Impact of Economic Growth and Trade Openness on Foreign Exchange Reserves in Indian Economy

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ABSTRACT

The present study analyses empirically the effect of economic growth and trade openness on international reserves in India. The study employed time series data with annual frequency from 1996 to 2016. The study developed an econometric model relating RES to ECON and TRDOP variables and used logarithmic transformation of the variables for econometric estimation. The econometric tools such as Augmented Dickey-Fuller (ADF) test, Johansen co integration test and vector error correction model were applied. The co integration test results suggest that there is an existence of a stable long-run equilibrium relationship among the variables. The vector error correction model (VECM) of international reserves reveals that lagged independent variables shows the expected signs i. e. economic growth and trade openness have significant effect on international reserves. Findings of the study suggest that economic growth and trade opennessis positively related to international reserves. This implies that the authorities of Indian economy have to involve more actively in foreign reserve management practices.

Keywords: *Economic growth, Trade openness, International reserves, VECM, Cointegration, India.*

INTRODUCTION

Over the past few years, there has been a remarkable increase in international reserves (IR) with the central banks of developing economies around the world, especially in the aftermath of East Asian crisis 1997-98 and Global Financial Crisis 2008. Total world international reserves have climbed up nearly from US$7.4 trillion in 2008 to US$ 11.4 trillion by 2017.The management of these huge reserves and the associated cost of holding are the major issues faced by the central banks of developing economies now.

International Reserves, also called as foreign reserves and foreign exchange reserves, are foreign currencies and deposits in the form of securities, bonds and financial derivatives held by Central Banks and monetary authorities of any economy. The components of IR comprise of monetary gold Special Drawing Rights and IMF reserves positions. International Reserves may also be referred to as official reserves which are assets of Central Banks held in different reserves currencies such as US Dollar, British Pound Sterling, Euro and Japanese Yen (Reza *et al.* 2011). According to IMF Balance of Payments Manual 6th edition (BPM6), reserve assets (gross

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international reserves) are those "external assets that are readily available to and controlled by the monetary authorities for meeting balance of payments financing needs, for intervention in exchange rate markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing)."

In developing countries like India, international reserves are one of the crucial determinants of BoP. They play a very significant role in the adjustment of exchange rate. Nevertheless, irrespective of all the theoretical justifications, the stock of international reserves of many emerging and developing countries, including India, has increased substantially even after their official announcements about commitment to the flexible exchange rate system (Flood and Marion, 2002).

Over the last decade, the pace of accretion in the India's stock of international reserve has been so striking that it has registered more than 1000% growth, despite the fact that India has entered into flexible exchange rate system since March 1993 (Ramachandran, 2006). And now it seems convincing to believe that India has surpassed many standard measures of reserve adequacy to rest in a somewhat protected zone. Theoretically, it was believed that under flexible exchange rate system countries will need to keep less stock of international reserves, since central banks were not obligated to defend their parities through frequent interventions.

India's stock of international reserves has been increasing continuously since the launch of economic reform in 1991. Starting from a stumpy level of US$ 5,834 million in 1990-91, the stock of international reserves increased regularly to US$ 1,99,179 million by 2006-07 and reached their highest at US$ 3,04,818 million in 2010-11 (see figure 1). Thereafter, owing the international financial disorder caused by 2008 crisis and strengthening of the US dollar and other international currencies, the stock of reserve declined to US$ 2, 51, 985 million at the end of 2008 and again touched the height of US$ 3, 60, 176 million by 2015-16. This evidently shows that irrespective of all the theoretical justifications, international reserves stock of India like many emerging countries has been constantly increasing during the economic reform period i. e.1991-till date.
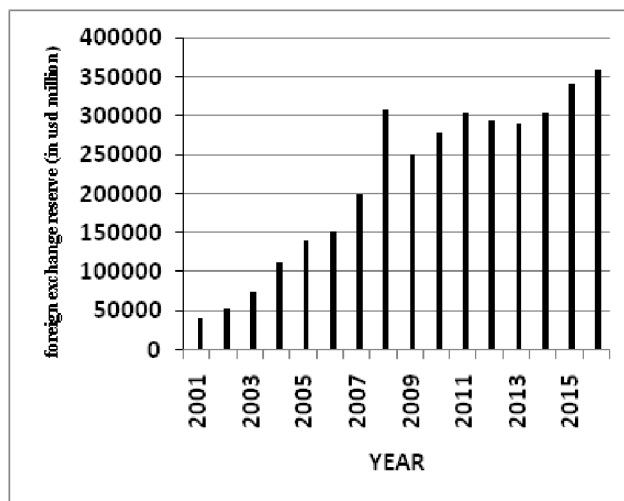
Figure 1: India's international reserves in the post reform era

