FINANCIAL DEVELOPMENT, FINANCIAL INCLUSION AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM INDIA

Ph.D. Thesis

By

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FINANCIAL DEVELOPMENT, FINANCIAL INCLUSION AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM INDIA

A THESIS

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By

SANJAYA KUMAR LENKA



DISCIPLINE OF ECONOMICS INDIAN INSTITUTE OF TECHNOLOGY INDORE MAY 2017



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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled FINANCIAL DEVELOPMENT, FINANCIAL INCLUSION AND ECONOMIC GROWTH: EMPIRICAL EVENDENCE FROM INDIA in the partial fulfillment of the requirements for the award of the degree of **DOCTOR OF PHILOSOPHY** and submitted in the **DISCIPLINE OF ECONOMICS**, **Indian Institute of Technology Indore**, is an authentic record of my own work carried out during the time period from January 2012 to December 2016 under the supervision of Dr. Ruchi Sharma, Associate Professor of Economics, Indian Institute of Technology Indore.

The matter presented in this thesis has not been submitted by me for the award of any other degree of this or any other institute.

Signature of the student with date (SANJAYA KUMAR LENKA)

This is to certify that the above statement made by the candidate is correct to the best of my/our knowledge.

Signature of Thesis Supervisor #1 with date	Signature of Thesis Supervisor #2
with date	
(Dr. Ruchi Sharma)	(NAME OF THESIS SUPERVISOR)

SANJAYA KUMAR LENKA has successfully given his Ph.D. Oral Examination held on **25th May, 2017**.

Signature(s) of Thesis Supervisor(s) Date:		Convener, DPGC Date:	
Signature of PSPC Member #1	Signature of PSPC Member #1	Signature of External	
Date:	Date:	Date:	

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SANJAYA KUMAR LENKA

Dedicated to

My Mother Labanyabati

and

Father Chandramani

with unconditional love and gratitude

SYNOPSIS

Financial Development, Financial Inclusion and Economic Growth: Empirical Evidence from India

Introduction

Indian economy has experienced broadly two waves of changes in financial institutions and financial markets in its history including nationalization of banks (1969) as well as financial liberalization (1991). India is moving towards the financial sector development, but it is still far from being a financially inclusive economy. So, the government of India (GOI) is taking various steps for achieving financial development and inclusion. The nationalization of banks marked a paradigm shift in Indian banking, as it was intended to shift the focus from class banking to mass banking. Private sector banks were nationalized for providing financial services to rural people, for extending planning, policy and operations in the field of credit for agriculture as well as several economic activities in rural areas, National Bank for Agricultural and Rural Development (NABARD) was established in 1982. It plays an active role in emerging financial inclusion policy in India. Moreover, it coordinates with GOI, state governments, Reserve Bank of India (RBI) and national level financial institutions to finance rural people and contributes to the development of institutions which help the rural economy. NABARD adopted the concept of microfinance, and it provides different financial services such as saving accounts, insurance, and microcredit to poor and low-income groups for improving their standard of living. Since loans provided to rural poor people by commercial banks have many limitations including lack of securities as well as high hidden charges. Therefore, microfinance helps to provide loans to the poor and marginalized people without any security or mortgage. In recent times, GOI has made further attempts to provide financial access to people of India especially after 2000 to bring people under the umbrella of formal financial institutions to avail credit and insurance facilities, RBI constituted Khan Commission in 2004 to look into financial inclusion policy to provide the basic banking services and for the opening of 'no frills' account either with zero balance or a very small amount to include vast sections of the society.

Literature Review

There is a significant body of theoretical and empirical literature that explains the importance of both financial development and inclusion for economic growth. However, there are different schools of thought that have varied opinions regarding how a financial sector (that includes both financial institutions and financial markets) contribute to economic growth through various channels. Some studies argue that financial development is a fundamental element for economic growth. Further studies explore several channels through which financial development promotes economic growth in an economy including efficient allocation of capital, mobilization of savings through attractive investment, and lowering the cost of information [Schumpeter (1911); McKinnon (1973); King and Levine (1993); Ranjan and Zinglas (1998); Ang (2008); Grounder (2012); Adu et al. (2013); Owusu and Odhiambo (2014); Lopes and Jesus (2015)]. Adding to it, other studies explain that financial market (say stock market) plays a key role in economic growth including financial institutions [see Levine (1997); Levine et al. (2000)]. However, Robinson (1952) and Kuznets (1955) argue that the growth of a country also drives financial development. They conclude that economic growth leads to an increase in financial development and financial markets begin to grow as an economy approaches at the intermediate stage of the growth process and develops after the economy is completely developed. Much empirical evidence also finds that there is a positive and significant relationship between financial development and economic growth especially in India [Acharya et al. (2009); Bhanumurthy and Singh (2013); Sahoo (2013); Sarma and Bardhan (2016)]. Alternatively, studies find that there exist a bidirectional

relationship between financial development and economic growth [see Demetriades and Luintel (1997); Luintel and Khan (1999); Singh (1998) and Pradhan (2009)] whereas some studies find unidirectional relationship [Bell and Rousseau (2001); Bhatachary and Suvasubramanian (2003)].

A recent study by Nain and Kamaiah (2014) computed financial development index using various financial proxies through Principal Component Analysis (PCA) method and find that there is no causal relationship between financial development and economic growth. The ambiguity in understanding the impact of financial development on economic growth in India is due to the use of various proxies (private sector credit, liquid liabilities, the stock traded) for financial development and varied investigation techniques used by researchers.

