Financial Development, Foreign Investment Inflows and Economic Growth Triangle: The Case of India

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Abstract
This paper aims to investigate the possible co-integration and the direction of causality between financial development, foreign investment inflows and economic growth in India. In a VAR framework, after employing unit root tests to see if the variables under consideration are stationary and LR test statistic to identify whether any restrictions are there in the co-integrating vector or on the adjustment coefficients, Granger causality have been conducted in a VECM framework. Apart from econometric analysis regression analysis is also conducted. The Cointegration test reveals that the variables under study are I(1) processes implying a long run relationship exists between them. Both supply-leading and demand-following hypotheses are observed in case of Indian economy. Moreover FII(foreign investment inflows) -led growth hypothesis and GDP-driven FII hypothesis is also seen. The adjusted $\bar{R}^2$ *value of 0.897 measures the goodness of fit of the regression model.*

Keywords: Granger causality, financial development, cointegration, VECM.
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Introduction

Sustainable long-term economic growth depends on the ability to raise the human and physical capital accumulation rates in order to use the resulting productive assets more effectively and ensure that the entire population can gain access to these assets. The financial intermediation supports this investment process by mobilizing household and foreign savings for investment by firms by ensuring that these funds are allocated to the most productive use and diversifying risk and providing liquidity so that firms can operate the new capacity effectively. Financial development involves the establishment and expansion of institutions, instruments and markets that support this investment and growth process. According to *Levine* (1997), the financial system facilitates trading, hedging, diversifying and pooling of risk; allocates resources; monitors managers and exerts corporate control; mobilizes savings; and facilitates the exchange of goods and services. Financial systems influence economic growth in two main ways – through capital

accumulation and technological innovation, which correspond to physical and human capital respectively in endogenous growth theory (*Jones* 2005; *Romer* 1986, 1990).

The role of the financial market and the banking sector in the growth process is one of the crucial factors that has begun to receive considerable attention more recently. There are diverse views regarding the relationship between economic growth and financial development. Though some economists like *Lucas* (1988) maintain that the role of financial factors in economic growth has been overstated and several noted development economists like *Chandavarkar* (1992), *Meier* and *Seers* (1984) and *Stern* (1989) have expressed their skepticism over the role of the financial system in economic development, a majority of economists contend that there is a relationship between financial development and economic development. However, there is no consensus on the direction of causal relationship. It is now well recognized, after extensive studies in this field, that financial development is a crucial factor for economic growth (*Calderon* and *Liu*, 2003) as it is a necessary condition for achieving a high rate of economic growth (*Chang*, 2002) and has a strong positive relationship with economic growth (*Mazur* and *Alexander*, 2001). However, *De Gregorio* and *Guidotti* (1995) point out that financial development significantly reduces economic growth for countries (especially in Latin America) experiencing relatively high-inflation rates.

The relationship between financial development and economic growth has occupied the minds of economists from *Smith* to *Schumpeter* (1936 [1911]), although the channels and even the direction of causality have remained unresolved in both theory and empirics. However, due to the wide range of organizational forms involved, any clear conclusion as to what kind of financial institutions might maximize economic growth could not be determined. *McKinnon* (1973) observes that liberalization of financial markets allows financial deepening which reflects an increasing use of financial intermediation by savers and investors and the monetization of the economy and allows efficient flows of resources among people and institutions over time.

Review of Literature

It is seen that well functioning intermediation by the financial sector in channelling the limited resources from surplus units to deficit units would provide efficient allocation of resources, thereby, catalyzing the growth process of the other economic sectors. The 'finance-led growth' hypothesis postulates the 'supply-leading' relationship between financial development and economic growth. The 'supply-leading' hypothesis posits a causal relationship from institutions to markets that increases the supply of financial services and, thus, leads to real economic growth. Indeed, a number of studies have argued that the development of the financial sector has significantly promoted economic growth (*Schumpeter*, 1912; *King* and *Levine*, 1993a, 1993b, *Levine*, 1997; *Levine et al*., 2000; *McKinnon*, 1973 and *Neusser* and *Kugler*, 1998).

A high economic growth may create demand for certain financial instruments/financial services and arrangements and the financial markets

can effectively respond to these demands and changes as enumerated in the 'growth-led finance' hypothesis. In other words, this hypothesis suggests a 'demand following' relationship between financial development and economic growth. The impact of economic growth on the financial development has been documented by *Robinson* (1952), *Romer* (1990), *Goldsmith* (1969), *Gurley* and *Shaw* (1967) and *Jung* (1986) among others.

A two-way causal relationship between financial development and economic performance is detailed in the 'feedback' hypothesis where it is asserted that a country with a well-developed financial system could promote high economic expansion through technological changes and product/ services innovation (*Schumpeter*, 1912). This, in turn, will create high demand on the financial arrangements and services (*Levine*, 1997). As the banking institutions effectively respond to these demands, these changes will stimulate a higher economic performance. This shows that both financial development and economic growth are positively interdependent and their relationship could lead to feedback causality. The works of *Luintel* and *Khan* (1999) and *Capasso* (2003) among others support this view. Though the direction of causality between financial development and economic growth has drawn the attention of the researchers in the relevant literature, this causal relationship generally remains unclear (*Calderon* and *Liu*, 2003).

Since the mid-1980s, trade and financial liberalization was initiated in India followed by concrete measures in 1991. Capital inflows increased in the form of foreign direct investment (FDI). The Indian economy started attracting foreign investors by providing them a congenial environment and increasing financial liberalization that positively affected the Indian economy. However, possible negative side effects of the financial liberalization can never be ignored. There are also noteworthy studies searching the relationship between economic growth and financial sector development in India. *Agarwal* (2000) has examined the financial sector reforms in India and indicated that it is important to consider the vulnerability of the Indian economy to financial crises due to high current account deficits, high fiscal deficits and slow growth of exports. The study by *Bhattacharya* and *Sivasubramanian* (2003) has investigated into the causal relationship between financial development and economic growth in India using causality analysis. They found that for the period 1970-1999 financial sector development, as measured by M3/GDP, lead to GDP growth. The study by *Demetriades* and *Luitel* (1996), on the relationship between financial development, economic growth and banking sector controls in India, has shown that there is bi-directional causality between financial development and economic growth in India. They also point out that policies that affect financial development also affect economic growth and financial sector policies affect financial deepening by altering the bank behaviour. On the other hand, *Topalova* (2004) has investigated into the impact of trade liberalization on firm's productivity in India, and found that trade liberalization (especially tariff reduction) increases the productivity of firms. This study also claimed that productivity and profitability of firms might lead to economic welfare improvement with more intensive privatization efforts in India. The study by *Bajpai* (2001) shows that there was potential for growth of 7-8 percent per year in India because of structural changes in the industrial and financial areas and trade, such as the reduction in

protection levels, decontrol of prices, and continuing reforms in the banking sector.The study by *Bajpai* (2002) points out that, with the initiation of economic reforms in India in 1991, the role of private investment has acquired a great deal of significance. *Das* and *Guha Khasnobis* (2007) specifies the relationships between financial development and the allocation of credit on the one hand and the transmission mechanism between real and financial sectors and the allocation of credit on the other in India. It tries to identify the missing link between financial development and output.
This study is the first of its kind which investigates the possible co integration and the direction of causality between the financial development, foreign investment inflows and economic growth triangle not only in the case of India but also in the relevant literature to the best of one's knowledge by using new measures of financial development.

Objective

The study seeks to examine the causal relationship, if any, between India's financial development measures, foreign investment inflows and economic growth, in a Vector Auto Regressive (VAR) framework during the post liberalization period and to ascertain the economic implications of such causal relationship.