Source: Handbook of statistics on Indian economy

After this introduction, rest of the paper is organised as: Section II discusses relevant review of literature, section III discusses objectives of the study whereas section IV presents data description and methodology, section V discusses about results and interpretations and section VI concludes.

LITERATURE REVIEW

Conceptually, a unique definition of foreign reserves is not available as there has been divergence of views in terms of coverage of items, ownership of assets, liquidity aspects and need for a distinction between owned and non-owned reserves. Nevertheless, for policy and operational purposes, most countries have adopted the definition suggested by the International Monetary Fund (Balance of Payments Manual, and Guidelines on Foreign Exchange Reserve Management, 2001); which defines reserves as external assets that are readily available to and controlled by monetary authorities for direct financing of external payments imbalances, for indirectly regulating the magnitudes of such imbalances through intervention in exchange markets to affect the currency exchange rate, and/ or for other purposes.

According to Krugman and Obstfeld (2000), Official international reserves (or foreign exchange reserves) are assets held by central banks of respective economies that are used for various transactions such as purchases of foreign goods

and assets, or payments of obligations to international organisations.

Foreign exchange reserves are defined as external stock of assets, which is available to the country's monetary authorities to cover external payment imbalances or to influence the exchange rate of the domestic currency through intervention in exchange market, or for other purposes (IMF, 2000). A country's reserve consists of gold, foreign currencies, special drawing rights (SDR) and the reserve position with the International Monetary Fund (IMF).

Historically, official international reserves consisted only of gold. But after World War II when the Breton Woods System was set up, the US Dollar turn out to be reserve currency and it also became part of a nation's official IR assets. From 1944-1968, the US dollar was convertible into gold through the Federal Reserve System. After 1968 no central bank could convert dollars to gold from official gold reserves and after 1973 no individual or institution could convert dollars into gold from official gold reserves. Since 1973 no major currencies have been convertible into gold from official gold reserves.

Under the Bretton-Woods system, the foreign exchange reserves were used by the central banks across the world to maintain the external value of their respective currencies at a fixed level. With the breakdown of Bretton-Woods system in the early 1970s, countries started adopting a relatively flexible exchange rate system, under which the reserves play only a less important role. Yet, the global exchange reserves have increased from1.75 to 7.8 percent of world GDP between1960 and 2002 (Flood and Marion, 2002).

The following specification from Aizenman and Lee's (2007) can be used to investigate factors influencing international reserves-

$$\text{Re}_{Sit} = \beta_o + \beta_1 \text{EXGrowth}_{it} + \beta_2 \text{PLDev}_{it-1}$$
$$+ \beta_3 \text{KAcc}_{it} + \beta_4 \text{Debt}_{it}$$
$$+ \beta_5 \text{Pop}_{it} + \beta_6 \text{Open}_{it} + \beta_7 \text{TOT}_{it} + \varepsilon_{it}$$

Where, EX Growth, PLDev, KAcc, Debt, Pop, Open, TOT denotes higher export growth rates, Price Level Deviation, capital account liberalization, log of the ratio of short-term external debt to Gross Domestic Product, Population size, log of ratio of imports to GDP, log of the terms of trade respectively.