Sarma (2010) argues that the country may be financially developed but not always financially inclusive due to high-income inequality especially in developing countries. Similarly, there has been substantial literature from theoretical and empirical perspective that explains the positive impact of financial inclusion on economic growth [see Schumpeter (1911); Swamy (2010); Dixit and Sharma (2016)]. Financial inclusion reduces poverty and inequality by increasing the income of the poor and marginalized community and increase economic growth (Kim, 2016). Thus a sustainable social development can be simultaneously achieved along with financial inclusion, which is helpful for economic growth (Banerjee and Francis, 2014). Different studies [Arora (2010); CRISIL (2013); Pradhan et al.(2014); Chakravarty and Pal (2013); Sharma (2015); Lenka and Bairwa (2016)] compute a composite financial inclusion index using various financial proxy variables but do not include the number of banking personnel as a ratio of bank branches, which is essential for financial inclusion. As bank employees play a major role between banks and customers for providing services.

The aim and objectives of both financial development and financial inclusion are closely connected and are inseparable components for building a sound financial system (Allen *et al.*, 2014), and both are an integral part of promoting economic growth (Chauvet and Jacolin, 2015). The well-fledged financial sector development of a nation not only assures its progress but it also spreads affordable financial services for the development of each section of the society (Sarma, 2010). Therefore, the ultimate goal of a sound financial system is to provide better financial access (i.e. financial inclusion) which will promote economic growth (Chung *et al.*, 2016). So, the importance of both financial development as well as financial inclusion is much essential for the economic growth especially in developing countries like India.

Research Gaps

From the above literature survey, we find that different studies use different kinds of proxy variables according to nature, purpose, and availability of data. However, few studies use the index of financial development and inclusion for measuring financial depth and access in the country. Though financial institutions (consists of both banking and nonbanking sectors) play a major role in financial sector development most of the studies use only banking sector variables and ignore the others. Similarly, in the case of financial inclusion index, most of the previous literature ignores the prominent financial access variables i.e. number of bank employees as a proportion of scheduled commercial bank branches, which facilitates the financial products and services to the customers. Thus, there is a lack of information in the existing financial development and inclusion index, especially in India. Most of the studies intermixed the various financial proxies for the construction of both financial development and financial inclusion index. Lastly, we could not find any study that has empirically investigated the linkages between financial development and inclusion in India.

Considering the existing literature and its gaps, this study has three main objectives to extend the analysis. Firstly, the study measures the financial development (FD) index using various financial proxy variables from financial institutions [(1) Private Sector Credit (PSC), (2) Credit to Government and state-owned enterprises (CGSE), (3) Central Bank Assets (CBA), (4) Liquid liabilities or M3 (LL), (5) Provident Fund (PF)] and financial markets [(6) Stock market returns (STOCK)] along with international capital flows [i.e. (7) FDI and (8) inflows of remittance (RI)] through PCA method and estimates the impact of financial development on economic growth in India. Secondly, using Principal Component Analysis (PCA) method the study measure the financial inclusion index including all financial access variables [(1) Number of saving bank account per 1,000 adults (SBA), (2) Number of credit account per 1,000 adults (CBA), (3) Number of bank branches in proportion to 1,000 adults (BB), (4) Number of bank employees as ratio of Bank branches (BE), (5) Amount of deposits as a percentage of GDP (DEP) and (6) Amount of credits as a percentage of GDP (CRE)] from Scheduled Commercial Banks (SCBs) and empirically estimates the impact of financial inclusion on economic growth. Lastly, this study establishes the relationship between financial development and inclusion with a set of possible determinants. Moreover, this study empirically estimates all three objectives both in aggregates as well as in state-level analysis for India.

Research Objectives

The research objectives of this doctoral dissertation are:

- To measure financial development and its impacts on economic growth in India.
- To compute financial inclusion index and its impact on economic growth in India.
- To differentiate between financial development and financial inclusion and empirically test the causality between these variables.

Data and Methodology

The study uses country-level aggregate data from 1980 to 2014 and state level data from 2000-2014. The present study uses different data sources including Basic statistical return file from Reserve Bank of India (RBI), World Development Indicators (WDI). International Financial Statistics (IFS) from International Monetary Fund (IMF), Bloomberg, Economic Survey Report (2015-16) from the Office of the Register General of India, Ministry of Home Affairs for secondary data to conduct the empirical investigation. We deal with set of issues related to time series and panel data bv adopting appropriate modeling techniques including Autoregressive Distributed Lag (ARDL), Error Correction Model (ECM), Fully Modified Ordinary Least Squares (FMOLS), Dynamic Ordinary Least Squares (DOLS) model, Two-stage Least Squares (2SLS) and Three-stage Least Squares (3SLS) following existing literature.

For the construction of a multidimensional index, weights can play a significant role in the overall composite indicator. Researchers mostly derive weights in two ways. Either by using participatory methods, like analytical hierarchy process or employing a statistical model like factor analysis-PCA. In PCA, weights can be calculated by eigenvector and factor scores whereas, in Analytical and Hierarchy Process (AHP) weight depends on components that are more influential, depending on expert

opinion, and reflect on policy priorities or technical factors. AHP may add subjectivity of the experts regarding the significance of various components. This study relies on the statistical procedure to avoid the subjectivity i.e. PCA for both FD and FI index.

We employ ARDL model because some of our variables that are used in this study are stationary in their level form I(0) and others in first difference I(1). The uniqueness of ARDL-bound testing approach is that it could be applied irrespective of whether variables are I(0), I(1) or combinations of both whereas Ordinary Least Square (OLS) cannot be applied (Pesaran *et al.*,2001). Further, ARDL method provides unbiased long run estimates with valid t-score even where some of the regressors are endogenous in nature (Owusu and Odhiambo, 2014). Again, in our state level co-integrated data we use FMOLS and DOLS method because it reduces the serial correlation and endogeneity in the regressors and gives robust result (Acharya *et al.*, 2009). Finally, we also use systems of the equation model for removing endogeneity in the data.

