I J A B E R, Vol. 14, No. 6, (2016): 4543-4555

BANKING SECTOR DEVELOPMENT AND CAPITAL FORMATION IN THE INDIAN ECONOMY: *AN EMPIRICAL ANALYSIS OF 47 YEARS POST ECONOMIC CRISES*

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Abstract: *It has been well accepted that capital formation plays a vital role in promoting the growth of the economy. While understanding the crucial role of capital formation, it is pertinent to know the factors that may affect it, so that, concrete strategies can be made to enhance its growth in order to achieve the targeted growth of the economy. This paper empirically studies the role of banking sector in India towards the growth of capital formation in the country, while also finding the causal relationship (if any) between them. To our knowledge, this is the first country-specific work on the Indian economy that attempts, to find the empirical evidence towards the role of Indian banking development in the capital formation of the country. Using time series analysis, we find that there exists a long run relationship between banking development and capital formation in India. The study also finds a unidirectional causality from banking development to capital formation while there is an absence of reverse causality.*

JEL Codes: *C220, E220, G210, O470.*

Keywords: *Banking, Capital formation, Economic growth, Time Series, India.*

I. INTRODUCTION

The role of capital formation towards economic growth of a country has gained considerable importance in the growth literature. Playing a vital role in the functioning of an economy, capital formation helps the productive system of a country to undertake developmental projects and ventures involving considerable risk. This directly increases their risk taking ability since with more capital investors can undertake investments with greater confidence that helps in boosting the development level of the economy. Indirectly, it helps in giving employment to a substantial part of the population and thereby increases the national as well as per capita income of the country. All this is helpful in raising the standard of living as well as the level of economic growth.

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While understanding the role of capital formation, it is vital to understand the factors that lead to capital formation and ultimately economic growth. The development of banking sector in an economy is one of the crucial factors that play an important role in the capital formation of a country. Banks mobilize savings from small savers who are ready to part away with their money to big investors who need it for productive purpose for a long period of time (Dunbar 1891, White 1895, Gilbart 1901, Johnson 1922, Fetter 1922). This leads to capital formation while also encouraging entrepreneurial activities. Since capital formation and entrepreneurial activities are closely interdependent (Baughn 1949), this role of banks towards enhancing entrepreneurship and thereby economic growth is noteworthy. With their intermediary services, banks help in easing the financial transaction process and hence indirectly help in smoothening the working of productive systems. Since efficient productive system is capable of undertaking further investment of capital, this makes capital more effective thereby speeding up the incorporation of new projects. All this is helpful in uplifting the development level of the country.

The studies that explain the role of capital formation towards economic growth include those of Adam (1776), Harrod (1939), Marx and Engels (1975), Greenwood and Hercowitz (1991), World Bank, (1993), Krugman (1994), Young (1995), Kuijs (2005), Ngoc (2008), Ding and Knight, (2011) among others. These studies have highlighted the importance of capital formation in the growth of the economy. However this established relationship between capital formation and economic growth is affected by several factors since, the growth of capital formation is dependent on several crucial factors. For *e.g.*, analyzing the role of capital formation towards economic development, Zhao and Du (2009) find that regional disparities have a considerable effect on the capital formation of the country. Due to this, the Western China is found to be weaker than Eastern and Central China in terms of capital formation. Other factors that may affect the growth of capital formation include fiscal policy and inflation (Feldstein 1980), entrepreneurship (Baughn 1949), foreign trade (Mattick 1962), etc. With regard to banking system, its relationship with capital formation has been well appreciated in the historical literature.

For example, it has been contended that commercial banks are one of the most important institutions that is related with capital formation, Moulton (1918). By introducing banking system in any community, there can be an equal increase in the capital formation to a considerable level (Dunbar 1891) as well as a substantial increase in the efficiency of wealth (Fetter 1922). According to White (1895), by providing capital in the most proficient hands, banks ensure that the well deserving section of the society has its adequate availability in order to undertake productive work. Besides encouraging productive functions, with their financing and investment functions, banks also help in the survival of the industrial units (Taussig 1921).

There have been studies that have empirically established the relationship between capital formation and economic growth, however the country-specific studies analyzing the relationship between banking sector development and capital formation, empirically are very limited. To our knowledge, there is no such work that attempts to empirically explore the causal relationship between banking sector development and capital formation in the Indian economy. We believe that, in order to support the theoretical role of banking sector development towards capital formation, it is pertinent to explore the relationship empirically as well.