Data

Quarter-wise data relating to the variables used as measures of financial development, such as bank credit (i.e., net bank credit to government and bank credit to commercial sector) to GDP (i.e., CREDIT), financial savings to GDP (i.e., M3-M1), financial deepening to GDP (i.e., M3), exports of goods and services to GDP (i.e., EXP), imports of goods and services to GDP (i.e., IMP), comprising 52 observations, have been used. Quarter-wise data relating to financial development measures and other two variables – foreign investment inflows to GDP (i.e., FII*) and gross domestic product [at 1999-00 prices] (i.e., GDP), covering a period of 13years (1st quarter of 1996-97 to the 4th quarter of 2008-09), have been collected from various publications of the Reserve Bank of India (RBI) like RBI Bulletins, RBI Annual Reports, etc.

Methodology

The study has used the Granger-Causality Test in a multivariate Vector Autoregressive (VAR) framework to examine the causal links between FII, GDP, CREDIT, M3-M1, IMP, EXP and M3 over the period 1996-97 Q1 to 2008-09 Q4 (**Figure 1**). The period corresponds to the post-liberalization period of market-oriented reforms in a wide range of sectors with an emphasis on liberalization of the trade and investment regime with a view to making the Indian economy increasingly integrated with the global economy. Regression Analysis is also done with the same set of data. Two methods are followed.

A. Econometric Analysis

* Here FII stands for foreign investment inflows and not foreign institutional investment as is traditionally used.

B. Statistical Analysis

A. Econometric Analysis

Tests for Stationarity

The first step in the methodology is to test the stationarity of the variables (used as regressors in the model). *Augmented Dickey Fuller (ADF)* [1979], *Phillips-Perron (PP)* [1988] and *Kwiatkowski*, *Phillips, Schmidt* and *Shin (KPSS)* [1992] *Tests* have been conducted to investigate into the stationarity property of the series.

Tests for Cointegration

In this study, the Error-correction Cointegration technique of *Johansen* (1988) and *Johansen* and *Juselius* (1990) has been applied to identify the cointegration relationship between the variables. *Johansen* and *Juselius'* (1990) approach to the number of co-integrating vectors is applicable only if two variables are I(1). The Cointegration Test of maximum likelihood (based on the *Johansen-Juselius Test*) has been developed based on a VAR approach initiated by *Johansen* (1988). According to *Johansen* (1988), a p-dimensional VAR model, involving up to k-lags, can be specified as below.

$$Z_t = \alpha + \prod_1 Z_{t-1} + \prod_2 Z_{t-2} + ...\prod_k Z_{t-k} + \varepsilon_t \quad \text{.....(1)}$$

where Z_t is a $(p \times 1)$ vector of p potential endogenous variables and each ofthe Π_i is a $(p \times p)$ matrix of parameters and ε_t is the white noise term. Equation (1) can be formulated into an Error Correction Model (ECM) form as below.

$$\Delta Z_t = \alpha + \prod_k Z_{t-k} + \sum_{i=1}^{k-1} \theta_i \Delta Z_{t-i} + \varepsilon_t \quad \text{.....(2)}$$

Figure 1: Logarithmic values of bank credit, broad money, financial savings, goods and services export, goods and services import, gross domestic product, foreign investment inflows

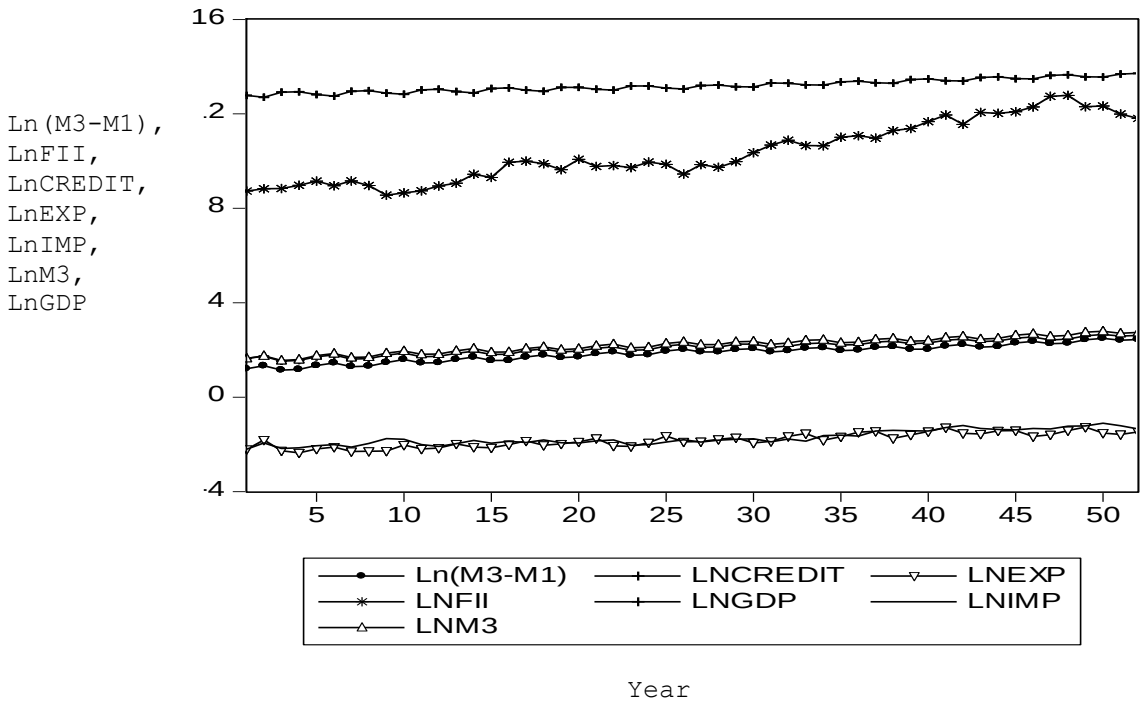


Figure 1: Logarithmic values of bank credit, broad money, financial savings, goods and services export, goods and services import, gross domestic product, foreign investment inflows

where Δ is the first difference operator, and Π and θ are p by p matrices of unknown parameters and k is the order of the VAR translated into a lag of $k-1$ in the ECM and ε_t is the white noise term. Evidence of the existence of cointegration is the same as evidence of the rank (r) for the Π matrix. *Johansen* and *Juselius* (1990) have shown that the rank of r of Π in equation (2) is equal to the number of cointegrating vectors in the system.

Johansen and *Juselius* (1990) have developed two Likelihood Ratio Tests. The first test is the Likelihood Ratio Test based on the maximal Eigen value which evaluates the null hypothesis of 'r' cointegrating vector(s) against the alternative of 'r+1' cointegrating vectors. The second test is the Likelihood Ratio Test based on the Trace Test which evaluates the null hypothesis of, at most, 'r' cointegrating vector(s) against the alternative hypothesis of more than 'r' cointegrating vectors. If the two variables are I(1), but cointegrated, the *Granger Causality Test* will be applied in the framework of ECM in which long-run components of the variables obey equilibrium constraints while the short-run components have a flexible dynamic specification.

Test for Granger Causality with VECM

In order to examine the causal linkages between the variables, the *Granger Causality Test* has been conducted. The direction of the impact of each of the variables is also determined from the analysis. In order to capture the impact of variables observed in the past time period in explaining the future performance, the optimal lag length p (which is 4 in the present study) is chosen (see **Table 1**) and the criteria used in selecting the VAR model and optimal lag length require the combination of information criterion (minimum of AIC or SBIC or HQIC or FPE value).