Several conclusions emerge from the specification. First, the holding of foreign reserves motivated by mercantilist concerns is positively correlated with higher export growth rates (variable EXGrowth_{it}) and with the deviation of the real exchange rate from its equilibrium value (Price Level Deviation noted PLDev_{it}). The latter observation captures the idea that international reserves are hoarded to manipulate the exchange rate.

Second, the holding of reserves motivated by precautionary concerns is positively correlated with the degree of capital account liberalization (KAcc_{it}) and the log of the ratio of short-term external debt to Gross Domestic Product (GDP) (Debt_{it}).

Third, the reserves stock is positively correlated with a country's population because reserves increase as the number of international transactions increases. In addition, reserves accumulation is positively correlated with the log of ratio of imports to GDP (Open_{it}). Last, the log of the terms of trade (ToT_{it}) is positively correlated with reserves if countries absorb their fluctuations through reserves holdings.

Frenkel and Jovanovic (1981) states that most of the rules for a country's demand for foreign exchange reserves consider real variables, such as imports, exports, foreign debt, severity of possible trade shocks and monetary policy considerations. Similarly, there are some common indicators that are used to determine international reserves for an economy. These indicators includes: import adequacy, debt adequacy and monetary adequacy.

Chin-Hong et al. (2011) empirically examined five explanatory variables to investigate their impacts on the international reserves holding in Malaysia. These variables include economic size, real effective exchange rate, openness, balance of payments and the opportunity cost of reserves holding. They concluded that all the variables are found to be statistically significant in the model. In particular, economic size and real effective exchange rate are positively related to international reserves, while balance of payments and the opportunity cost of holding reserves have negative impacts on international reserves.

Empirical research works on foreign reserves (e.g. Landell-Mills, 1989; Lane and Burke, 2001) established a relatively stable long-run demand for reserves based on a limited set of explanatory variables such as gross domestic products (GDP).

Gosselin and Nicolas (2005) grouped the influencing factors of reserve holdings in five categories: economic size, current account vulnerability, capital account vulnerability, exchange rate flexibility, and opportunity cost. In the long run, central banks will increase their reserves in response to a greater exposure to external shocks. Thus, the level of foreign reserves could be positively correlated with an increase in both exports and imports. Capital account vulnerability increases with financial openness and potential for resident-based capital flight from the domestic currency. Consequently, reserves could be positively correlated with some variables like the ratio of capital flows to GDP. Exchange rate flexibility is usually important.

Charles (2012), in his study finds the factors that affect the level of foreign reserves are GDP, level of trade openness, exchange rate and inflation. The levels of GDP and trade openness were found to exhibit positive impacts on foreign reserves, supporting the self-insurance theoretical base of foreign reserves whereas the level of foreign capital inflow and inflation had a negative relationship with foreign reserves.

India Economic Survey (2004) identified three main factors that predicated the nation's reserve holdings which include: import adequacy—the number of months of imports that it can finance; its ability to cover external payment obligations—captured by the ratio of reserve to external and short-term debt; and monetary adequacy—measured by ratio of reserve to broad money and reserve money. Demand for liquidity is one of the factors influencing international reserves.

OBJECTIVES OF THE STUDY

Almost all economies particularly developing countries have accumulated large stockpiles of international reserves on breakdown of the Bretton Wood system. They reflect fabulous increase in international reserves. The flexible exchange rate system was introduced after breakdown of Bretton Wood System. Henceforth, developing countries have frightened the uncertainties of this system. They embarked accumulating international reserves to intervene FX markets to get price stability and lessen foreign exchange volatility. The hoarding of these reserves is made irrespective of the opportunity cost and the effects they have on price stability and volatility. Another reason to have large stockpile of international

reserves is foreign debt service and international trade activities. The import and export transactions affect foreign exchange reserves as foreign currencies get involved in these transactions. The more export of goods and services will fetch more trade activities and economic growth. This paper, therefore, assesses how international reservesare being affected by trade openness and economic growth.

