

A NEXUS BETWEEN GOVERNMENT SPENDING, CREDIT TO PRIVATE SECTOR AND ECONOMIC GROWTH OF INDIA: A TIME-SERIES ANALYSIS

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ABSTRACT

The role of financial development for the growth of an economy is vital to analyze. There is a lengthy debate going on in identifying the nexus between financial development and economic growth. The study focuses on examining the relationship between Government expenditure, Credit to Private Sectors and economic growth and also to identify causality between them. The study considers two major indicators of financial development namely, Domestic credit to private sector, Government spending. This Paper employs Unit-root test, Co-integration and Granger causality test to identify the relationship between economic growth and financial development of India. The annual time-series data ranging from 1964-2020 considered for study. The result of co-integration test suggests that there is long-run relationship between GDP and, domestic credit to private sector, government spending. Granger Causality result was suggesting unidirectional causality between, Domestic credit to private sector to GDP. It also found unidirectional relationship from Economic growth to government spending.

KEYWORDS

ADF test, Financial Development and Economic Growth, Granger Causality, Johansen Co-integration.

JEL CLASSIFICATION: C58, F63, O11, O16, O43.

INTRODUCTION

The Indian Financial system has experienced drastically transformed over the 1990s. The reforms has brought changes in the structure of organization; the pattern of ownership of the firm and also has increased competition amongst firms. This brings in compulsion for financial institutions to change in order to survive in the market.

Financial sector comprises of institution, financial instruments, market and regulatory framework. Financial sector development aims at reducing cost incurred in financial system. Financial sector development will be possible when institutions, instruments, market and regulatory framework works in congruence to reduce cost of acquiring information, enforcement and transaction. Financial sector development in developing economies helps in reducing poverty and stimulates economic growth.

The Importance of financial development also reflected in the following definition given by Global financial development report (2019/20).

Conceptually, a process of reducing the costs of acquiring information, enforcing contracts and making transactions. (Global Financial Development Report 2019/20, Pg. XV).

On other hand, "Economic Growth is an increase in the capacity of an economy to produce goods and services, compared between one period of time to another".

There are four schools of thoughts, Firstly, "Supply leading hypothesis", which indicates that financial development leads to economic growth. Second, "Demand following hypothesis", which signifies that economic growth contributes to financial development. Third "Feedback hypothesis"

: Financial development and economic growth are responsible for each other and finally, there is no relationship between financial development and economic growth.

Our paper investigated the relationship between financial development and economic growth for the period 1996-2020 by using Unit root test of stationarity, Johansen co-integration test, and Granger causality test. In the study, we have employed various measures of financial development, credit to private sector as % of GDP, Government spending and GDP as a measure of economic growth.

The rest of the paper is organized as; the section 2 provides literature review, section 3 offers discussion on Data and Methodology. Results and discussion are given in section 4. The paper ends with concluding comments.

LITERATURE REVIEW

The pioneer work was carried out by the Schumpeter to examine the relationship between finance and growth. The Empirical studies made on single country data or panel countries or region for investigating relationship between finance and growth. Despite of availability of much literature on the topic, evidence provides conflicting and differences in results on direction of causality.

J.A. Schumpeter (1911) and McKinnon and Saw (1973) supported supply leading hypothesis which suggest that finance has positive impact on economic growth. The demand following hypothesis confirmed by Odhiambo (2004), Liang and Teng (2006) and Zang and Kim (2007). While Robinson (1952), Lucas (1988) and Stern (1989) who point out that finance may not be significant determinant of growth.

Misra (2003) made a study on Indian Context. He studied 25 Indian states credit-output relationship using annual data from 1981-2000. The study concluded that there is significant support in favor of the credit-output nexus in Indian states. In the study, it was found that, developed states have high credit-output nexus than under development and less developed states.