Table 1: VAR Lag Order Selection

[D(LnM3),D(LnCREDIT),D(LnEXP), D(LnIMP),D(LnFII),D(LnM3-M1),D(LnGDP)]

Lag	LL	LR	FPE	AIC	SIC	HQIC
0	663.1090	NA	3.16e-21	-27.33788	-27.06499	-27.23475
1	771.2567	180.2461	2.75e-22	-29.80236	-27.61930	-28.97738
2	874.2567	141.4076	3.32e-23	-32.04578	-27.95252*	-30.49893
3	952.7763	85.23418*	1.39e-23*	-33.28235*	-27.27891	-31.01364*

**indicates lag order selected by the criterion.*
D: represents the first difference of logarithmic values of the concerned variables.

If the variables contain cointegrating vector, causality exists in at least one direction. According to *Engle* and *Granger* (1987), if two series, say X and Y, are integrated of order one [i.e., I(1)] and cointegrated, then there is possibility of a causal relationship in at least one direction. The direction of a causal relationship can be detected in the VECM. *Engel* and *Granger* (1987) have found that, in the presence of cointegration, there always exists a corresponding error-correction representation, captured by the error-correction term (ECT).This means that changes in the dependent variable are a function of the level of disequilibrium in the cointegrating relationship as well as changes in other explanatory variable(s). The ECT captures the long-run adjustment of cointegration variables and the short run adjustments are captured by the co-efficient of the first differnce terms. As such, in addition to the direction of causality, the incorporation of ECT in the VECM allows to detect both short- and long-run causal relationships between the variables. On the other hand, if no cointegrating vector exists in the model, the standard VAR should be applied to test the causal relationship between variables. As the prerequisite of causality testing, it is necessary to check the cointegrating properties of the variables, and, to examine the causal linkages, a VECM is specified, which can be expressed as follows:

$$\Delta LnCREDIT_t = \sum_{j=1}^{p-1} \beta_{11,j} \Delta LnCREDIT_{t-j} + \sum_{j=1}^{p-1} \beta_{12,j} \Delta LnGDP_{t-j} + \sum_{j=1}^{p-1} \beta_{13,j} \Delta LnFII_{t-j} + \sum_{j=1}^{p-1} \beta_{14,j} \Delta LnM3_{t-j} +$$
$$\sum_{j=1}^{p-1} \beta_{15,j} \Delta Ln(M3-M1)_{t-j} + \sum_{j=1}^{p-1} \beta_{16,j} \Delta LnEXP_{t-j} + \sum_{j=1}^{p-1} \beta_{17,j} \Delta LnIMP_{t-j} + \alpha_1 ECT_{t-1} + \varepsilon_{1t} \ldots\ldots\ldots\ldots (3a)$$

$$\Delta LnM3_t = \sum_{j=1}^{p-1} \beta_{21,j} \Delta LnM3_{t-j} + \sum_{j=1}^{p-1} \beta_{22,j} \Delta LnGDP_{t-j} + \sum_{j=1}^{p-1} \beta_{23,j} \Delta LnFII_{t-j} + \sum_{j=1}^{p-1} \beta_{24,j} \Delta Ln(M3-M1)_{t-j} +$$
$$+ \sum_{j=1}^{p-1} \beta_{25,j} \Delta LnEXP_{t-j} + \sum_{j=1}^{p-1} \beta_{26,j} \Delta LnIMP_{t-j} + \sum_{j=1}^{p-1} \beta_{27,j} \Delta LnCREDIT_{t-j} + \alpha_2 ECT_{t-2} + \varepsilon_{2t} \ldots\ldots\ldots (3b)$$

$$\Delta LnEXP_t = \sum_{j=1}^{p-1} \beta_{31,j} \Delta LnEXP_{t-j} + \sum_{j=1}^{p-1} \beta_{32,j} \Delta LnGDP_{t-j} + \sum_{j=1}^{p-1} \beta_{33,j} \Delta LnFII_{t-j} + \sum_{j=1}^{p-1} \beta_{34,j} \Delta LnM3_{t-j} +$$
$$+ \sum_{j=1}^{p-1} \beta_{35,j} \Delta Ln(M3-M1)_{t-j} + \sum_{j=1}^{p-1} \beta_{36,j} \Delta LnIMP_{t-j} + \sum_{j=1}^{p-1} \beta_{37,j} \Delta LnCREDIT_{t-j} + \alpha_3 ECT_{t-3} + \varepsilon_{3t} \ldots (3c)$$

$$\Delta LnIMP_t = \sum_{j=1}^{p-1} \beta_{41,j} \Delta LnIMP_{t-j} + \sum_{j=1}^{p-1} \beta_{42,j} \Delta LnGDP_{t-j} + \sum_{j=1}^{p-1} \beta_{43,j} \Delta LnFII_{t-j} + \sum_{j=1}^{p-1} \beta_{44,j} \Delta LnM3_{t-j} +$$
$$+ \sum_{j=1}^{p-1} \beta_{45,j} \Delta Ln(M3-M1)_{t-j} + \sum_{j=1}^{p-1} \beta_{46,j} \Delta LnEXP_{t-j} + \sum_{j=1}^{p-1} \beta_{47,j} \Delta LnCREDIT_{t-j} + \alpha_4 ECT_{t-4} + \varepsilon_{4t} \ldots\ldots (3d)$$

$$\Delta LnFII_t = \sum_{j=1}^{p-1} \beta_{51,j} \Delta LnFII_{t-j} + \sum_{j=1}^{p-1} \beta_{52,j} \Delta LnGDP_{t-j} + \sum_{j=1}^{p-1} \beta_{53,j} \Delta LnCREDIT_{t-j} + \sum_{j=1}^{p-1} \beta_{54,j} \Delta LnM3_{t-j} +$$
$$\sum_{j=1}^{p-1} \beta_{55,j} \Delta Ln(M3-M1)_{t-j} + \sum_{j=1}^{p-1} \beta_{56,j} \Delta LnEXP_{t-j} + \sum_{j=1}^{p-1} \beta_{57,j} \Delta LnIMP_{t-j} + \alpha_5 ECT_{t-5} + \varepsilon_{5t} \ldots\ldots\ldots (3e)$$
$$+$$

$$\Delta LnGDP_t = \sum_{j=1}^{p-1} \beta_{61,j} \Delta LnGDP_{t-j} + \sum_{j=1}^{p-1} \beta_{62,j} \Delta LnFII_{t-j} + \sum_{j=1}^{p-1} \beta_{63,j} \Delta LnM3_{t-j} + \sum_{j=1}^{p-1} \beta_{64,j} \Delta Ln(M3-M1)_{t-j} +$$
$$\sum_{j=1}^{p-1} \beta_{65,j} \Delta LnEXP_{t-j} + \sum_{j=1}^{p-1} \beta_{66,j} \Delta LnIMP_{t-j} + \sum_{j=1}^{p-1} \beta_{67,j} \Delta LnCREDIT_{t-j} + \alpha_6 ECT_{t-6} + \varepsilon_{6t} \ldots\ldots\ldots\ldots (3f)$$

$$\Delta Ln(M3-M1)_t = \sum_{j=1}^{p-1} \beta_{71,j} \Delta Ln(M3-M1)_{t-j} + \sum_{j=1}^{p-1} \beta_{72,j} \Delta LnGDP_{t-j} + \sum_{j=1}^{p-1} \beta_{73,j} \Delta LnFII_{t-j} + \sum_{j=1}^{p-1} \beta_{74,j} \Delta LnM3_{t-j} +$$
$$+ \sum_{j=1}^{p-1} \beta_{75,j} \Delta LnEXP_{t-j} + \sum_{j=1}^{p-1} \beta_{76,j} \Delta LnIMP_{t-j} + \sum_{j=1}^{p-1} \beta_{77,j} \Delta LnCREDIT_{t-j} + \alpha_7 ECT_{t-7} + \varepsilon_{7t} \ldots\ldots\ldots\ldots (3g)$$

where Δ is the first difference operator and $\varepsilon_{1t}, \varepsilon_{2t}, \varepsilon_{3t}, \varepsilon_{4t}, \varepsilon_{5t}, \varepsilon_{6t}$ and ε_{7t} are white noise. ECT is the error correction term, and p is the order of the VAR, which is translated to lag of $p-1$ in the ECM. $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ and α_7 represent the speed of adjustment after the bank credit, broad money, goods and services export, goods and services import, foreign investment inflows, GDP and financial savings deviate from the long-run equilibrium in period t-1.