Foreign Exchange Reserves are now accumulated regardless of the opportunity cost and other impacts on the economic activities. As for explaining the current reserve hoarding, numerous arguments have been set forth. Some say that international reserves are a by-product of the countries' exchange rate regime. Another argument is that countries hoard international reserves for precautionary purposes to insure themselves against financial crises (Aizenman and Marion, 2003). Yet another theory suggests that high level of reserves is the outcome of countries' mercantilist behavior to keep their real exchange rate devalued against the dollar to bolster the domestic economy (Flood and Marion, 2001).

Countries all over the world in particular developing ones are fanatical with accumulation of international reserves. Several explanations as we have seen in earlier lines advocated for reserves hoarding. International reserves have both social and opportunity costs that impact the whole economy. A lot of studies are there on international reserves but not much appears to have been done to examine the effect ofeconomic growth and trade openness. This study contributes to international reserves literature by examining the effect that economic growth and trade openness have oninternational reservesin Indian context. Hence, this paper is toadd to existing knowledge. Also there will be some information on hoarding of international reserves and the relationship among the variables under consideration. The findings will thus enrich the existing literature. The main aim of this study is to find why India hoards reserves. Other objective is to explore the influence thateconomic growth and trade opennesshave on international reserves.

DATA DESCRIPTION AND METHODOLOGY

The study employs secondary data and econometric modelling to obtain the results. Following is the data description and methodology applied:

(a) Data

The present study deals with extensive literature review which takes in the areas of international reserves and economic growth of India. Time series data for a period of 21 years from 1996 to 2016 were collected from World Development Indicators (WDI) of the World Bank. The variables are arranged as dependent and independent variable. Dependent variable is international reserves (RES) measured as total reserves excluding gold divided by nominal GDP converted into logarithm form. Independent variables are economic growth (ECON) proxied by real GDP and trade openness (TRDOP) measuredas the ratio of sum of exports and imports to real GDPconverted into logarithm form. E-Views 8.1 package has been used to run regression equation.

(b) Model Specification

This study analyses the impact of economic growth and trade openness oninternational reservesin Indian context. The study developed an econometric model below relating RES to ECON and TRDOP variables and used logarithmic transformation of the variables for econometric estimation.

$$(RES) = \beta_1 + \beta_2(ECON) + \beta_3(TRDOP) + e \quad ....(1)$$

Where, (RES) is total international reserves minus gold divided by nominal GDP. (ECON) is economic growth proxied by the real GDP. (TRDOP) is trade openness measured as the ratio of sum of exports and imports to real GDP. β_1, β_2 and β_3 are regression coefficients for the model and e is an error term. Logarithmic transformation of the equation is as under:

$$Ln(RES) = \beta_1 + \beta_2 Ln(ECON) + \beta_3 Ln(TRDOP) + e ....(2)$$

(c) Methodology

First time series properties of the variables are checked. The study checked stationarity of the series using Augmented Dickey-Fuller (ADF) test. If the variables are found to be order of I(1) or say non-stationary, there may be chances of forming I(0) variable. This is called cointegration which mean long-run relationship among the variables.The long-run relationship can be appropriately examined through cointegration tests. If the variables under study are cointegrated, the cointegrating vector is normalizedwith respect to international reserves. To test whether cointegration exists or not, we applythe systems method of cointegration proposed by Johansen and Juselius (1992). The Johansen cointegration

test suggests that variables are highly cointegrated indicating to employ vector error correction model (VECM).