Empirical Results

We begin our empirical results with investigating the impact of financial development and economic growth especially in India. The study finds a positive impact of financial development on economic growth both in the long-run and short run respectively (details in Table 1 & 2). Further there is a positive relationship between the financial development and economic growth in 28 states of India during 2000-2014(see Table 3). Thus, our results clearly indicate both at aggregate and state level analysis that financial sector development positively impacts economic growth. We also find that financial reforms undertaken in India have resulted in economic growth both in short run and long run. The panel Granger causality test estimates that there exists bidirectional causality between financial development and economic growth in all Indian states (see Table

4). This indicates that financial development helps to foster economic growth, as well as growth also drive financial sector development.

Similarly, the study estimates a positive impact of financial inclusion on economic growth both in the long run and short run (details in Table 5 & 6). Adding to it, the study posits a unidirectional relatioship between between financial inclusion and economic growth in country level data .The study finds a positive relationship between the financial inclusion and economic growth in 28 states of India during 2000-2014 using FMOLS and DOLS methods (see Table 7). Further, the panel Granger causality test estimates that there exists bidirectional causality between financial inclusion and economic growth in all Indian states (see Table 8). That indicates that financial inclusion stimulates economic growth, as well as growth, was also driven financial inclusion. Using the determinants of financial development and financial inclusion, the study finds that there exists a unidirectional relationship between financial inclusion and financial development in county-level data from 1980 to 2014 (see Table 9). Similarly, the empirical estimates of the study explain that there is a unidirectional relationship between financial inclusion and financial development in Indian states from 2000-2014 (see Table 10). Thus, it indicates that financial inclusion promotes financial sector development and financial sector development is responsible for affordable financial services to people. The lag effect between financial inclusion and development explains that financial inclusion of current year will stimulate financial development after two years (see lag two effect in Table 10) and financial inclusion will foster economic growth.

From the empirical estimates, we can say that both financial development and financial inclusion are important factors stimulating economic growth both in long run and short run. In addition to it, there exists a unidirectional relationship between financial development and financial inclusion in India. Now the aim of the government of India should be improve affordable financial services to every section of society. Moreover, our estimates suggest that the government has to maintain high economic growth to boost demand for financial products and services which ultimately leads to financial development and inclusion in India.

Table 1: ARDL approach: Financial development and economic growth with structural break

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Variable	Ι	II	III	IV
С	0.668**	0.588**	0.588	0.762**
	(2.118)	(2.065)	(1.344)	(2.674)
PSC	0.171*			
	(1.900)			
LL (M3)		0.238***		
		(3.412)		
STOCK			-0.002*	
			(-1.854)	
FD (Index)				0.248**
				(2.705)
INF	-0.007*	-0.001	-0.054	-0.006**
	(-1.840)	(0.177)	(-0.002)	(-2.597)
TRADE	0.185*	0.165***	0.231***	0.273**
	(1.716)	(3.088)	(3.091)	(2.256)
HUM	0.212***	0.517***	0.195*	0.265**
	(3.480)	(3.733)	(1.814)	(2.012)
GEXP	0.243	0.049	0.375*	0.421
	(0.550)	(0.220)	(1.864)	(1.194)
Fin_DUM	0.006**	0.006*	-0.037	0.023***
	(2.271)	(1.819)	(0.025)	(3.914)
Obs.	35	35	35	35
\mathbf{R}^2	0.748	0.769	0.611	0.803
Adj.R [∠]	0.479	0.602	0.330	0.562
LM	0.077	1.090	0.128	0.926
	(0.828)	(0.146)	(0.776)	(0.118)
DW	1.970	2.222	1.887	1.960

Dependent variable: Y (growth)

Notes: Values in parenthesis are t-statistics and *, **, *** null hypothesis of at the 10%, 5%, and 1% level of significance respectively. PSC, LL, and STOCK are three proxy variables use for financial development whereas; FD is the index of financial development.

Variable	V	VI	VII	VIII
ΔC_t	0.031**(2.686)	0.025*(1.808)	0.041***(4.101)	0.030**(2.340)
ΔPSC_t	0.185**(2.415)			
ΔPSC_{t-1}	0.169**(2.542)			
ΔLL_t		0.139***(2.929)		
ΔLL_{t-1}		0.126**(2.128)		
$\Delta STOCK_t$			0.023*(1.894)	
$\Delta STOCK_{t-1}$			0.009*(1.783)	
Δ FD (Index) _t				0.167**(2.408)
Δ FD (Index) _{t-1}				0.138***(3.409)
ΔINF_t	0.012*(1.904)	0.008(0.535)	0.024**(2.225)	0.016*(1.938)
ΔINF_{t-1}	0.017*(1.892)	0.009(0.879)	0.029*(1.879)	0.019*(1.863)
$\Delta TRADE_t$	0.052*	0.048**(2.733)	0.026*(1.751)	0.016**(2.246)
	(1.806)			
$\Delta TRADE_{t-1}$	0.049**	0.041*	0.019**(2.109)	0.053*(1.792)
	(2.109)	(1.872)		
ΔHUM_t	0.362**	0.326*	0.202*	0.197**
	(2.256)	(1.801)	(1.877)	(2.251)
ΔHUM_{t-1}	0.291*	0.298	0.483	0.191*
	(1.882)	(0.930)	(0.752)	(1.879)
ΔGEXP_{t}	0.333*(1.950)	0.293*(1.859)	0.012(0.043)	0.144*(1.779)
ΔGEXP_{t-1}	0.298(0.229)	0.281(0.973)	0.154(0.027)	0.137*(0.188)
ΔFin_Dum_t	0.015*(1.852)	0.019*(1.765)	0.030(1.159)	0.091*(1.821)
ECT(-1)	-0.341**(-2.532)	-0.365**(-2.298)	-0.307**(-2.575)	-0.325**(-2.242)
Obs.	35	35	35	35
R^2	0.549	0.515	0.451	0.691
Adj.R ²	0.301	0.208	0.189	0.411
LM	0.167(0.747)	0.034(0.939)	1.608(0.098)	0.023(0.959)
DW	1.918	1.835	1.657	1.931

Table 2: ECM approach: Financial development and economic growth with structural break Dependent variable: Y (growth)

Notes: The values in parenthesis are t-statistics and *, **, *** null hypothesis of at the 10%, 5%, and 1% level of significance respectively. PSC, LL, and STOCK are three proxy variables uses for financial development whereas; FD is the index of financial development.