Statistical Analysis

The regression equation for the model is as follows:

$$LnGDP_i = \alpha_i + \beta_1 LnM3_i + \beta_2 LnEXP_i + \beta_3 LnIMP_i + \beta_4 LnFII_i + \beta_5 LnCREDIT_i + \beta_6 Ln(M3 - M1)_i + \varepsilon_i \ldots\ldots (4)$$

where ε_i represents the noise or error term, α_i represents the slope and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ represent coefficients of regression .

Findings

Econometric Analysis

Time Series Properties of the Variables

Table 2 reports the results of the *ADF* and *PP Test* and *KPSS Tests* of unit root by lag length chosen based on minimum values of *SBC* or *SIC*. The tests are performed on both the level and first differences of the lagged variables.

Table 2: Test of Unit Root Test Hypothesis (1996-97 Q1 – 2008-09 Q4) without trend

		ADF Statistic		PP Test		KPSS	
Series		Test Statistic	Lags	Test Statistic	Lags	Test Statistic	Lags
LnM3	Level	0.965755	8	-0.795933	8	0.693553***	8
	First Difference	-2.305097	3	-58.11610***	3	0.260314	3
LnCREDIT	Level	0.492670	4	0.197295	4	1.12935***	4
	First Difference	-1.961203	3	-52.72994***	3	0.239039	3
LnEXP	Level	0.074454	5	-0.209608	5	0.956932***	5
	First Difference	-4.332098***	4	-22.70356***	4	0.0586995	4
LnIMP	Level	0.101942	5	-0.155090	5	0.91382***	5
	First Difference	-3.948879***	4	-7.032201***	4	0.0927642	4
LnFII	Level	-1.072956	0	-1.072956	0	4.87828***	0
	First Difference	-8.657003***	0	-8.657003***	0	0.0659368	0
Ln(M3-M1)	Level	-0.068820	4	-0.897160	4	1.11761	4
	First Difference	-1.778410	3	-60.09667***	3	0.290814***	3
LnGDP	Level	0.901398	4	2.473643	4	1.13601	4
	First Difference	-2.632188*	3	-75.41490***	3	0.453798*	3

(a) The critical values are those of McKinnon (1991).
(b) ,**, * represent the rejection of null hypothesis at the 1% level of significance, 5% level of significance, and 10% level of significance respectively.***

The variables LnM3, LnCREDIT and Ln(M3-M1) are I(1) processes according to PP test and KPSS test , but are I(2) processes according to ADF test. The variables LnEXP, LnIMP, LnFII, LnGDP are I(1) processes according to ADF test, PP test and KPSS test.

Johansen Cointegration Test

Johansen Cointegration Test results for the cointegration rank r have been presented in **Table 3.** Going by the results of the *PP Test* and the *KPSS Test*, it has been observed that the variables have the same order of integration, i.e., I(1) and the *Johansen Cointegration Test* has been employed to find out the cointegration rank and the number of cointegrating vectors. The null hypothesis is rejected in the cases of both the Trace statistic and Max-Eigen value statistic. **Table 3** shows that the number of statistically significant cointegration vectors is equal to 3 for the Trace statistic and 2 for the Max-Eigen value statistic. The results suggest that there is a long-run relationship among the variables considered for the study.

Table 3: Johansen -Juselius Cointegration Test Results
[no deterministic trend (restricted constant)]

H_0	H_1	λ_{trace}	$CV_{(trace,5\%)}$	H_0	H_1	$\lambda_{\max}$	$CV_{(\max,5\%)}$
$r = 0$	$r \geq 1$	257.3644**	134.6780	$r = 0$	$r = 1$	119.7630**	47.07897
$r \leq 1$	$r \geq 2$	137.6014**	103.8473	$r \leq 1$	$r = 2$	57.66046**	40.95680
$r \leq 2$	$r \geq 3$	79.94095**	76.97277	$r \leq 2$	$r = 3$	28.63991	34.80587
$r \leq 3$	$r \geq 4$	51.30104	54.07904	$r \leq 3$	$r = 4$	19.36868	28.58808
$r \leq 4$	$r \geq 5$	31.93236	35.19275	$r \leq 4$	$r = 5$	14.29206	22.29962
$r \leq 5$	$r \geq 6$	17.64030	20.26184	$r \leq 5$	$r = 6$	12.14143	15.89210
$r \leq 6$	$r \geq 7$	5.498876	9.164546	$r \leq 6$	$r = 7$	5.498876	9.164546

(a) r is the number of cointegrating vectors.
(b) Trace test indicates 3 cointegrating equations and Max-Eigen value test indicates 2 cointegrating equation at the 5% level of significance respectively.
(c)**denotes rejection of the null hypothesis at the 5% level of significance.
(e) The critical values (i.e., CVs) are taken from Mackinnon-Haug-Michelis (1999).

Analysis of VECM

Johansen's $\lambda_{\max}$ and λ_{trace} statistics (as per **Table 3**) reveal that the variables under study stand in a long-run relationship among them, thus, justifying the use of ECM for showing short-run dynamics. Going by the definition of cointegration, the Granger Representation Theorem (*Engle* and *Granger*, 1987) states that, if a set of variables is cointegrated, then there exists a valid error correction representation of the data. The coefficients of ECT contain information about whether the past values affect the current values of the variable under study.A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes. The information obtained from the ECM is related to the speed of adjustment of the system towards long-run equilibrium. The short-run dynamics are captured through the individual coefficients of the difference terms.

In **Table 4** below, the cointegrating equations are given along with the equation for changes in bank credit (*first* column), changes in broad money (*second* column), changes in goods and services export (*third* column), changes in goods and services import (*fourth* column), changes in foreign investment inflows (*fifth* column), changes in gross domestic product (*sixth* column), and changes in financial savings (*seventh* column). The coefficients of ECT contain information about whether the past values affect the current values of the variable under study. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes. The information obtained from the ECM is related to the speed of adjustment of the system towards long-run equilibrium. The short-run dynamics are captured through the individual coefficients of the difference terms.

The adjustment coefficient on ECT_{t-1} in equation 3(a) is negative and statistically significant (at 1% level), which means that the error term contributes in explaining changes in bank credit and a long-term relationship exists between the independent variables and bank credit. The estimates of lagged coefficients $\Delta LnEXP_{t-2}$ in equation 3(a) is positive and statistically significant (at 1% level), implying that higher goods and services export has a positive impact on bank credit in the short-run. The estimates of lagged coefficients $\Delta LnIMP_{t-1}$, in equation 3(a), is positive and statistically significant (at 1% level), implying that higher goods and services import has a positive impact on bank credit in the short-run. The estimates of lagged coefficients $\Delta LnGDP_{t-3}$ in equation 3(a) is positive and statistically significant (at 1% level), implying that a higher GDP has a positive effect on bank credit in the short-run. The estimates of the lagged coefficients $\Delta LnFII_{t-1}$ in equation 3(a) is negative and statistically significant (at 5% level), implying that higher foreign investment inflows has a negative impact on bank credit in the short run.