Vector Error Correction Model (VECM)

If three I (1) series x, y and z are cointegrated, then there exists unique α_o, $\alpha_1$and α_2 such that u_t = y_t - $á_o$ - $á_1 x_t$- $á_2 z_t$is I(0). In the single equation model of cointegration where we thought of y as the dependent variable and x and z as an exogenous regressor, the appropriate specification for the error-correction model will be:

$$\Delta y_t = \beta_o + \beta_1 \Delta x_t + \beta_2 \Delta z_t + \lambda u_{t-1} + \varepsilon_t \quad ....(3)$$

Or,

$$\Delta y_t = \beta_o + \beta_1 \Delta x + \beta_2 \Delta z_t + \lambda(y_{t-1} - \alpha_o - \alpha_1 x_{t-1} - \alpha_2 z_{t-1}) + \varepsilon_t ....(4)$$

All terms in equation (4) are I(0) as long as the a coefficients (the "cointegrating vector") are known or at least consistently estimated. The u_{t-1}termis the magnitude by which y was above or below its long-run equilibrium value in the previous period. The coefficient λ (which we expect to be negative) represents the amount of "correction"of this period (t-1) disequilibrium that happens in period t. For example, if λ is 0.25, then one quarter of the gap between y_{t-1} and its equilibrium value would tend (all else equal) to be reversed (because the sign is negative) in period t.

The VEC model extends this single equation error correction model to allow y,x and z to evolve jointly over time as in a VAR system. In the three variable case, there can be two cointegrating relationship and the y equation of the VEC system is similar to (4), except that we mirror the VAR specification by putting lagged differences of y, x and z on the right hand side. With only one lagged difference (there can be more) the VECM can be written as:

$$\Delta y_t = \beta_{yo} + \beta_{yy1}\Delta y_{t-1} + \beta_{yx1}\Delta x_{t-1} + \beta_{yz1}\Delta z_{t-1} + \lambda_y(y_{t-1} - \alpha_o - \alpha_1 x_{t-1} - \alpha_2 z_{t-1}) + n_t^y, ...(5)$$

$$\Delta x_t = \beta_{xo} + \beta_{xy1}\Delta y_{t-1} + \beta_{xx1}\Delta x_{t-1} + \beta_{xz1}\Delta z_{t-1} + \lambda_x(y_{t-1} - \alpha_o - \alpha_1 x_{t-1} - \alpha_2 z_{t-1}) + n_t^x ...(6)$$

$$\Delta z_t = \beta_{zo} + \beta_{zy1}\Delta y_{t-1} + \beta_{zx1}\Delta x_{t-1} + \beta_{zz1}\Delta z_{t-1} + \lambda_x(y_{t-1} - \alpha_o - \alpha_1 x_{t-1} - \alpha_2 z_{t-1}) + n_t^x ...(7)$$

As in (4), all of the terms in equations (5), (6) and (7) are I(0) if the variables are cointegrated with cointegrating vector $(1, -\alpha_o, -\alpha_1, -\alpha_2)$, in other words, if $y_t - \alpha_o - \alpha_1 x_t - \alpha_2 z_t$ is stationary. The λ coefficients are again the error correction coefficients, measuring the response of each

variable to the degree of deviation from long-run equilibrium in the previous period.

We expect $\lambda_y < 0$ for the same reason as above: if y_{t-1} is above its long-run value in relation to x_{t-1} and z_{t-1} then the error correction term in parentheses is positive and this should lead, other things constant, to downward movement in y in period t. The expected sign of l_x depends on the sign of α_1. We expect $\partial \Delta x_t / \partial x_{t-1} = -\lambda_x \alpha_1 < 0$ for the same reason that we expect $\partial \Delta y_t / \partial \Delta y_{t-1} = \lambda_y < 0$: if x_{t-1} and z_{t-1} is above its long run relation to y, then we expect, ceteris paribas, Δx_t and Δz_t to be negative.