		1
Dependent Variable: SDP	FMOLS	DOLS
Banking and Insurance	6.974***	6.103***
(B&I)	(7.823)	(4.393)
Provident Fund (PF)	2.226***	2.021***
	(5.146)	(3.499)
Remittance Inflows (RI)	3.179***	2.474***
	(6.423)	(3.891)
Index of Financial	4.050***	3.841***
Development (FD)	(3.339)	(3.878)

Table 3: Pedroni panel FMOLS and DOLS result

Note: *** indicates at 1% level of significance and bracket value indicates t-statistics

Dependent		Dire	ction of caus	ality	
Variables	Independent variables				
	SDP	B&I	PF	RI	Index of
					FD
SDP		9.981***	6.199***	1.423***	1.858***
		(0.000)	(0.002)	(0.003)	(0.001)
B&I	8.100***		7.414***	0.429	1.301***
	(0.000)		(0.000)	(0.651)	(0.000)
PF	2.059	2.629		8.307***	6.055
	(0.129)	(0.073)		(0.000)	(0.602)
RI	6.357	5.857***	3.399		3.525
	(0.701)	(0.003)	(0.334)		(0.830)
Index of	4.673***	4.195**	4.779***	10.009***	
FD	(0.009)	(0.015)	(0.008)	(0.000)	

Table 4: Panel Granger Causality test result

 FD
 (0.009)
 (0.015)
 (0.008)
 (0.000)

 Notes: ** and *** indicates at 5% and 1% level of significance

Table 5: ARDL approach: Financial inclusion and economic growth with structural break: 1980-2014

Dependent	variable:	Y	(Growth))
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Variable	Coef.	Std.Error	t-stat	Prob.
С	1.131**	0.539	2.098	0.041
FI	0.217***	0.048	4.520	0.004
INF	-0.027	0.019	-1.421	0.166
TRADE	0.251***	0.074	3.391	0.003
HUM	0.181*	0.102	1.774	0.094
GOVT	0.197*	0.115	1.713	0.096
LIB_Dummy	0.504**	0.183	2.754	0.013
Sample	35			
R-squared	0.744			
Adj R-suared	0.487			
DW Stat	1.953			
LM test	0.521			
(Prob.Chi-square(2)	(0.376)			

Notes: *, **, and *** indicate 10%, 5%, and 1% level of significance respectively.

Table 6: ECM approach: Financial inclusion and economic growth with
structural break: (1980-2014)

Dependent variable: Y (Growth)

Variable	Coef.	Std.Error	t-stat.	Prob.
ΔC_t	0.034***	0.009	3.777	0.001
ΔFI_t	0.313**	0.116	2.698	0.020
ΔFI_{t-1}	0.297***	0.048	6.187	0.004
ΔINF_t	-0.014	0.008	-1.751	0.190
ΔINF_{t-1}	-0.126	0.118	-1.067	0.251
$\Delta TRADE_t$	0.161**	0.056	2.875	0.039
$\Delta TRADE_{t-1}$	0.149**	0.051	2.921	0.024
ΔHUM_t	0.371**	0.148	2.506	0.020
ΔHUM_{t-1}	0.315***	0.123	2.560	0.013
$\Delta GOVT_t$	0.140	0.116	1.206	0.240
$\Delta GOVT_{t-1}$	0.107***	0.023	4.652	0.002
LIB_Dummy	0.021***	0.004	5.250	0.001
ECT(-1)	-0.449***	0.137	-3.277	0.003
Sample	35			
R-squared	0.601			
Adj R-suared	0.427			
DW Stat	1.801			
LM test (Prob.Chi-	0.812			
square(2)	(0.317)			

Notes: *, **, and *** indicate 10%, 5%, and 1% level of significance respectively.

Dependent Variable: SDP	FMOLS	DOLS
BB	0.167(5.914)***	0.136(6.417)***
BE	0.153 (6.154)***	0.148(6.328)***
CRE	0.588 (4.328)***	0.473(3.943)***
DEP	0.632 (3.164)***	0.567(4.665)***
Index of Financial Inclusion	0.803 (2.991)***	0.721(2.893)***
(FI)		

Table 7: Pedroni panel FMOLS and DOLS result (2000-2014)

Note: *** indicates at 1% level of significance and bracket value indicates t-statistics

Dependent	Direction of causality					
Variables			Independer	ıt variables		
	SDP	BB	BE	CRE	DEP	Index of
						FI
SDP		2.394**	6.789	2.116**	2.360**	0.237
		(0.002)	(0.071)	(0.012)	(0.015)	(0.801)
BB	2.293		7.809**	1.598***	7.260***	4.782***
	(0.102)		(0.040)	(0.000)	(0.000)	(0.000)
BE	7.749***	7.206***		5.221***	2.845***	2.160***
	(0.001)	(0.000)		(0.000)	(0.000)	(0.000)
CRE	3.366***	1.059	5.054***		6.768***	0.641***
	(0.000)	(0.347)	(0.006)		(0.001)	(0.000)
DEP	9.533***	1.195	2.914***	7.098***		7.808***
	(0.000)	(0.303)	(0.000)	(0.000)		(0.000)
Index of	6.770***	2.240***	2.706***	7.030***	1.097***	
FI	(0.001)	(0.000)	(0.000)	(0.001)	(0.004)	

Table 8: Panel Granger Causality test result

Note: *** indicates at 1% level of significance and bracket value indicates t-statistics