The study on financial development and economic growth in Indian states was done by Acharya, Amanulla and Joy (2009). The author used Pedroni Panel co-integration and Fully Modified Ordinary least Square (FMOLS) test using panel data sets. The annual data on net domestic product and total commercial bank credit outstanding in various sectors during period 1981-2002 were used. The results suggest a long run association between financial development and growth across Indian States.

The long-run relationship between financial development and economic growth was examined by Kiran, Yavuz and Guris (2009). The author considered a panel of 10 emerging countries over the period of 1968-2007 by employing panel data unit root test and Pedroni Panel data Co-integration test. The Co-integration test result identified the long-run relationship between financial development and economic growth. Financial development has a positive and statistically significant effect on economic growth supported by fully modified ordinary least square test.

The post reform period impact of financial sector development on economic growth in India was studied by Chakroborty (2010). The author used quarterly data for the period 1993 to 2005. The

study used the techniques of co-integration and Vector Error Correction Method (VECM). The positive relationship between capital-output ratio and rate of human capital growth on GDP found with co-integration test. The study found that, market capitalization had a negative effect on the economic growth in India, whereas no significant effect of turnover on economic growth.

The Schumpeter's prediction on finance promotes growth was examined by Adusei (2012) using annual time series data from South Africa. Time series data ranging from 1965-2010, employs Unit root test, co-integration analysis, FMOLS regression, two stage least squares regression, Error correction model and Pairwise granger causality test. Domestic credit as a percentage of GDP, broad money as a percentage of GDP was considered as measure of financial development. Control variables included in models are Inflation, Size of government, openness of the South Africa economy and dummy variable accounting for financial reforms that began in South Africa in the 1980s. The empirical result indicated no short-run and long-run relationship between financial development and economic growth. The unidirectional causality found from financial development to economic growth in South Africa by Granger causality test.

The association between financial development and economic growth in Indian context examined by Ray (2013) using Granger causality test for the period of 1990-91 to 2010-11. The study includes the Ratio of gross domestic capital formation to GDP, gross domestic savings to GDP, the ratio of outstanding debt to GDP, annual population growth, annual growth rate of real commodities and service export to capture financial development. GDP was considered as measure of economic development. The result of Granger Causality test indicates unidirectional causality running from financial development to economic development in India between time span of 1991-2011. The study concluded that the growth in India was significantly determined by financial development in India.

The study undertaken by Nayak J (2020) on financial development and economic growth in India drawn from the annual time series data for the period 1960-2018 reveals that there is a long term relationship between the two. The result of long run causality suggested an unidirectional causality from economic growth, saving and financial development.

Present study attempts to investigate relationship between financial development and economic growth. The study will help policy makers in determining the direction of causality and designing economic and financial policy accordingly.

RESEARCH DESIGN

SAMPLE AND STUDY PERIOD

Annual time-series data were collected from World Bank (<https://www.worldbank.org>) for the period between 1964-2020.

Definition of Data used:

GDP (Constant LCU) per capita (LGDP)	Log of GDP per capita is gross domestic product/midyear populations
Credit to Private Sector (LCP)	Log Credit to private sector as % of GDP
Government Spending (LGS)	Log General government final consumption expenditure as a % of GDP

METHODOLOGY

We try to analyze the long-run relationship between financial development and economic growth and causal relationship using different indicators. The basic testing requires testing of unit-root to confirm stationarity of each variable. If the variables are not stationary, then there will be possibility of spurious regression results. Augmented Dickey Fuller test is used to test stationarity. In the second step, Johansen Co integration methods used to investigate the long-run relationship between the financial development and economic growth.

The granger Causality test was employed to know the direction of causality between financial development and economic growth.

We consider following definition for indicators of financial development.

To capture the activities of financial intermediaries, Credit to private sector as a % of GDP was used.

The World Bank defines domestic credit to private sector % of GDP as follows:

It refers to “financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public”.

The expansion of financial sector is an important aspect of financial development that is measured by government spending. The Government spending includes government consumption, investment and transfer payments.