The purpose of this paper is therefore to analyze the causal relationship (if any) between banking sector development and capital formation in India using time series approach, which is considered to be more adequate in comparison to cross country approach (*e.g.*, Quah, 1993; Evans, 1995; Lee, Pesaran and Smith 1996; Arestis and Demetriads, 1997). For this, we proceed with a discussion of the banking development and growth of capital formation in India in the next section. The empirical methodology is discussed in Section III while the results are discussed in Section IV. The underlying conclusions and policy implications are discussed in Section V.

II. THE INDIAN SCENARIO

Capital formation in India was at its lowest in 1950-51 with Rs. 4490.6 Million due to consistent domination of the British Empire for more than a century. The initiation of planned economic policy in 1951 had important implications for the growth and development of the country. In the light of this, efforts were also made to improve the growth of capital formation. However such growth was almost steady in the initial years while it started improving after a certain period of time. In the year 2014, the Capital formation in India was Rs 33,179,000 Million which shows that there has been more that 7, 30,000 per cent increase in capital formation since 1951 (Figure 1).

With regard to the banking system in India, it has transformed itself from a completely state regulated sector for a substantial period of time and then to a liberalized one with the inclusion of private and foreign players in this sector. With the nationalization of Reserve Bank in India in 1948, the process of transfer of important financial intermediaries to public sector control started. In 1969 fourteen major private banks were nationalized and brought into public control. Further, in 1980 there were six more private commercial banks that were nationalized. One of the important reasons for this includes the diversion and expansion of credit to the priority sectors. Thus, during this period, the banking system was dominated by public sector banks till 1991 when the New Economic Policy was introduced that led to the entry of private and foreign banks in the

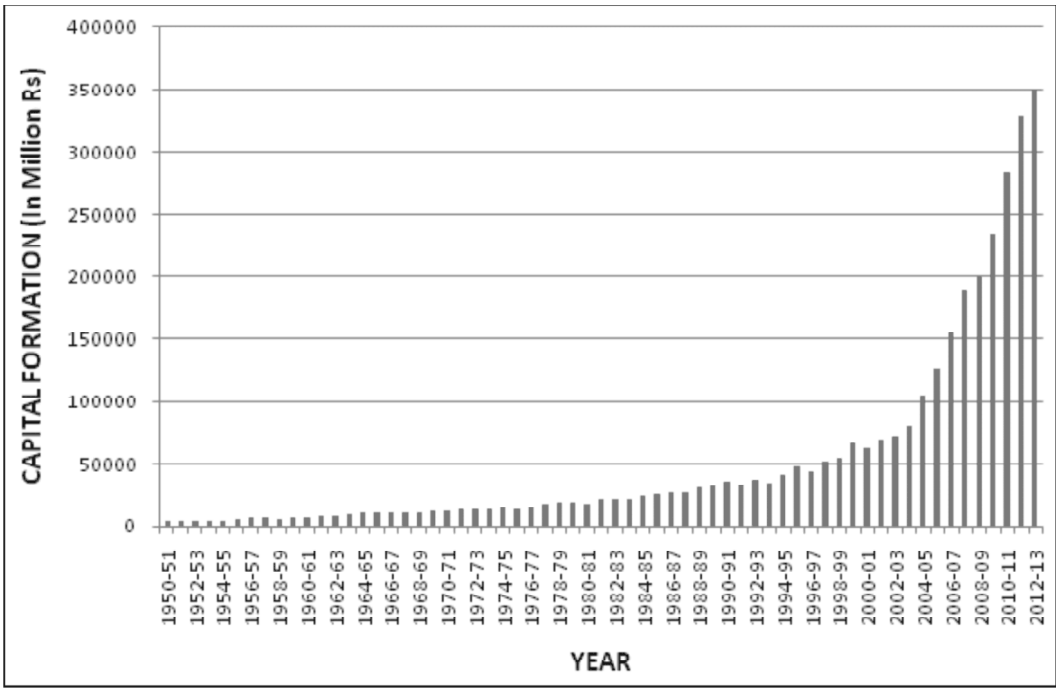

Figure 1: Capital Formation in India

Source: Handbook of statistics on Indian Economy, Reserve Bank of India (RBI)

Indian banking sector. Major objective behind it was to expand the banking system in India including credit expansion, improving productivity, profitability and efficiency. It is clearly evident from Table 1 that the total bank credit was Rs 9000 Million in 1957 which increased to Rs 65,364200 Million in 2015 showing a growth of more than 700,000 per cent.