Independent	OLS	2SLS	3SLS
variables	(Financial	(Financial	(Financial
	Development)	Development)	Development
GDP per capita	0.313	0.445	0.437**
	(0.393)	(0.399)	(0.146)
Human Capital	-0.683**	-0.537	0.888**
	(0.325)	(0.432)	(0.374)
Trade Openness	-0.010	0.057***	0.091***
	(0.061)	(0.016)	(0.017)
Inflation	-0.038**	-0.048	-0.041**
	(0.011)	(0.042)	(0.034)
Urbanization	-1.084***	0.671	1.872**
	(0.169)	(0.991)	(0.847)
	OLS	2SLS	3SLS
	(Financial	(Financial	(Financial
	Inclusion)	Inclusion)	Inclusion)
Financial	0.241**	0.522	0.801***
Development	(0.110)	(0.326)	(0.272)
(FD)			
GDP per capita	1.091***	1.290**	1.219***
	(0.398)	(0.491)	(0.414)
Rural	-5.032**	-3.014	-2.416***
Population	(1.957)	(3.067)	(0.593)
Age	-0.904	-1.781	2.417**
	(2.744)	(4.192)	(0.946)
Literacy	1.919***	1.899***	1.667***
	(0.256)	(0.284)	(0.243)
Obs.	35	35	35
Endogenous	: Financial Deve	lopment, Financial	Inclusion
variables			
Exogenous	: GDP per capi	ita, Human Capital	l, Trade Openne
variables	Inflation, Urba	inization, Rural	Population, A
	Literacy		

Table 9: Least squares regression results between financial inclusion and financial development in India

Notes: The Standard errors are in parenthesis. *** and ** denote significance at 1% and 5% level respectively.

Null Hypothesis		Direction	n of causality	
	Obs.	Lags	F-stat	Prob.
FI does not Granger Cause	392	1	0.208	0.648
FD				
FD does not Granger	392	1	4.829	0.028
Cause FI				
FI does not Granger Cause	364	2	0.519	0.595
FD				
FD does not Granger	364	2	5.868	0.003
Cause FI				
FI does not Granger Cause	336	3	0.836	0.423
FD				
FD does not Granger	336	3	6.231	0.002
Cause FI				

Table 10: Pairwise Granger Causality Test between financial development and inclusion

The main findings of the study include:

- I. We find from the financial development index, among all states of India, Goa is at the top, and the states of Maharashtra and Punjab are ranked in 2nd and 3rd respectively. However, the states Manipur, Sikkim and Bihar are placed in ranked as 26th, 27th and 28th respectively.
- II. The construction of financial inclusion (FI) index, show that over time all states are moving forward with the financial access from 2000-2014. Among all states of India, Goa is at the top, and the states of Kerala and Punjab are ranked 2nd and 3rd respectively. However, the states Assam, Nagaland and Manipur are placed in 26th, 27th, and 28th position respectively.

- III. The empirical results reveal that the financial development, in the long run as well as in the short run, positively influences economic growth in India and there is a bidirectional causal flow from financial development to economic growth except in a stock market context where the relationship is unidirectional.
- IV. The empirical results reveal that the financial inclusion, in the long run as well as in the short run, positively influences economic growth in India. The study also finds that there is a unidirectional causal flow from financial inclusion to economic growth.
- V. Again, the empirical estimates posit that usability of banking services (deposit and credit) is essential for financial inclusion.
- VI. The study concludes that the financial reforms undertaken in India have resulted in economic growth both in the short run as well as in the long run. This clearly indicates that the implementation of appropriate liberalization policies spurs economic growth.
- VII. Financial development and financial inclusion are complementary to each other as well as an integral part of economic growth. However, there is a unidirectional relationship between financial development and inclusion in India.
- VIII. Other control variables like GDP per capita and human capital have a positive impact on both financial inclusion and development in India. This indicates that income of the people and education stimulates both financial development and inclusion.
- IX. Trade openness and urbanization are positively associated with financial development whereas inflation is negatively related to financial development. Again, urbanization creates more

employment as well as banking facilities to the people which lead to financial sector development.

X. Literate people and working age people are positively linked with financial inclusion whereas the rural population is negatively related to financial inclusion. This clearly indicates that education is vital factor for using financial products and services and profitable investment.

Conclusion and Policy Implications

We conclude by saying that both financial development and inclusion are positively associated with each other. It clearly indicates that affordable and transparent financial access in the economy is very much essential for economic development. Similarly, financial sector development is also responsible for providing affordable financial access. Moreover, this study concludes that financial inclusion and development are unidirectional to each other. That clearly indicates that financial development causes financial inclusion in India. Now the aim of the government of India should be improve affordable financial services to every section of society.

Further, to sustain financial development in the country, the government has to maintain high per capita income and spread financial awareness to boost demand for financial products and services which will lead to the financial development and economic growth. The study is limited to SCBs related variables to capture financial inclusion due to data availability in India, and we plan to include MFIs, SHGs, and POSB in our future work for the holistic understanding of financial inclusion and its impact on financial sector development and economic growth.

LIST OF PUBLICATIONS

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http://store.ectap.ro/articole/1141.pdf

- Lenka, S. K. (2015). Measuring Financial Development in India: A PCA Approach, *Theoretical and Applied Economics*, 22(1): 187-198. Indexing: EBSCO, RePEc, EconLit, General Association of Economists from Romania Publication, <u>http://store.ectap.ro/articole/1066.pdf</u>
- Lenka, S. K. & Barik, R. (2017), Does diffusion of mobile phone and internet service spur financial inclusion?, Evidence from SAARC countries. *Financial Innovation* (accepted with minor revision), Indexing: Emerging Sources Citation Index (ESCI), Springer publication.
- Lenka, S. K. & Bairwa, A. K. (2016), Does financial inclusion affect monetary policy in SAARC countries?, *Cogent Economics & Finance, 4*(1): 1-8. Indexing: Scopus, Taylor and Francis Publication,

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- Lenka, S. K. & Sharma, P. (2014), FDI as a main determinant of Economic Growth: A panel data analysis. *Research Journal* of Symbiosis Centre of Management Studies, 1 (1): 84-97. <u>http://www.scmspune.ac.in/chapter26/7.pdf</u>
- Lenka, S. K. (2013), Exchange rate as a determinant of FDI inflows Evidence from India, published by Bloomsbury India Pvt Ltd. pp: 206-218.