The adjustment coefficient on ECT_{t-2} in equation 3(b) is negative and statistically significant (at 1% level), which means that the error term

contributes in explaining changes in broad money and a long-term relationship exists between the independent variables and broad money. The estimates of lagged coefficients $\Delta LnEXP_{t-2}$ in equation 3(b) is positive and statistically significant (at 1% level), implying that a higher goods and services export has a positive impact on broad money in the short run. The estimates of lagged coefficients $\Delta LnIMP_{t-1}$, in equation 3(b) is positive and statistically significant (at 1% level), implying that higher goods and services import has a positive impact on broad money in the short-run. The estimates of lagged coefficients $\Delta LnGDP_{t-2}, \Delta LnGDP_{t-3}$ in equation 3(b) is positive and statistically significant (at 10% level and 1% level respectively), implying that a higher GDP has a positive impact on broad money in the short run. The estimates of the lagged coefficients $\Delta LnFII_{t-1}$ in equation 3(b) is negative and statistically significant (at 10% level), implying that higher foreign investment inflows has a negative impact on broad money in the short run.

The estimates of lagged coefficients in $\Delta LnCREDIT_{t-1}$ in equation 3(c) is negative and statistically significant (at 10% level), implying that higher bank credit has a negative impact on goods and services export in the short run. The estimates of lagged coefficients $\Delta LnIMP_{t-1}$ in equation 3(c) is positive and statistically significant (at 5% level), implying that a higher goods and services import has a positive impact on goods and services export in the short run.

The estimates of lagged coefficients in $\Delta LnCREDIT_{t-1}$ in equation 3(d) is negative and statistically significant (at 10% level), implying that higher bank credit has a negative impact on goods and services import in the short run. The estimates of lagged coefficients $\Delta LnEXP_{t-2}$ in equation 3(d) is positive and statistically significant (at 10% level), implying that goods and services export has a positive impact on goods and services import in the short run. The estimates of lagged coefficients $\Delta LnGDP_{t-3}$ in equation 3(d) is positive and statistically significant at 5% level, implying that higher economic growth has a positive impact on goods and services import in the short run.

The estimates of lagged coefficients $\Delta LnGDP_{t-2}$ in equation 3(e) is positive and statistically significant at 1% level, implying that higher economic growth has a positive impact on foreign investment inflows in the short run. The adjustment coefficient on ECT_{t-6} in equation 3(f) is positive and statistically significant (at 1% level), which means that the error term contributes in explaining changes in GDP and a long-term relationship exists between the independent variables and GDP. The estimates of lagged coefficients $\Delta LnCREDIT_{t-1}, \Delta LnCREDIT_{t-2}$ in equation 3(f) are positive and statistically significant (at 1% level), implying that higher bank credit has a positive impact on GDP in the short run. The estimates of the lagged coefficients $\Delta LnM3_{t-1}, \Delta LnM3_{t-2}$ are negative

and statistically significant (at 1% level), implying that higher broad money has a negative impact on economic growth in the short run. The estimates of lagged coefficients $\Delta LnEXP_{t-2}, \Delta LnEXP_{t-3}$ in equation 3(f) is negative and statistically significant (at 1% level), implying that higher goods and services export has a negative impact on economic growth in the short run. The estimates of lagged coefficients $\Delta LnIMP_{t-1}, \Delta LnIMP_{t-2}$ in equation 3(f) is negative and statistically significant at 1% level and 5% level respectively, implying that higher goods and services import has a negative impact on economic growth in the short run. The estimates of the lagged coefficients $\Delta LnFII_{t-1}, \Delta LnFII_{t-2}$ in equation 3(f) is positive and statistically significant at 1% level and 5% level respectively, implying that higher foreign investment inflows has a positive impact on economic growth in the short run. . The estimates of the lagged coefficients $\Delta Ln(M3-M1)_{t-1}, \Delta Ln(M3-M1)_{t-2}$ are positive and statistically significant at 1% level, implying that higher financial savings have a positive impact in economic growth in the short run.

The adjustment coefficient on ECT_{t-7} in equation 3(g) is negative and statistically significant (at 5% level), which means that the error term contributes in explaining changes in financial savings and a long-term relationship exists between the independent variables and financial savings. The estimates of lagged coefficients $\Delta LnEXP_{t-2}$ in equation 3(g) is positive and statistically significant at 1% level, implying that higher goods and services export has a positive impact on financial savings in the short run. The estimates of lagged coefficients $\Delta LnIMP_{t-1}$ in equation 3(g) is positive and statistically significant at 5% level, implying that higher goods and services import has a positive impact on financial savings in the short run. The estimates of lagged coefficients $\Delta LnGDP_{t-3}$ in equation 3(g) is positive and statistically significant at 1% level, implying that higher GDP has a positive impact on financial savings in the short run. The estimates of lagged coefficients $\Delta LnFII_{t-1}$ in equation 3(g) is negative and statistically significant at 10% level, implying that higher foreign investment inflows has a negative impact on financial savings in the short run.

To test whether each coefficient in a cointegrating equation is statistically zero and can be excluded from the set of co-integrating relations, restrictions can be imposed on the cointegrating vector (elements of the β matrix).The number of rows of the β matrix corresponds to the number of selected co-integration equations. Restrictions may be placed on the coefficients B(r,k) of the r^{th} co-integrating relation:

B(r,1)*LnCREDIT + B(r,2)*LnM3 + B(r,3)*LnEXP + B(r,4)*LnIMP + B(r,5)*LnFII + B(r,6)*LnGDP + B(r,7)*Ln(M3-M1).Restrictions may also be put on the adjustment coefficients, where A(k,r) is the coefficient of the r-th cointegrating relation in the k-th VEC equation, and where:

k = 1 D(LnCREDIT) equation

```
k = 2     D(LnM3)       equation
k = 3     D(LnEXP)      equation
k = 4     D(LnIMP)      equation
k = 5     D(LnFII)      equation
k = 6     D(LnGDP)      equation
k = 7     D[Ln(M3-M1)]  equation
```

The statistical significance of these restrictions is provided by the Chi-square statistic with degrees of freedom equal to the number of restrictions. In **Table (4a),** the null hypothesis that coefficient of LnEXP is not significantly different from zero cannot be rejected as there is a high probability value of 0.227194. In **Table 4(b),** the null hypothesis that adjustment coefficients in equation 3(c) is not significantly different from zero cannot be rejected as there is a high probability value of 0.890984. In **Table 4(c),** the null hypothesis that adjustment coefficients in equation 3(e) is not significantly different from zero cannot be rejected as there is a high probability value of 0.331778.Since there are three restrictions, the test statistic follows χ^2 distribution with three degrees of freedom. The p value in **Table (5)** for the test is 0.535838.So the restrictions are supported by the data and it can be concluded that the cointegrating relationship must consider the restrictions.

Table 4(a): VEC Coefficient Restrictions

Restrictions:				
B(1,3) = 0				
Tests of Cointegration restrictions:				
Hypothesized No. of CE(s)	Restricted Log-likelihood	LR Statistic	Df	Probability
1	949.9540	1.458342	1	0.227194
2	979.5134	NA	NA	NA
3	993.8334	NA	NA	NA
4	1003.518	NA	NA	NA
5	1010.664	NA	NA	NA
6	1016.734	NA	NA	NA
NA indicates that restriction is not binding.				

Table 4(b): VEC Coefficient Restrictions

Restrictions:				
A(4,1) = 0				
Tests of Cointegration restrictions:				
Hypothesized No. of CE(s)	Restricted Log-likelihood	LR Statistic	Df	Probability
1	950.6738	0.018785	1	0.890984
2	979.5134	NA	NA	NA
3	993.8334	NA	NA	NA
4	1003.518	NA	NA	NA
5	1010.664	NA	NA	NA

6	1016.734	NA	NA	NA
NA indicates that restriction is not binding.				