A simple, concrete example may help clarify the role of the error correction terms in a VEC model. Let the long-run cointegrating relationship be $y_t = x_t + z_t$, so that $\alpha_0 = 0$, $\alpha_1 = -1$ and $\alpha_2 = -1$. The parenthetical error correction term in equations of (5), (6) and (7) is now $y_{t-1} - x_{t-1} - z_{t-1}$, the difference between y, x and z in the previous period. Suppose that because of previous shocks, $y_{t-1} = x_{t-1} + 1$ so that y is above its long-run equilibrium relationship to x by one unit (or, equivalently, x is below its long-run equilibrium relationship to y by one unit). To move toward long-run equilibrium in period t, we expect (if there are no other changes) $\Delta y_t < 0$, $\Delta x_t > 0$ and $\Delta z_t > 0$. Using equations (5), (6) and (7) Δy_t changes in response to this equilibrium by $\lambda_y (y_{t-1} - x_{t-1} - z_{t-1}) = \lambda_y$ so for stable adjustment to occur $\lambda_y < 0$; y is "too high" so it must decrease in response to the disequilibrium. The corresponding change in "x_t and Δz_t from all equations is $\lambda_x (y_{t-1} - x_{t-1} - z_{t-1}) = \lambda_x$. Since x and z are "too low," stable adjustment requires that the response in x and z be positive, so we need $\lambda_x > 0$. Note that if the long-run relationship between y, x and z were inverse ($\alpha_1, \alpha_2 < 0$), then x and z would need to decrease in order to move toward equilibrium and we would need $l_x < 0$. The expected sign on λ_x depends on the sign of α_1 and α_2.

If theory tells us the coefficients a_0, a_1 and a_2 of the cointegrating relationship, then we can calculate the error-correction term in both the equations and estimate it as a standard VAR. However, we usually do not know these coefficients, so they must be estimated.

RESULTS AND INTERPRETATION

The study employed time series data for analysing the variables. Empirical research work based on time series data presumes that the underlying time series is stationary. The estimated results are reported table wise. To test the stationarity the widely applied Augmented Dickey-Fuller (ADF)unit root test has been used.All the variables i.e. international reserves (RES), trade openness (TRDOP) and economic growth (ECON) were non-stationary at level. After first differencing, the variables became stationary i. e. order of I(1) (see Table 1). This suggests that long-run relationship may exist among the variables.

Table 1: Augmented Dickey Fuller Unit Root Test

Variables	Level	First Difference
RES	-1.092974	-4.720630*
ECON	-0.190311	-3.616661*
TRDOP	-0.182341	-4.736683*

*denotes rejection of null hypotheses at 1% level

The long-run relationship can be appropriately examined through cointegration tests. For this purpose the study employed Johansen cointegration test. The significant values or trace statistics, maximal eigen value and critical values are given below (see Table 2).

Table 2: Johansen Cointegration Test

Hypothesized no. of CE(s)	Trace Statistic	5% critical Value	Max-Eigen Statistic	5% critical value
None*	22.64	15.49	16.37	14.26
At most 1*	6.27	3.84	6.26	3.84
At most 2*	5.94	3.84	5.26	3.84

*denotes rejection of null hypotheses at 5% level

The normalized cointegrating coefficients imply theoretically expected signs and the standard errors in the parentheses indicate that the explanatory variables are statistically significant at 5 percent level. The normalized cointegrating coefficients are given in Table 3.

Table 3: Normalized Cointegrating Coefficients

	RES	ECON	TRDOP
Normalized β	1.000	1.148 (0.121)*	1.367 (0.136)*

*denotes significant at 5% level; Figures in parenthesis are standard error

Now, the long run equation of cointegration can be written as:

RES = 1.148 (ECON) + 1.367 (TRDOP) ....(8)

The normalized equation of cointegration shows theoretically expected signs. The equation (8)

suggests that a one percent increase in economic growth and trade openness will lead more than one percent increase in foreign exchange reserves.

The VECM of international reserves reveals that lagged independent variables shows the expected signs. The variables Δ(ECON), Δ(TRDOP), Δ(ECON)$_{t-1}$,and Δ(TRDOP)$_{t-1}$are found significant in vector error correction model. The determination coefficient R-squared is 74% and 73%. This means that changes in economic growth explains 74% and changes in trade openness explains 73%of the reasons for India's accumulation of international reserves over the years. Moreover the t-statistics is 4.36and 3.86 with a p-value of 0.04. The t-stat result is used to test the hypothesis that- economic growth and trade openness have no significant effect on international reserves. Since the p-value is highly significant, the null hypothesis can be rejected and alternative hypothesis (Economic growth and trade openness have significant effect on international reserves) can be accepted. Hence based on these results, this study found that economic growth and trade openness have significant effect on international reserves in Indian economy.