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- Lenka, S. K. & Sharma, R. (2017). Re-examining the effect of financial development on economic growth in India: Does the measurement of financial development matter?, *Journal* of *Emerging Market Finance* (under review), Indexing: Scopus, Sage Publication.
- Lenka, S. K. & Sharma, R. (2017). Financial inclusion and financial development in India: Is there any link?, *Macroeconomics and Finance in Emerging Market Economies* (under review), Indexing: Scopus, Taylor and Francis Publication.

Conferences Papers:

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- Lenka, S. K. (2012). The Impact of Exchange Rate on Inflows of Foreign Direct Investment in India: An empirical analysis", a research paper presented at the International Conference held in Indian Institute of Technology, Kharagpur, India on 27-29, Dec 2012

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- 4. Attended a workshop (AWTOR) held in Indian Institute of Management Indore on 22-25, August 2012.

List of Figures xxvii
List of Tables xxviii
Acronymsxxx
Chapter 1: Introduction1
1.1.The Context
1.1.1. Finance1
1.1.2. Financial System2
1.1.3. Financial Development4
1.1.4. Financial Inclusion6
1.1.5. Importance of Financial Development and Financial Inclusion on Economic Growth .8
1.2. Financial Sector Reforms and Government Policies related to the Financial Development and Financial Inclusion in India
1.3. Motivation of the Study
1.4. Objectives of the Study
1.5. Database and Methods14
1.6. Organization of the Thesis15
Chapter 2: Literature Review17
2.1. Financial Development (FD)
2.1.1. The Concept
2.1.2. The Background and importance of Financial Development20
2.1.3. Measurement of Financial Development21
2.1.4. Determinants of Financial Development24
2.1.5. Theories on the relationship of between Finance and Growth
2.1.6. Impact of Financial Development on Economic Growth
2.2. Financial Inclusion (FI)
2.2.1 The Concept
2.2.2 The Background and importance of Financial Inclusion in India

Table of Contents

2.2.3 Measurement of Financial Inclusion (FI)	35
2.2.4 Determinants of Financial Inclusion	38
2.2.5 Impact of Financial Inclusion on Economic Growth	40
2.2.6 Relationship between financial inclusion and financial development	42
2.3 Concluding Remarks	44
Chapter 3: Conceptual Framework, Data, and Econometric Issues	47
3.1. Gaps in previous Literature	47
3.2. Econometric Specifications, Variables, and Data Sources	49
3.2.1. Sample	49
3.2.2. Financial Development Index (FD)	49
3.2.3. Determinants of Financial Development	53
3.2.4. Financial Development and Economic Growth	55
3.2.5. Financial Inclusion Index (FI)	60
3.2.6. Determinants of Financial Inclusion	62
3.2.7. Financial Inclusion and Economic Growth	64
3.2.8. Causality between Financial Development and Financial Inclusion	66
3.3. Econometric Issues	69
3.3.1. Time-series and Panel Data Modeling	69
3.3.2. Unit Root Test for Time-series and Panel Data	70
3.3.3. Endogeneity	70
3.4. Concluding Remarks	71
Chapter 4: Financial Development and Economic Growth in India: Empirical Result	ts77
4.1. Measurement of Financial Development Index (FD)	77
4.1.1 Measurement of state wise Financial Development Index in India	81
4.2. Impact of Financial Development on Economic Growth in India	84
4.3. The impact of Financial Development on Economic Growth in all States of India	94
4.4. Concluding Remarks	99
Chapter 5: Financial Inclusion and Economic Growth in India: Empirical Results	101
5.1. Measurement of Financial Inclusion Index (FI)	102

5.1.1. Measurement of state wise Financial Inclusion Index in India1	06
5.2. The impact of Financial Inclusion on Economic Growth in India1	09
5.3. The impact of Financial Inclusion on Economic Growth all States of India1	15
5.4. Concluding Remarks1	21
Chapter 6: Causality between Financial Development and Financial Inclusion in India:	
Empirical Results1	23
	24
6.1 Financial Development and Financial Inclusion in India	24
6.2 Relationship between Financial Development and Financial Inclusion1	27
6.3. Causality between Financial Development and Financial Inclusion in Indian states1	30
6.4. Concluding Remarks1	32
Chapter 7: Summary and Conclusion1	133
7.1 Overall Summary1	33
7.1 Overall Summary	33 38
 7.1 Overall Summary	33 38 39
 7.1 Overall Summary	133 138 139 139
7.1 Overall Summary .1 7.1.1 Main Findings of the Study .1 7.2 Synthesis and Policy Implications .1 7.2.1 Synthesis .1 7.2.2 Policy Implications .1	 33 38 39 39 40
7.1 Overall Summary .1 7.1.1 Main Findings of the Study .1 7.2 Synthesis and Policy Implications .1 7.2.1 Synthesis .1 7.2.2 Policy Implications .1 7.3 Contribution of the Study .1	 33 38 39 39 40 41
7.1 Overall Summary .1 7.1.1 Main Findings of the Study .1 7.2 Synthesis and Policy Implications .1 7.2.1 Synthesis .1 7.2.2 Policy Implications .1 7.3 Contribution of the Study .1 7.4 Limitations and Future Research .1	 133 138 139 139 140 141 142
7.1 Overall Summary 1 7.1.1 Main Findings of the Study 1 7.2 Synthesis and Policy Implications 1 7.2.1 Synthesis 1 7.2.2 Policy Implications 1 7.3 Contribution of the Study 1 7.4 Limitations and Future Research 1 7.5 Concluding Remarks 1	 133 138 139 139 140 141 142 142 142
7.1 Overall Summary 1 7.1.1 Main Findings of the Study 1 7.2 Synthesis and Policy Implications 1 7.2.1 Synthesis 1 7.2.2 Policy Implications 1 7.3 Contribution of the Study 1 7.4 Limitations and Future Research 1 7.5 Concluding Remarks 1 References 1	 133 138 139 139 140 141 142 142 142 143