Table 4(c): VEC Coefficient Restrictions

Restrictions:				
A(5,1) = 0				
Tests of Cointegration restrictions:				
Hypothesized No. of CE(s)	Restricted Log-likelihood	LR Statistic	Df	Probability
1	950.2122	0.941946	1	0.331778
2	979.5134	NA	NA	NA
3	993.8334	NA	NA	NA
4	1003.518	NA	NA	NA
5	1010.664	NA	NA	NA
6	1016.734	NA	NA	NA
NA indicates that restriction is not binding.				

Table 5: Test Results of Vector Error Correction Model
Vector Error Correction Estimates
Included observations: 48 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:		
B(1,3)=0,A(4,1)=0,A(5,1)=0		
LR test for binding restrictions (rank = 1):		
Chi-square(3)	2.180306	
Probability	0.535838	
Cointegrating Eq:	CointEq1	
LnCREDIT(-1)	-149.0718	
LnM3(-1)	691.2844	
LnEXP(-1)	0.000000	
LnIMP(-1)	6.422394	
LnFII(-1)	-1.700814	
LnGDP(-1)	-125.0752	
Ln(M3-M1)(-1)	-421.1046	
C	1231.011	

Error Correction:	D(LnCREDIT)	D(LnM3)	D(LnEXP)	D(LnIMP)	D(LnFII)	D(LnGDP)	D[Ln (M3-M1)]
CointEq1	-0.005694	-0.004318	-0.010858	0.000	0.000	0.009048	-0.004615
	(0.00176)	(0.00153)	(0.00776)	(0.00)	(0.00)	(0.00123)	(0.00203)
	[-3.23059]***	[-2.82414]***	[-1.39895]	[NA]	[NA]	[7.33885]***	[-2.27068]**
D(Ln CREDIT(-1))	-0.160986	-0.147973	-2.599450	-4.771441	-8.178896	0.727060	-0.019031
	(0.29662)	(0.25200)	(1.37338)	(1.59024)	(5.90686)	(0.20582)	(0.33562)
	[-0.54273]	[-0.58719]	[-1.89274]*	[-3.00045]***	[-1.38380]	[3.53247]***	[-0.05670]
D(Ln CREDIT (-2))	-0.085763	0.050445	1.115150	1.438604	10.36032	0.662284	-0.048491
	(0.35566)	(0.30217)	(1.64675)	(1.90678)	(7.08262)	(0.24679)	(0.40243)
	[-0.24113]	[0.16694]	[0.67718]	[0.75447]	[1.46278]	[2.68359]***	[-0.12050]
D(Ln CREDITs(-3))	0.015939	0.039694	-0.849035	-1.328213	4.946493	0.123539	0.054109
	(0.28032)	(0.23816)	(1.29791)	(1.50285)	(5.58227)	(0.19451)	(0.31718)
	[0.05686]	[0.16667]	[-0.65416]	[-0.88379]	[0.88611]	[0.63513]	[0.17059]
D(LnM3(-1))	0.762112	0.733776	6.998206	1.979422	22.99456	-3.536938	0.745087
	(1.19522)	(1.01544)	(5.53395)	(6.40779)	(23.8014)	(0.82935)	(1.35237)
	[0.63763]	[0.72262]	[1.26459]	[0.30891]	[0.96610]	[-4.26472]***	[0.55095]
D(LnM3(-2))	1.115866	-0.157280	3.754773	-2.032174	-11.42712	-2.536783	-0.283215
	(1.23133)	(1.04612)	(5.70114)	(6.60138)	(24.5205)	(0.85440)	(1.39322)
	[0.90623]	[-0.15035]	[0.65860]	[-0.30784]	[-0.46602]	[-2.96907]***	[-0.20328]
D(LnM3(-3))	0.377615	-0.241111	5.566863	4.903687	8.183956	-0.923870	-0.372621
	(0.79938)	(0.67914)	(3.70118)	(4.28561)	(15.9187)	(0.55468)	(0.90448)
	[0.47238]	[-0.35503]	[1.50408]	[1.14422]	[0.51411]	[-1.66559]	[-0.41197]
D(LnEXP(-1))	-0.027653	0.028203	-0.356339	0.311939	-0.223857	0.047131	0.033342
	(0.04561)	(0.03875)	(0.21117)	(0.24452)	(0.90825)	(0.03165)	(0.05161)
	[-0.60631]	[0.72785]	[-1.68742]*	[1.27572]	[-0.24647]	[1.48924]	[0.64610]
D(LnEXP(-2))	0.178467	0.159436	-0.199025	0.415654	-1.596441	-0.128285	0.169411
	(0.04607)	(0.03914)	(0.21331)	(0.24699)	(0.91743)	(0.03197)	(0.05213)
	[3.87379]***	[4.07343]***	[-0.93304]	[1.68287]*	[-1.74012]*	[-4.01299]***	[3.24993]***

Error Correction:	D(LnCREDIT)	D(LnM3)	D(LnEXP)	D(LnIMP)	D(LnFII)	D(LnGDP)	D[Ln (M3-M1)]
CointEq1	-0.005694	-0.004318	-0.010858	0.000	0.000	0.009048	-0.004615
	(0.00176)	(0.00153)	(0.00776)	(0.00)	(0.00)	(0.00123)	(0.00203)
	[-3.23059]***	[-2.82414]***	[-1.39895]	[NA]	[NA]	[7.33885]***	[-2.27068]**
D(Ln CREDIT(-1))	-0.160986	-0.147973	-2.599450	-4.771441	-8.178896	0.727060	-0.019031
	(0.29662)	(0.25200)	(1.37338)	(1.59024)	(5.90686)	(0.20582)	(0.33562)
	[-0.54273]	[-0.58719]	[-1.89274]*	[-3.00045]***	[-1.38380]	[3.53247]***	[-0.05670]
D(Ln CREDIT (-2))	-0.085763	0.050445	1.115150	1.438604	10.36032	0.662284	-0.048491
	(0.35566)	(0.30217)	(1.64675)	(1.90678)	(7.08262)	(0.24679)	(0.40243)
	[-0.24113]	[0.16694]	[0.67718]	[0.75447]	[1.46278]	[2.68359]***	[-0.12050]
D(Ln CREDITs(-3))	0.015939	0.039694	-0.849035	-1.328213	4.946493	0.123539	0.054109
	(0.28032)	(0.23816)	(1.29791)	(1.50285)	(5.58227)	(0.19451)	(0.31718)
	[0.05686]	[0.16667]	[-0.65416]	[-0.88379]	[0.88611]	[0.63513]	[0.17059]
D(LnM3(-1))	0.762112	0.733776	6.998206	1.979422	22.99456	-3.536938	0.745087
	(1.19522)	(1.01544)	(5.53395)	(6.40779)	(23.8014)	(0.82935)	(1.35237)
	[0.63763]	[0.72262]	[1.26459]	[0.30891]	[0.96610]	[-4.26472]***	[0.55095]
D(LnM3(-2))	1.115866	-0.157280	3.754773	-2.032174	-11.42712	-2.536783	-0.283215
	(1.23133)	(1.04612)	(5.70114)	(6.60138)	(24.5205)	(0.85440)	(1.39322)
	[0.90623]	[-0.15035]	[0.65860]	[-0.30784]	[-0.46602]	[-2.96907]***	[-0.20328]