Thus, there has been a remarkable growth in the credit provided by banks in India, but, the question arises as, to what contribution has the bank played towards the growth in capital formation in the country. As literature suggests that, banks play a crucial role in capital formation, we next proceed with, empirically examining this relationship between banks and capital formation.

III. DATA AND METHODOLOGY

In order to study the causal relationship between banking development and capital formation, the current study uses two macro economic variables based on literature. For measuring the development of banking system, yearly figures of Total Credit by banks has been used, while Gross Capital Formation has been used in order to measure the capital formation in India. The data has been collected from Central Statistics Office under Ministry of Statistics and Programme Implementation, India

Table 1
Total Bank Credit in India

Year	*Bank credit (In rupees Million)*	*Year*	*Bank credit (In rupees Million)*	*Year*	*Bank credit (In rupees Million)*
1956-57	9000	1976-77	131730	1996-97	2784010
1957-58	9630	1977-78	149390	1997-98	3240790
1958-59	10140	1978-79	182850	1998-99	3688370
1959-60	11280	1979-80	215370	1999-00	4359580
1960-61	13360	1980-81	253710	2000-01	5114340
1961-62	14080	1981-82	296820	2001-02	5897230
1962-63	15880	1982-83	354930	2002-03	7292150
1963-64	18170	1983-84	412940	2003-04	8407850
1964-65	20350	1984-85	489530	2004-05	11004280
1965-66	22870	1985-86	560670	2005-06	15070770
1966-67	26920	1986-87	633080	2006-07	19311890
1967-68	30320	1987-88	705360	2007-08	23619140
1968-69	33960	1988-89	847190	2008-09	27755490
1969-70	39710	1989-90	1014530	2009-10	32447880
1970-71	46840	1990-91	1163010	2010-11	39420830
1971-72	52630	1991-92	1255920	2011-12	46118520
1972-73	61150	1992-93	1519820	2012-13	52604590
1973-74	73990	1993-94	1644180	2013-14	59940960
1974-75	87620	1994-95	2115600	2014-15	65364200
1975-76	108770	1995-96	2540150		

Source: Select aggregates of Scheduled Commercial Banks, Reserve Bank of India (RBI).

and different reports published by Reserve Bank of India (RBI). The Indian economy had succumbed through a major fiscal crisis in 1966, as a consequence of which Indian Rupee was devalued by 57 percent.

The crucial factors behind this crises include, massive defence spending due to Indo-China War in 1962. As defence burden is achieved at the expense of capital formation (Rasler and Thompson, 1988), this led to serious pressure on India's capital formation. The situation further deteriorated as a result of two draughts in the year 1964 leading to high inflation rates. This imposed heavy burden on the exchequer that resorted to heavy imports in order to reduce the pressure on prices as well as overcoming the situation of food scarcity. As a result of this economic crisis, there was a heavy set back to the capital formation as it reduced from 8.4% in 1960-61 to 3.3% in 1965-66. The situation however started improving after 1966. The current study therefore uses yearly statistics from 1966 to 2014 in order to examine the empirical relationship between banking and capital formation in the Indian economy.

For analyzing this relationship, Vector Error Correction Model (VECM) has been used that comprises of some important steps. As the non stationary time

series may give spurious results with erroneous conclusions, in the first step, we therefore check the stationary properties of the variables by using Augmented Dickey Fuller (ADF) (Dickey and Fuller 1979, 1981) test. If the variables are found non-stationary and integrated of the same order, we can move to the next step. This step checks the existence of a long-run relationship among the variables using Johansen's Co-integration test (Johansen 1988, Johansen and Juselius 1990). Although there is an availability of many other tests for co-integration, many studies consider this test as superior and popular. If the long run relationship is found, we further proceed with checking the short run dynamics of our model. In order to examine the causality among the variables in our study we have used the Granger Causality test (Granger 1969, 1986).