List of Figures

Figure 1.1.1:	Structure of financial sector	5
Figure 4.1.1:	Scree Plot in principal component analysis	80
Figure 4.1.2:	Financial Development Index in India (1980-2014)	80
Figure 4.1.3:	Scenario of Financial Sector Development in all Indian States	82
	(2000-2014)	
Figure 4.2.1:	CUSUM and CUSUMSQ test (after ARDL method)	93
Figure 4.2.2:	CUSUM and CUSUMSQ test (after ECM)	93
Figure 5.1.1:	Scree Plot in principal component analysis	105
Figure 5.1.2:	Financial Inclusion Index of India (1980-2014)	105
Figure 5.1.3:	Scenario of Financial inclusion in all Indian States (2000-2014)	107
Figure 5.2.1:	CUSUM and CUSUMSQ test (after ARDL method)	114
Figure 5.2.2:	CUSUM and CUSUMSQ test (after ECM)	114
Figure 6.1.1:	Nature of financial development and financial inclusion in India	127
	(1980-2014)	

List of Tables

Table 3.4.1:	Variables used to verify different Hypothesis, their Definition, and Data	73
	Sources (aggregate analysis)	
Table 3.4.2:	Variables used to verify different Hypothesis, their Definition, and Data	75
	Sources (for Indian states)	
Table 4.1.1:	PCA for financial development index	79
Table 4.1.2:	Components scores	79
Table 4.1.3:	Ranking of Indian States on the basis of Financial Development: 2000-	83
	2014	
Table 4.2.1:	Unit Root results	84
Table 4.2.2:	Financial Development and Economic Growth: ARDL-ECM model	85
	diagnostic tests	
Table 4.2.3:	Result of bounds F-test for co-integration	86
Table 4.2.4:	ARDL approach: Financial development and economic growth with	89
	structural break	
Table 4.2.5:	ECM approach: Financial development and economic growth with	91
	structural break	
Table 4.3.1:	Im, Pesaran and Shin (IPS) panel unit root test results	94
Table 4.3.2:	Pedroni panel co-integration test result	96
Table 4.3.3:	Pedroni panel FMOLS and DOLS result	97
Table 4.3.4:	Panel Granger Causality test result	98
Table 5.1.1:	PCA for Financial Inclusion Index	103
Table 5.1.2:	Components scores	104
Table 5.1.3:	Ranking of India States on the basis of financial inclusion: 2000-2014	108
Table 5.2.1:	Unit Root results	109
Table 5.2.2:	Financial inclusion and economic growth: ARDL-ECM model diagnostic	110
	test	
Table 5.2.3:	Result of bound tests for co-integration	110
Table 5.2.4:	ARDL approach: Financial inclusion and economic growth with structural	112
	break: 1980-2014	

Table 5.2.5:	ECM approach: Financial inclusion and economic growth with structural	113
	break: (1980-2014)	
Table 5.3.1:	Im, Pesaran and Shin (IPS) panel unit root test results (2000-2014)	115
Table: 5.3.2:	Pedroni panel co-integration test result	117
Table 5.3.3:	Pedroni panel FMOLS and DOLS result (2000-2014)	119
Table 5.3.4:	Panel Granger Causality test result	120
Table 6.1.1:	Nature of financial development and financial inclusion in India (1980-	126
	2014)	
Table 6.2.2:	Least squares regression results between financial inclusion and financial	129
	development in India	
Table 6.2.3:	Granger causality test between financial development and financial	130
	inclusion in aggregate	
Table 6.3.1:	Pairwise Granger Causality Test between financial development and	131
	inclusion	
Table 7.2.1:	Relationship between FD, FI and Y	140

ACRONYMS

AHP	Analytical and Hierarchy Process
ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag
BSR	Basic Statistical Returns
CBA	Central Bank Assets
CBD	Central Bank Deposits
CGSE	Credit to Government and State-owned Enterprises
CGSE	Credit to Govt. and State-owned Enterprises
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum of Squares
DBS	Direct Benefits Scheme
DOLS	Dynamic Ordinary Least Squares
Y	Economic Growth
ECT	Error Correction Term
ECM	Error Correction Model
FD	Financial Development Index
FI	Financial Inclusion Index
FIs	Financial Institutions
FMs	Financial Markets
FSD	Financial System Deposits

FMOLS	Fully Modified Ordinary Least Squares
GEXP	Govt. expenditure
GOI	Government of India
HUM	Human Capital
IPS	Im, Pesaran and Shin
INF	Inflation
IFDI	Inflows of FDI
IFS	International Financial Statistics
IMF	International Monetary Fund
JAM	Jan Dhan Aadhaar Mobile
КМО	Kaiser-Meyer-Olkin
LL	Liquid liabilities or M3
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MRW	Mankiw, Romer and Weil
MFIs	Microfinance Institutions
NABARD	National Bank for Agriculture and Rural Development
OLS	Ordinary Least Square
PP	Phillips-Perron
POSB	Post Office Saving Banks
PMJDY	Pradhan Mantri Jan Dhan Yojana
PCA	Principal Component Analysis
PSC	Private Sector Credit
PF	Provident Fund
RBI	Reserve Bank of India
RI	Remittance Inflows