D(LnM3(-3))	0.377615	-0.241111	5.566863	4.903687	8.183956	-0.923870	-0.372621
	(0.79938)	(0.67914)	(3.70118)	(4.28561)	(15.9187)	(0.55468)	(0.90448)
	[0.47238]	[-0.35503]	[1.50408]	[1.14422]	[0.51411]	[-1.66559]	[-0.41197]
D(LnEXP(-1))	-0.027653	0.028203	-0.356339	0.311939	-0.223857	0.047131	0.033342
	(0.04561)	(0.03875)	(0.21117)	(0.24452)	(0.90825)	(0.03165)	(0.05161)
	[-0.60631]	[0.72785]	[-1.68742]*	[1.27572]	[-0.24647]	[1.48924]	[0.64610]
D(LnEXP(-2))	0.178467	0.139436	-0.199025	0.415654	-1.596441	-0.128285	0.169411
	(0.04607)	(0.03914)	(0.21331)	(0.24699)	(0.91743)	(0.03197)	(0.05213)
	[3.87379]***	[4.07343]***	[-0.93304]	[1.68287]*	[-1.74012]*	[-4.01299]***	[3.24993]***
D(LnEXP(-3))	0.061195	0.016182	-0.355733	0.281578	-1.591170	-0.097429	0.016502
	(0.04446)	(0.03778)	(0.20587)	(0.23838)	(0.88545)	(0.03085)	(0.05031)
	[1.37626]	[0.42837]	[-1.72793]*	[1.18121]	[-1.79701]*	[-3.15783]***	[0.32800]
D(LnDMP(-1))	0.220596	0.107785	0.419095	0.098667	-0.707648	-0.161666	0.104782
	(0.04391)	(0.03730)	(0.20331)	(0.23541)	(0.87441)	(0.03047)	(0.04968)
	[5.02384]***	[2.88930]***	[2.06141]**	[0.41913]	[-0.80929]	[-5.30601]***	[2.10900]**
D(LnDMP (-2))	-0.020424	-0.020743	0.462237	0.116644	0.356651	-0.076680	-0.027523
	(0.05021)	(0.04266)	(0.23247)	(0.26918)	(0.99986)	(0.03484)	(0.05681)
	[-0.40678]	[-0.48627]	[1.98834]	[0.43333]	[0.35670]	[-2.20094]**	[-0.48446]
D(LnDMP(-3))	0.010734	-0.013876	-0.096509	-0.495066	-1.186328	-0.042706	-0.001942
	(0.05901)	(0.05013)	(0.27320)	(0.31634)	(1.17503)	(0.04094)	(0.06676)
	[0.18192]	[-0.27680]	[-0.35325]	[-1.56497]	[-1.00961]	[-1.04306]	[-0.02908]
D(LnFII(-1))	-0.021280	-0.014474	0.015661	-0.031875	-0.379788	0.032704	-0.018069
	(0.00955)	(0.00811)	(0.04421)	(0.05119)	(0.19014)	(0.00663)	(0.01080)
	[-2.22872]**	[-1.78482]*	[0.35425]	[-0.62269]	[-1.99743]*	[4.93623]***	[-1.67256]*
D(LnFII(-2))	-0.010808	-0.008494	0.022108	0.063328	0.067367	0.018196	-0.014103
	(0.01092)	(0.00927)	(0.05054)	(0.05852)	(0.21738)	(0.00757)	(0.01235)
	[-0.99006]	[-0.91583]	[0.43741]	[1.08209]	[0.30990]	[2.40221]**	[-1.14180]
D(LnFII(-3))	-0.004099	0.001997	0.028920	0.052108	-0.009885	0.006576	0.007591
	(0.01084)	(0.00878)	(0.04786)	(0.05541)	(0.20583)	(0.00717)	(0.01169)
	[-0.39655]	[0.22739]	[0.60431]	[0.94035]	[-0.04802]	[0.91687]	[0.64908]
D(LnGDP(-1))	-0.147714	0.096428	-1.552050	-2.348362	-5.096839	0.319756	0.265001
	(0.25203)	(0.21412)	(1.16692)	(1.35118)	(5.01889)	(0.17488)	(0.28517)
	[-0.58609]	[0.45035]	[-1.33004]	[-1.73801]	[-1.01553]	[1.82842]*	[0.92928]
D(LnGDP(-2))	0.235027	0.378934	1.561931	0.871300	13.50654	0.256284	0.008355
	(0.23197)	(0.19708)	(1.07405)	(1.24365)	(4.61946)	(0.16096)	(0.26247)
	[1.01316]	[1.92274]*	[1.45424]	[0.70060]	[2.92383]***	[1.59219]	[0.03183]
D(LnGDP(-3))	1.573378	1.156720	2.018443	3.402579	-4.470642	-1.145130	1.419340
	(0.28390)	(0.24119)	(1.31446)	(1.52202)	(5.65345)	(0.19699)	(0.32122)
	[5.54207]***	[4.79582]***	[1.53557]	[2.23557]**	[-0.79078]	[-5.81308]***	[4.41855]***
D(Ln(M3-M1)(-1))	-0.728143	-0.551955	-5.159319	-0.731290	-20.54692	2.465067	-0.458279
	(0.79303)	(0.67374)	(3.67179)	(4.25158)	(15.7923)	(0.55027)	(0.89730)
	[-0.91818]	[-0.81923]	[-1.40513]	[-0.17200]	[-1.30108]	[4.47971]***	[-0.50516]
D(Ln(M3-M1)(-2))	-1.171771	-0.050374	-2.869649	-0.003921	12.09140	2.118334	-0.140896
	(0.87581)	(0.74364)	(4.05272)	(4.69266)	(17.4306)	(0.60736)	(0.99039)
	[-1.33870]	[-0.06774]	[-0.70808]	[-0.00084]	[0.69369]	[3.48776]***	[-0.14226]
D(Ln(M3-M1)(-3))	0.606633	0.817813	-2.768693	-1.047569	-13.93867	0.126010	1.115643
	(0.59806)	(0.50810)	(2.76907)	(3.20632)	(11.9097)	(0.41499)	(0.67669)
	[1.01433]	[1.60954]	[-0.99987]	[-0.32672]	[-1.17036]	[0.30365]	[1.64867]
R-squared	0.990609	0.993646	0.864627	0.829201	0.512811	0.995363	0.989284
Adj. R-squared	0.983025	0.988514	0.755287	0.691248	0.119312	0.991618	0.980629
F-statistic	130.6060	193.6185	7.907704	6.010752	1.303207	265.7790	114.2978

****** denotes statistical significance at 1% level of significance, ** denotes statistical significance at 5% level and * denotes statistical significance at 10% level of significance. Standard errors in ( ) & t-statistics in [ ].***

Causality Test with VECM

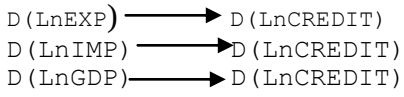
Results of Causality Test with VECM are detailed in **Table 6**. A bi-directional causality is observed between GDP and bank credit, GDP and broad money, GDP and goods and services exports, GDP and goods and services import, GDP and foreign investment inflows, goods and services import and bank credit, and M3-M1 and GDP. Unidirectional causality runs from M3-M1 to M3, from goods and services import to goods and services export, from goods and services export to M3-M1, and from M3-M1 to foreign investment inflows. Unidirectional causality is observed from goods and services export to M3, goods and services import to M3, and goods and services export to bank credit.

If these results are summarized, then both supply-leading and demand-following hypotheses, i.e., feedback hypotheses, are accepted with respect to the Indian economy. Moreover, export-led and import-led growth hypotheses, i.e., trade-led growth hypotheses are accepted on the basis of the above results. It is also important to note that changes in exports and imports lead to change in bank credit. Further, changes in exports and imports lead to a change in M3. In the Indian economy, both FII (foreign investment inflows)-led growth hypothesis and GDP-driven FII hypothesis are to be accepted and there is a two-way linkage between the two.