In order to eliminate the heteroscadasticity among variables, the study uses natural logarithms of Total Bank Credit and Capital Formation. The variables are therefore denoted as,

CF = log Capital Formation

BANK = log Total Bank Credit

The long run equation of our study is as follows,

$$CF_t = \alpha + \beta \text{ Bank}_t + \varepsilon_t \qquad \text{...Eq. (I).}$$

From equation (1), the VECM model can be written as,

$$\Delta CF_t = \alpha_0 + \alpha_1 ET_{1t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta CF_{t-i} + \sum_{i=1}^{n} \alpha_{3i} \Delta BANK_{t-i} + \varepsilon_{1t} \qquad \text{...Eq. (II).}$$

$$\Delta BANK_t = \beta_0 + \beta_1 ET_{t-1} + \sum_{i=1}^{n} \beta_{2i} \Delta BANK_{t-i} + \sum_{i=1}^{n} \beta_{3i} \Delta CF_{t-i} + \varepsilon_{2t} \qquad \text{...Eq. (III).}$$

Where, Δ denotes the difference operator. The number of lags is represented by 'n'. The symbol of $\varepsilon(i = 0, 1, 2, 3)$, denotes the stochastic error term with zero mean and a constant variance. The error correction term derived from the long-run relationship is denoted by ET_{t-1}.

IV. RESULTS AND DISCUSSIONS

Stationarity Results

As the non stationary time series may give spurious results with erroneous conclusions, we have checked the stationarity of both the data series by unit root test using Augmented Dickey Fuller (ADF) tests. Table 2 summarizes the results of the test. It is clear from the table that CF (Capital formation) and BANK both have unit root at their level values at 10, 5 and 1 percent level of significance. This

shows that the series are non stationary. However the hypothesis of unit root is rejected in all series, after first differencing which means that the series become stationary after first differencing (Table 3). It can therefore be concluded that the series are integrated of order one, *i.e. I*(1) suggesting a long run relationship between these variables.

Table 2
ADF Unit Root Test at level

					Critical values		
Variables	*Null hypothesis*	*ADF test Stat.*	*Prob**	*DW Statistics*	*1%*	*5%*	*10%*
CF	CF has a unit root	3.712516	1.0000	1.992014	–3.584743	–2.928142	–2.602225
Bank	Bank has a unit root	1.598066	0.9993	1.608104	–3.584743	–2.928142	–2.602225

Table 3
ADF Unit Root Test after first differencing

					Critical values		
Variables	*Null hypothesis*	*ADF test Stat.*	*Prob**	*DW Statistics*	*1%*	*5%*	*10%*
CF	CF has a unit root	–7.181903	0.0000	1.956072	–3.584743	–2.928142	–2.602225
Bank	Bank has a unit root	–5.216024	0.0001	1.608104	–3.584743	–2.928142	–2.602225

To further understand the nature of the data series, Figure 2 and 3 depict the time series under unit root test at their level values and after first differencing respectively. It is clear from the figure that the data series have some trend at their levels (Figure 2), however the first differencing has removed the trend and the data series have become stationary (Figure 3).

Co-integration Test

Understanding the fact that the series are stationary at first order or *I*(1), we next proceed to estimate the Vector Error-correction Model (VECM). For this, the selection of an optimum lag length (*n*) is essential for ensuring proper specification of VECM model and before performing Johansen co-integration test. We have computed different information criteria's for different time lags. The results (Table 4) of different information criteria suggest lag 2 to be the optimal lag. We have therefore selected lag 2 and hence, the Johansen test has been performed on the data series with 2 lags.