UNIT ROOT TEST

Augmented Dickey-Fuller (Dickey and Fuller, 1979) test was employed to check the stationary properties of the data series.

The pre-requisite of a time series analysis is that each individual variable under time series analysis must be stationary over the sample period. To examine stationarity of each time series, ADF unit root test proposed by Dickey and Fuller (1981) was employed. The estimation of the following regression requires in ADF unit root test.

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{i=1}^p \beta_i \Delta X_{t-1} + \varepsilon_t$$

Where, Intercept is α , the co-efficient of lagged term is δ , P is the number of lagged term chosen to ensure that ε is white noise.

Based upon this estimate the hypotheses of the test are:

H_0 : $\delta = 0$, the time series is non-stationary - there is a unit root

H_1 : $\delta \neq 0$, the time series is stationary - there is no unit root

CO-INTEGRATION TEST

The next phase involves an assessment of Co-integration among variable selected. The analysis is performed to analyze long term relationship between financial development and economic growth. The methodology developed by Johansen (1988) and Johansen and Juselius (1990) are deployed. It involves two steps- "trace test" and "maximum Eigenvalue test" as follows:

Co-integration assumes the presence of common non-stationary (i.e. I(1)) processes underlying the input time series variables.

$$X_{1,t} = \alpha_1 + \gamma_1 Z_{1,t} + \dots + \gamma_p Z_{p,t} + \varepsilon_{1,t}$$

$$X_{2,t} = \alpha_2 + \phi_1 Z_{1,t} + \phi_2 Z_{2,t} + \dots + \phi_p Z_{p,t} + \varepsilon_{2,t}$$

$$X_{m,t} = \alpha_m + \psi_1 Z_{1,t} + \psi_2 Z_{2,t} + \dots + \psi_p Z_{p,t} + \varepsilon_{m,t}$$

The number of independent linear combinations (k) is related to the assumed number of common non-stationary underlying processes (p) as follows:

$$P = m - k$$

So, let's consider three possible outcomes:

1. $K = 0, p = m$. In this case, time series variables are not cointegrated.
2. $0 < k < m, 0 < p < m$. In this case, the time series variables are cointegrated.
3. $K = m, p = 0$. All time-series variables are stationary (I (0) to start with. Co-integration is not relevant here.

By examining the number of independent combinations, we are indirectly examining the co-integration existence hypothesis.

TRACE TEST

The trace test examines the number of linear combinations (i.e. K) to be equal to a given value (K_0), and the alternative hypothesis for K to be greater than K_0 .

$$H_0 = K = K_0$$

$$H_1 = K > K_0$$

To test for the existence of Co-integration using the trace test, we set $K_0 = 0$ (no co-integration), and examine whether the null hypothesis can be rejected. If this is the case, then we conclude there is at least one co-integration relationship.

MAXIMUM EIGENVALUE TEST

With the maximum Eigenvalue test, we ask the same central question as the Johansen test. The difference, however, is an alternate hypothesis:

$$H_0 = K=K_0$$

$$H_1 = K=K_0 + 1$$

So, starting with $K_0 = 0$ and rejecting the null hypothesis implies that there is only one possible combination of the non-stationary variables to yield a stationary process.

A special case for using the maximum Eigenvalue test is when $K_0 = m-1$, where rejecting the null hypothesis implies the existence of m possible linear combinations. This is impossible, unless all input time series variables are stationary ($I(0)$) to start with.

GRANGER CAUSALITY

To study the causality between financial development and economic growth in India, this study uses Granger Causality Test suggested by C. W. J. Granger (1969). By using past value of a time series A, if our prediction of current value of a time series B improves, we can say that Series A Granger cause time series B. This can be tested by running a regression of B on past values of B and A. The null and alternative hypotheses of the test are:

H0: There is no causal relation between financial development and economic growth.

H1: There is Causality between financial development and economic growth.