Table 4: Vector Error Correction Model (VECM)

Variables	Δ(RES)	Δ(ECON)	Δ(TRDOP)
Δ(RES)$_{t-1}$	0.385 (1.160)	-0.421 (-2.686)*	-0.332 (-1.881)*
Δ(RES)$_{t-2}$	0.016 (0.080)	-0.186 (-1.925)*	-0.153 (-1.622)
Δ(ECON)$_{t-1}$	-0.578 (-1.349)*	-0.204 (-1.011)	-1.123 (-0.021)*
Δ(ECON)$_{t-2}$	-0.119 (-0.251)	-0.315 (-1.400)*	-0.233 (-1.337)
Δ(TRDOP)$_{t-1}$	-0.367 (-1.239)*	-0.314 (-1.021)*	-0.423 (-1.132)*
Δ(TRDOP)$_{t-2}$	-0.197 (-1.132)*	-0.272 (-1.031)*	-0.165 (-1.103)*
Constant	0.107 (1.242)	0.178 (4.364)*	0.241 (3.858)*
R-squared	0.35	0.74	0.73
F-Statistics	1.32	3.71	4.23
Std. Error	0.12	0.05	0.04

Note: Figures in parenthesis are t-statistics; * denotes significant at 5% level

DISCUSSION ON RESULTS

The present study assessed whether independent variables under consideration have systematic effects on international reserves with special reference to Indian economy. The main finding of the study is that economic growth and trade openness impact positively the international reserves of Indian economy. Encouraging domestic trade will assist to achieve higher rate of economic growth. These results are important for the policy makers because international reserves are utilized as buffer stock in the time of financial crisis. Moreover, these are used to manage exchange rate fluctuations in the capital market. *Cetetris paribus,*keeping substantial amount of international reserves is beneficial for the economy. More international trade especially export activities will fetch more reserves. Hence the concerned authorities should engage more actively in the management of international reserves.

CONCLUSION

This paper has analysed empirically the influence of economic growth and trade openness on international reserves in Indian context. We study employed time series data with annual frequency from 1996 to 2016.The study developed an econometric model relating RES to ECON and TRDOP variables and used logarithmic transformation of the variables for econometric estimation. Our study agrees with Puah C. et al. (2011) in which they found economic size and real effective exchange rate positively related to international reserves in case of Malaysia.

The purpose of this study is to investigate empirically the effect of economic growth and trade openness on international reserves in India. The ADF unit root test results indicate that all the variables are integrated with order one. Thus, we proceed to the Johansen-Juselius cointegration test to study the long-run equilibrium association between the variables. The cointegration test results suggest that there is an existence of a stable long-run equilibrium relationship among international reserves, economic growth and trade openness at 5 % level of significance. By normalizing the cointegrating vector with respects to international reserves, the study obtained the parameters that showing the relationship among economic growth, trade openness and international reserves. The determination coefficient R-squared is 74% and 73%. This means that changes in economic growth explains 74% and changes in trade openness explains 73% of the reasons for India's accumulation of international reserves over the years. Moreover

the t-statistics is 4.36 with a p-value of 0.04. The t-stat result is used to test the hypothesis that-economic growth and trade openness have no significant effect on international reserves. Since the p-value is highly significant, the null hypothesis can be rejected and alternative hypothesis can be accepted. Therefore, economic growth and trade openness have significant effect on international reserves.

Findings of the study suggest that economic growth and trade openness is positively related to international reserves. This implies that India must involve more actively in foreign reserve management practices.The Government of India should procure constructive steps to maintain steady exports growth rate as it is a real indicator of a nation's real growth rate. The Government should encourage people to avoid demonstration effect through home country's satisfied products in our own country to satisfy the consumption needs of the Indian consumer. The Government should bargain to get high volume of SDRs, to avoid balance of payments problem.

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