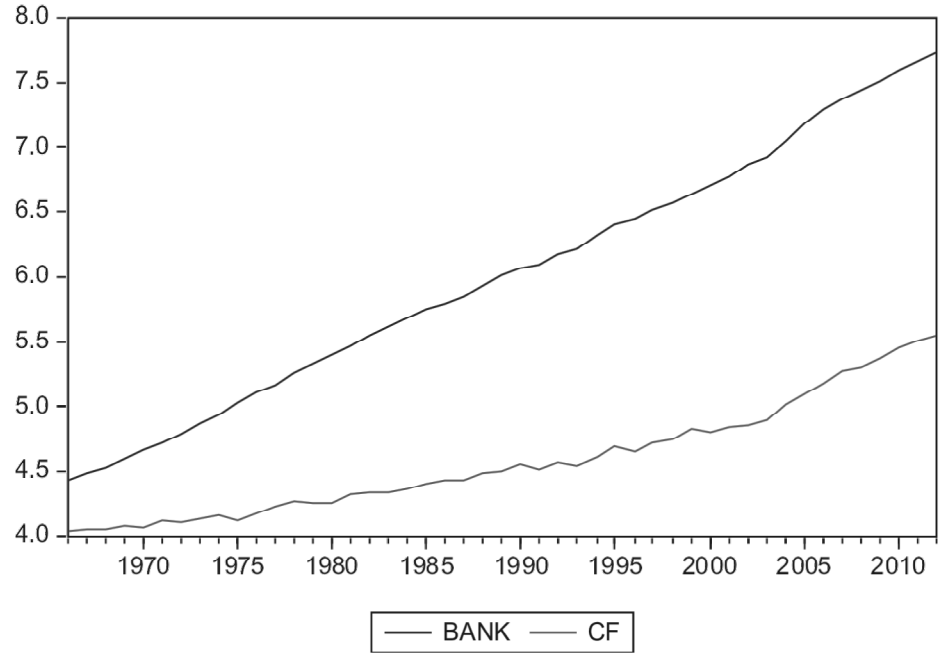

Figure 2: Graphical presentation of CF and BANK at levels

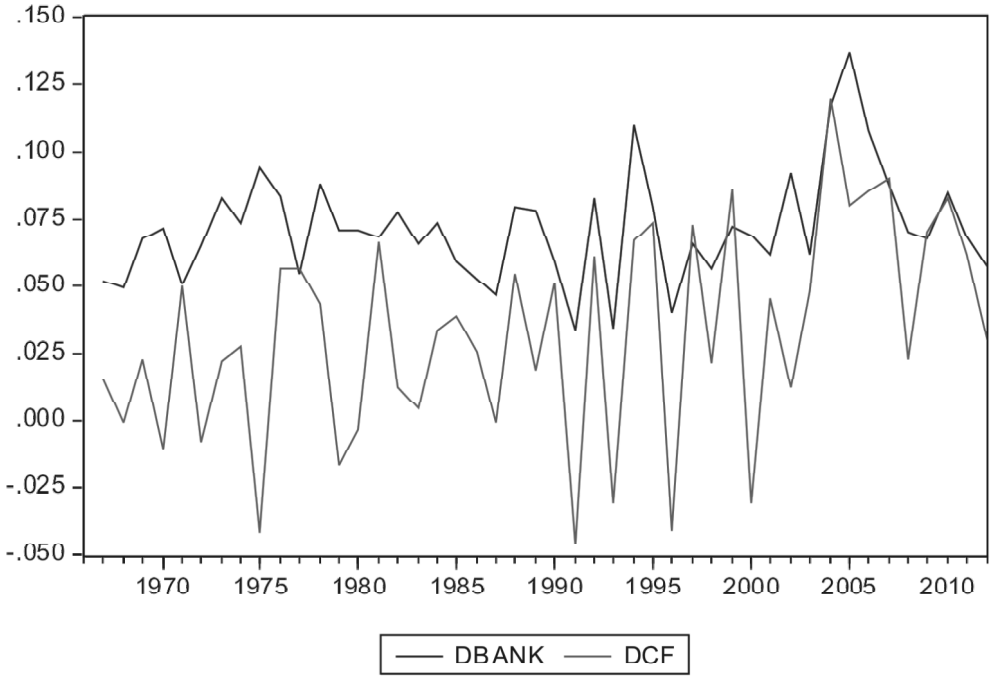

Figure 3: Graphical presentation of CF and BANK after first differencing

Table 4
Determination of Optimum Lags

Lag	*LogL*	*LR*	*FPE*	*AIC*	*SC*	*HQ*
0	–3.652957	NA	0.004548	0.282648	0.367092	0.313180
1	181.0986	341.7904*	5.41*e*-07	–8.754929	–8.336232	–8.663332*
2	185.1690	7.123294	5.40*e*-07*	–8.758452*	–8.501597*	–8.605791
3	186.5193	2.227900	6.19*e*-07	–8.625964	–8.034856	–8.412238
4	189.0543	3.929329	6.72*e*-07	–8.552717	–7.792721	–8.277926
5	191.2889	3.240189	7.44*e*-07	–8.464447	–7.535564	–8.128592
6	194.4831	4.312116	7.90*e*-07	–8.424155	–7.326384	–8.027236
7	197.0561	3.216278	8.73*e*-07	–8.352806	–7.086147	–7.894822

We next proceed with performing the Johansen Co integration test after obtaining the optimal lag. The results (Table 5) explain the existence of a long run relationship between BANK and CF (Capital Formation).