RESULT AND DISCUSSION

The test for presence of Co-integration is performed when all the variables are non-stationary and integrated of the same order. The first phase in the estimation process is deciding the order of integration on individual variable in natural log levels. The log of the variables denoted as, GDP, CP and GS are tested for unit root using the Augmented Dickey-Fuller (ADF) test.

The result of unit-root test is reported in Table 1 .The result of ADF unit root test show that the null hypothesis of the presence of a unit root is rejected for all five variables of the study when they are transformed into their first differences. That is all the series are stationary on their first differencing.

Now we proceed to conduct co-integration test to ascertain whether all time series variables are $I(1)$.

TABLE-1. UNIT ROOT TEST RESULTS

Augmented Dickey-Fuller test (ADF) test

Variable	Level	1st Difference
L(GDP)	-0.21854	-2.03779
	(0.6033)	(0.0408)
L(CP)	1.76027	-2.27332
	(0.98)	(0.0234)
L(GS)	1.303726	-5.72635
	(0.9499)	(0.0000)

Note: Probability values are reported in Parenthesis.

We apply Schwarz information criterion to select appropriate lag length. It suggests lag length of order one.

The next phase involves an assessment of Co-integration. Table 2 presents the result of Co-integration test pertaining to different variable under study. The result reveals the presence of significant Co-integration relationship between GDP and different indicators of financial development. The λ_{trace} test and λ_{max} test shows 1 Co-integrating equations. This indicates the presence of long-run equilibrium relations between financial development indicators. In short, by and large all indicators of financial development are moving together.

TABLE-2. JOHANSEN'S CO-INTEGRATION TEST RESULTS

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value (0.05)	Prob.**
None *	0.397342	40.68324	29.79707	0.0019
At most 1	0.109392	11.81816	15.49471	0.1659
At most 2 *	0.087425	5.214675	3.841466	0.0224
Trace test indicates 1 co-integrating eqn(s) at the 0.05 level				
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-EigenStatistic	Critical Value (0.05)	Prob.**
None *	0.397342	28.86509	21.13162	0.0034
At most 1	0.109392	6.60348	14.2646	0.537
At most 2 *	0.087425	5.214675	3.841466	0.0224
Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

The next phase involves checking the direction of causality between the significant financial development indicators and economic growth, Granger causality test is employed.

The test result is presented in Table 3. As we can observe unidirectional causality found from credit to private sector to GDP. Similarly, unidirectional causality running from GDP to government spending at 10% significant level.

TABLE-3. RESULT OF GRANGER CAUSALITY

Null Hypothesis:	Lag 1		Lag 2		Lag 3		Lag 4		Lag 5	
	F-Statistic	Prob.	F-Statistic	Prob.	F-Statistic	Prob.	F-Statistic	Prob.	F-Statistic	Prob.
CP does not Granger Cause GDP	9.53132	0.0031	4.87024	0.0114	3.51761	0.0215	3.38402	0.0162	3.22727	0.0142
GDP does not Granger Cause CP	0.51892	0.4742	1.11285	0.336	2.74622	0.0524	3.08404	0.0244	2.4728	0.0462
GS does not Granger Cause GDP	0.18609	0.6678	0.27429	0.7612	0.33554	0.7997	1.58031	0.1948	0.99139	0.4337
GDP does not Granger Cause GS	2.86389	0.096	1.74176	0.1849	1.05204	0.3777	0.7987	0.532	1.4158	0.2369

CONCLUSION

The paper seeks to answer two questions: 1. Does financial development promotes economic growth in the long run in India? and 2. Which is the direction of causality between the financial development and economic growth in India?

It employs the annual time series data spanning from 1964-2020 obtained from world development indicators of the World Bank. The result of ADF test suggests that the series are integrated of the order one. The Johansen co-integration test result indicates the presence of long run relationship between economic growth and the measures of financial development. Furthermore, the Granger Causality result was suggesting unidirectional causality Credit to Private Sector (CP) to GDP We also found Unidirectional causality from GDP to government spending (GS) at lag 1 with 10% level of significant.

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