypothesis of a unit root: viz., the Augmented Dickey-Fuller (ADF) test (1979), the Phillips-Peron (PP) test (1988), and the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) test (1992). In the present study researcher has used ADF test to check stationarity.

The null hypothesis of non-stationarity is conducted in the form of the following regression equation:

$$\Delta p_{it} = \propto_0 + \propto_1 t + p_0 p_{it-1} + \sum_{i=1}^{q} p_i \Delta p_{it-1} + \varepsilon_{it}$$

Where Pit denotes the logarithm of the price for the ith market at time t,

ΔPit = Pit – Pit-3, P are coefficients to be estimated, q is the number of lagged terms, t is the trend term, α_1 is the estimated coefficient for the trend, α_0 is the constant, and ε is white noise. MacKinnon's critical values are used in order to determine the significance of the test statistic associated with P_0.

Null Hypothesis: Series has a unit root

Table-2: Augmented Dickey-Fuller test at first difference

Variable	ADF Test Value	Critical Value	Durbin Watson	R-Squared Value
DLIIP	-4.8785	-3.5380**	2.10	0.8927
DLWPI	-2.6005	-3.6228**	1.84	0.3612
DLImport	-4.6180	-3.5380**	1.99	0.7130
DLExport	-7.1345	-3.5380**	1.95	0.4050
DLEuro	-3.2140	-2.9084*	1.97	0.5244
DLUSD	3.4419	-2.9084*	1.94	0.5813
DLSDR	-3.4473	-2.9084*	1.95	0.5576
DLPound	-2.9479	-3.5380**	1.98	0.5948

Source: Author calculations

**Null Hypothesis rejected at 1% significance level

*Null Hypothesis rejected at 5% significance level

The above table shows that ADF test run through the E-views-4 econometric software. Result suggested that null hypothesis is failed to accept and therefore it can be said that the all series 'is stationary with 5% significance level. The all variables under study are stationary at log difference to 1st difference so, it indicates that now researcher can be generalize the result with entire economy for whole period. Now, research can apply for the Granger causality test.

The Granger Causality Test

Granger causality test is a technique for identified whether one variables is significantly causes for another variables (Granger. 1969). It helps to predict whether past values of a variable cause to another variable.

International Trade, Foreign Exchange, WPI and IIP are, interlinked and co-related through different ways. The Granger Causality test was carried out between WPI and IIP with International Trade and Foreign Exchange.

Therefore, a time series X is said to Granger-cause Y if it can be shown through a series of F-tests on lagged values of X (and with lagged values of Y also known) that those X values predict statistically significant information about future values of Y.

If causality (or causation) runs from IIP and WPI to International trade and Foreign exchange, we have:

DLIIP/DWPI=α+α1Y t-1 + α2Y t-2 + β1 dlexport/dlimport/dleuro/dlusd/dlsdr/pondt-1 + β2 dlexport/dlimport/dleuro/dlusd/dlsdr/pondt-2 + μt

Our null hypothesis for testing Granger causality is: H0: β1 =β2 = 0

Observation: 63 Lags: 4

Table-3: Pairwise Granger Causality Tests

Null Hypothesis:	F-Statistic	Probability	Result
DLEXPORT does not Granger Cause DLIIP	1.19870	0.32202	Accepted
DLIIP does not Granger Cause DLEXPORT	2.88970	0.03062	Rejected
DLEURO does not Granger Cause DLIIP	0.31271	0.86826	Accepted
DLIIP does not Granger Cause DLEURO	1.31701	0.27539	Accepted
DLIMPORT does not Granger Cause DLIIP	1.38494	0.25143	Accepted
DLIIP does not Granger Cause DLIMPORT	4.23881	0.00468	Rejected
DLPOUND does not Granger Cause DLIIP	0.45373	0.76923	Accepted
DLIIP does not Granger Cause DLPOUND	0.37595	0.82480	Accepted

DLSDR does not Granger Cause DLIIP	0.46666	0.75989	Accepted
DLIIP does not Granger Cause DLSDR	1.80115	0.14205	Accepted
DLUSD does not Granger Cause DLIIP	0.82854	0.51288	Accepted
DLIIP does not Granger Cause DLUSD	2.33004	0.06756	Rejected
DLUSD does not Granger Cause DLWIP	0.41759	0.79456	Accepted
DLWIP does not Granger Cause DLUSD	1.13856	0.35802	Accepted
DLSDR does not Granger Cause DLWIP	0.48819	0.74430	Accepted
DLWIP does not Granger Cause DLSDR	0.96235	0.44294	Accepted
DLPOUND does not Granger Cause DLWIP	0.72871	0.57966	Accepted
DLWIP does not Granger Cause DLPOUND	1.09253	0.37872	Accepted
DLIMPORT does not Granger Cause DLWIP	0.59647	0.66805	Accepted
DLWIP does not Granger Cause DLIMPORT	4.85775	0.00402	Rejected
DLEXPORT does not Granger Cause DLWIP	0.65722	0.62661	Accepted
DLWIP does not Granger Cause DLEXPORT	4.21496	0.00823	Rejected
DLEURO does not Granger Cause DLWIP	0.64547	0.63453	Accepted
DLWIP does not Granger Cause DLEURO	0.50164	0.73473	Accepted

Source: Author calculations

The above table shows the Granger Causality Test result which concerns with examining the impact of WPI and IIP on International trade and Exchange rate. The reported F-value and P-Value suggest that there is causality between variables. Based on above analysis, it suggested that IIP and WPI have positive impact on export and import. On the other side IIP has only positive impact on USD whereas pound sterling, SDR and euro are not affected. WPI is not cause of change in exchange rate. The above results show that causality between variables is bidirectional as well as unidirectional.

Conclusions

The role of international trade made more attention towards growth of the country through development of domestic production level as well as maintaining fluctuation in exchange rate cause for country risk. With the view of this we have analyses impact of WPI and IIP on exchange rate and international trade a causal study. Study reveals that both WPI and IIP have significant impact in international trade and exchange rate. IIP and WPI having bidirectional causality with international trade but there is no causality found with exchange rate. From the regression it is clearly identified that WPI has negative impact with exchange rate means change in inflation will affect the exchange rate it is also support with literature and theoretical assumption. As change in exchange rate also cause for international trade this also support with literature study.

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