Table 5
Johansen Co integration Results

Hypothesized No. of CE(s)	*Eigen value*	*Trace Statistic*	*Critical Value at 5%*	*Prob.** Statistic*	*Max-Eigen*	*Critical Value at 5%*	*Prob.***
$r = 0$	0.395467	29.75150*	20.26184	0.0018	22.14515*	15.89210	0.0045
$r \leq 1$	0.158754	7.606351	9.164546	0.0979	7.606351	9.164546	0.0979

Note: * denotes significant at 5% significance levels; **MacKinnon-Haug-Michelis (1999) *p*-values.

The results of VECM are reported in Table 6 based on which, we can write the long run equation as,

$$CF_{t-1} = -6.870472 + 0.062643\ \text{BANK}_{t-1}$$

Table 6
Vector Error Correction Estimates

Standard errors in ( ) and t–statistics in [ ]		
Cointegrating Eq:		*Coint Eq 1*
CF(–1)		1.000000
BANK(–1)		0.062643
		(0.15510)
		[0.40388]
C		–6.870472
Error Correction:	*D(CF)*	*D(BANK)*
Coint Eq 1	–0.023626	–0.014154
	(0.01038)	(0.00618)
	[2.27530]	[–2.29160]

Cont. table 6

Error Correction:	*D(CF)*	*D(BANK)*
D(CF(–1))	–0.460186**	0.048394
	(0.19863)	(0.11815)
	[–2.31677]	[0.40961]
D(CF(–2))	–0.093004	0.107201
	(0.19647)	(0.11686)
	[–0.47339]	[0.91734]
D(BANK(–1))	0.742213**	0.328587*
	(0.31539)	(0.18760)
	[2.35331]	[1.75156]
D(BANK(–2))	0.585956*	0.219692
	(0.31090)	(0.18492)
	[1.88473]	[1.18801]

** Denotes significance level at the rate of 5 per cent

* Denotes significance level at the rate of 10 per cent

The results given above clearly explain that, in both the equations, the co-integrating vector coefficients are significant. This shows that the system is in the state of short run dynamics. In case of equation II in the short run, the lagged values of ΔCF_t are significant for only 1 year lagged value. Similar is the case found with equation III, where the lagged values of ΔBANK are significant for 1 year lagged value. However, the dependent variable ΔCF_t is found to be significantly dependent on the lagged values of ΔBANK for consecutively two years. This explains the crucial role of BANK towards CF (Capital formation).

We further proceed with examining the causal relationship between the two variables namely CF and BANK by using Granger causality test. This is done in order to find if there is any causality that runs from independent variables to dependent variables. Here, the null hypothesis states that the lagged values of coefficients in each equation are zero. We reject the null hypothesis at 5% significance level. This would indicate that the independent variable can influence the dependent variable.

Knowing that our data series are *I*(1) and co-integrated, we can obtain the proper statistical inference by analyzing the causal relationship, based on the error correction model (ECM). This is because the simple F statistic does not have a standard distribution in the traditional Granger causality test. Table 7 and 8 show the results of causality tests. It is clearly evident from the table that, there is a unidirectional relationship from BANK to CF (Capital formation) since the reverse causation from CF to BANK is insignificant. This shows that, it is BANK that granger causes CF (Capital formation).

Table 7
Dependent variable: Δ*CF*

Excluded	*Chi-sq*	*df*	*Prob.*
ΔBANK	11.60973	2	0.0030
All	11.60973	2	0.0030

Table 8
Dependent variable: ΔBANK

Excluded	*Chi-sq*	*df*	*Prob.*
Δ*CF*	0.842055	2	0.6564
All	0.842055	2	0.6564

V. CONCLUSION

The main objective of the study was to find the role of Indian banking development towards capital formation in the country. The study empirically finds the existence of a long run relationship between banking development in India and capital formation. We also find that, there is a unidirectional causality from banking to capital formation in India in the short run. This is due to the channelization of savings by banks to investors that, invest it, in productive activities for a long period of time. This leads to capital formation while also encouraging entrepreneurial activities and making capital more effective. The study also reveals the absence of any reverse causality from capital formation to banks. As it is well evident in the growth literature that capital formation leads economic growth, this role of banks as a positive stimulator of capital formation is worth considerable. Thus, we can conclude that development in the banking sector leads capital formation in India. The policymakers are therefore suggested in this regard to make concrete strategies that may help in promoting the growth of banking sector, which will help in improving the growth of capital formation in India. This would thereby lead to enhanced economic growth which is the ultimate objective of the country in the long run.

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