Table 6: VEC Granger Causality (Sample: 1 to 48)

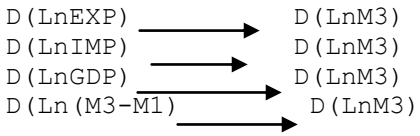
Dependent variable: D(LnCREDIT)

Excluded	Chi-square	df	Probability
D(LnM3)	0.826498	3	0.8431
D(LnEXP)	25.14370	3	0.0000
D(LnIMP)	30.81405	3	0.0000
D(LnFII)	5.132874	3	0.1623
D(LnGDP)	129.0701	3	0.0000
D(Ln(M3-M1)	6.209428	3	0.1019
All	883.1645	18	0.0000



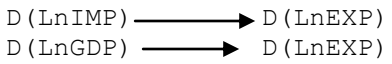
Dependent variable: D(LnM3)

Excluded	Chi-square	df	Probability
D(LnCREDIT)	0.355782	3	0.9492
D(LnEXP)	20.55524	3	0.0001
D(LnIMP)	11.21422	3	0.0106
D(LnFII)	3.371030	3	0.3379
D(LnGDP)	167.1823	3	0.0000
D(Ln(M3-M1)	7.416340	3	0.0597
All	1099.270	18	0.0000



Dependent variable: D(LnEXP)

Excluded	Chi-square	df	Probability
D(LnCREDIT)	4.751627	3	0.1909
D(LnM3)	2.841749	3	0.4167
D(LnIMP)	7.313841	3	0.0625
D(LnFII)	0.504463	3	0.9179
D(LnGDP)	9.525643	3	0.0231
D(Ln(M3-M1)	2.227453	3	0.5266
All	71.14370	18	0.0000



Dependent variable: D(LnIMP)

Excluded	Chi-square	df	Probability
D(LnCREDIT)	11.20180	3	0.0107
D(LnM3)	2.563052	3	0.4640
D(LnEXP)	3.524432	3	0.3176
D(LnFII)	2.596874	3	0.4580
D(LnGDP)	8.518275	3	0.0364
D(Ln(M3-M1)	0.155960	3	0.9844
All	78.73739	18	0.0000

D(LnCREDIT) → D(LnIMP)
D(LnGDP) → D(LnIMP)

Dependent variable: D(LnFII)

Excluded	Chi-square	Df	Probability
D(LnCREDIT)	4.043662	3	0.2568
D(LnM3)	4.295464	3	0.2313
D(LnEXP)	5.327191	3	0.1493
D(LnIMP)	2.249749	3	0.5222
D(LnGDP)	8.633222	3	0.0346
D(LnM3-M1)	7.764060	3	0.0511
All	23.30593	18	0.1791

D(LnGDP) → D(LnFII)
D(LnM3-M1) → D(LnFII)

Dependent variable: D(LnGDP)

Excluded	Chi-square	Df	Probability
D(LnCREDIT)	25.04355	3	0.0000
D(LnM3)	19.37286	3	0.0002
D(LnEXP)	37.98311	3	0.0000
D(LnIMP)	28.27558	3	0.0000
D(LnFII)	25.31334	3	0.0000
D(Ln(M3-M1)	29.09365	3	0.0000
All	200.0574	18	0.0000

D(LnCREDIT) → D(LnGDP)
D(LnM3) → D(LnGDP)
D(LnEXP) → D(LnGDP)
D(LnIMP) → D(LnGDP)
D(LnFII) → D(LnGDP)
D(Ln(M3-M1) → D(LnGDP)

Dependent variable: D(Ln(M3-M1))

Excluded	Chi-square	Df	Probability
D(LnCREDIT)	0.044682	3	0.9975
D(LnM3)	1.800304	3	0.6149
D(LnEXP)	12.89376	3	0.0049
D(LnIMP)	6.211383	3	0.1018
D(LnFII)	3.942183	3	0.2678
D(LnGDP)	110.4463	3	0.0000
All	821.9742	18	0.0000

D(LnEXP) → D(LnM3-M1)
D(LnGDP) → D(LnM3-M1)

Table 7: OLS estimates using the 52 observations (1996-97 Q1 to 2008-09 Q4)

Dependent Variable: LnGDP				
Method: Least Squares				
	Coefficient	Std. Error	t-Statistic	Prob.
LnM3	-5.153385	1.787015	-2.883794	0.0060***
LnCREDIT	0.075920	0.821634	0.092402	0.9268
LnEXP	0.482399	0.192823	2.501770	0.0161***
LnIMP	0.158562	0.168522	0.940902	0.3518
LnFII	0.145926	0.042381	3.443208	0.0013***
Ln(M3-M1)	4.217114	1.126545	3.743404	0.0005***
C	18.03440	1.019661	17.68667	0.0000***

R^2=0.909361
Adjusted R^2=0.897276
F-statistic=75.24600
Prob(F-statistic)= 0.000

Findings

The results reveal that LnEXP, LnM3, LnFII, and Ln(M3-M1) are significant at 1% level in explaining LnGDP. The R^2 value (0.909361) implies that the model explains 90% and reveals the goodness of fit of the regression model. The small p value (0.000) of the F statistic (75.2460) reveal that the regression to be significant.

Conclusion and Policy Implications

The study has investigated into the possible cointegration and the direction of causality between financial development, foreign investment inflows and economic growth in India, using quarterly data for a period of 12 years. It is observed that a healthy inflow of foreign investment is a vital factor in accelerating economic growth and a healthy economic growth is also imperative in ensuring large inflow of foreign investment into the economy. Findings of the study indicate that the supply-leading and demand-following hypotheses are accepted with respect to the Indian economy.

A bi-directional causality has been observed between foreign investment inflows and economic growth. Foreign investment inflows are growth-enhancing in the same way as domestic investment and a statistically significant effect exists in the sense that a higher ratio of foreign investment inflows to gross capital formation has a positive effect on the level of GDP and hence on economic growth. Monetary deepening, as measured by the ratio of M3 to GDP (at market prices), increased from 65.5% in 2004-05 to 77.8% in 2008-09 (*Economic Survey*, 2009-2010). This could be attributed to the spread of banking services in the country and the overall development of the financial sector.

To promote growth in the long run, attention needs to be given on formulation of long-run policies for modernisation of the financial sector. The cost of external finance to the firms is affected by the functioning of the financial markets. Therefore, appropriate policies are necessary to facilitate the investment process. Growth in the long run may be impeded unless conditions for low-cost investment are created. The present analysis indicates that, for utilizing the positive externalities of foreign investment inflows in the Indian economy, financial development plays a crucial role. Therefore, for attracting more and more foreign investment inflows and gaining positive externalities/spillovers from that, financial development is necessary and it should be a stable one. Financial development is considered as a policy variable to accelerate economic growth and economic growth, in turn, helps accelerate financial development in the economy. Hence, to maintain a sustainable economic growth, the government has to deepen the financial sector and undertake essential measures to strengthen the long-run relationship between financial development and economic growth.

These measures include increasing financial integration; minimising government intervention in the financial systems, increasing the status of financial institutions, etc. There is a need for development of the

institutional environment, the quality of institutions (including the judicial system and bureaucracy) and property rights in order to foster commercial activities and investment and hence growth. For investment to be successful, there is need for proper infrastructure and, even though there has been a marked improvement in the financial sector over the last few decades, the degree of financial development is still below the threshold needed to accelerate economic growth. So, to achieve the desired benefits of financial development, enhanced efforts should be made to deepen the financial sector by reducing government interference in financial systems, enhancing competition, investing in human resources and developing conducive legal environment on the one hand and improving the quality of institutions on the other. No doubt, the government has to come out with supportive policy measures, which are to be implemented over time with great caution.

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