RPOP	Rural Population
SCBs	Scheduled Commercial Banks
SEBI	Securities and Exchange Board of India
SHGs	Self Help Groups
SEM	Simultaneous Equations Model
SDP	State Domestic Product
SMR	Stock Market Returns
3SLS	Three-Stage Least Squares
TRADE	Trade Openness
2SLS	Two-stage Least Squares
URB	Stands For Urbanization
VAR	Vector Auto Regression
WDI	World Development Indicators

Chapter 1

Introduction

"The stark reality is that most poor people in the world still lack access to sustainable financial services, whether it is savings, credit or insurance. The great challenge before us is to address the constraints that exclude people from full participation in the financial sector... Together, we can and must build inclusive financial sectors that help people improve their lives" – Kofi Annan¹

1.1. The Context 1.1.1. Finance

The term finance is a French word, which means the management of money. The scope and meaning of finance are getting wider day by day. It refers to management, creation, and study of money, banking credit and investment, assets, and liabilities that make up financial system as well as the study of those financial instruments. In other words, finance is monetary resource comprising debt and ownership funds of a state, company or person. The term finance can be divided into three main subcategories like public finance, corporate finance, and personal finance. The public finance refers to a part of finance which mostly deals with government revenue and government expenditure of the public authorities. The scope of public finance is mainly to deal with (1) efficient allocation of resources, (2) distribution of public revenue and (3) macroeconomic stabilization. Similarly, corporate finance is also a part of funding and capital structure (mainly includes equity, debt, and securities) of corporations. Its scope includes business valuation in financial markets,

¹Former UN secretary-General, on 29 December 2003, following the adoption of 2005 as the International Year of Microcredit
stock investing, or investment management. Lastly, personal finance refers to the budget of financial management of an individual/household unit. The main motto of personal finance is to save, and spend money overtime considering the risks and uncertainties of future life events. It may include paying for the education; investing in durable goods such as real estate and cars, purchasing insurance (like health and property insurance) and saving for future. Nowadays we cannot imagine the world without finance because it is the soul of the economic transactions and activities. Thus, finance makes the bridge between the present and future of human being about financial management, investment, and activities.

1.1.2. Financial System

The system that covers financial transactions and alteration of money between investors, lender, and borrowers is known as financial system. Economists highlight the importance of the financial system for capitalism, industrialization, and economic development irrespective of countries. The word 'system' in financial system refers to a set of complex and closely associated or intermixed institutions, agents, practices, markets, transactions, claims, and liabilities in an economy. The financial system is concerned about the behavior of money, credit, and finance. In other words, it refers to a system that covers financial transactions and circulation of money between investors, lenders, and borrowers in the global, regional and firm specific level. There are mainly five key functions of financial system such as (i) generating information ex-ante about possible investments and assign capital; (ii) monitoring investments and exercising corporate governance after providing finance; (iii) facilitating the trading, modification, and management of risk; (iv) mobilizing and assembling savings; and (v) facilitation the exchange of goods and services.

A well-developed financial system that includes both the depth and access to finance from the financial institutions, as well as financial market, provides a better financial service that promotes faster economic growth. The flow of financial resources from debtors to creditors is possible through sound financial system that prevails in an economy. Hence, the prime motto of the banking personnel and policy makers is to improve financial access to each and every section of society to improve the financial systems, which can ultimately foster financial development and economic growth (Ang, 2008). The role and success of sound financial system can be followed in two broad ways i.e. transparent and affordable financial access (or financial inclusion) and development of its financial sector that includes financial institutions and financial markets (or financial development). However, the aim and objectives of both financial inclusion and financial development are closely connected to each other for building a sound financial system (Allen et al., 2014) and both are an integral part of promoting economic growth (Chauvet and Jacolin, 2015). The well-fledged financial sector development of a nation does not only assure its progress, but also it spreads affordable financial services for the development of each section of society (Sarma, 2010). Therefore, the ultimate goal of a sound financial system is to provide better financial access (i.e. financial inclusion) which will boost economic growth (Chung et al., 2016). For fulfilling the objective of the sound financial system, financial markets play a significant role in providing affordable financial services in the modern economy, particularly in processing funds from surplus to deficit units. The flows of funds and affordable financial services spread in the economy are helpful for financial development and economic growth (Rasheed et al., 2016). However, financial development sustains in the long run where all people have better financial access. An efficient financial sector will give affordable financial services to all sections of the people. So, the importance of both financial development (FD) as well as financial inclusion (FI) is much for economic growth

basically in developing countries. We will discuss about FD and FI in details subsections 1.1.2 and 1.1.3.

1.1.3. Financial Development

Financial development (FD) is one of the key objectives of sound financial system. FD refers to the set of institutions, instruments, markets, as well as the legal and regulatory framework that permit the transaction to be made by extending credit (World Bank, 2016). In other words, we may say financial development is a multi-dimensional process that overcomes "social costs" incurred in the financial systems. It includes the development of financial institutions (includes banking and non-banking institutions) and financial markets (like the stock market), and international capital flows [(like remittance inflows, Foreign Direct Investment (FDI), Foreign Institutional Investment (FII)]. Moreover, financial institutions includes both banking [Schedule Commercial Banks (SCBs), Nationalized banks, SBI and its associates, Regional Rural Banks (RRBs), foreign banks, other Indian Private Sector Banks, Scheduled State Co-operative Banks, Schedules State Urban Co-operative Banks, Foreign Private Banks], and non-banking institutions [includes Unit Trust of India (UTI), General Insurance Corporation (GIC), Life Insurance Corporation (LIC), Mutual Funds, Investment Trusts, Provident and Pension Funds, Small savings organizations, National House Banking (NHB), Housing and Urban Development Corporation (HUDCO), etc.]. FD is displayed in the figure no 1.1.1.





Source: Authors' Summary

The financial sector development helps to reduce costs of acquiring information, enforcing contracts and making transactions resulting in the emergence of financial contracts, markets, and intermediaries. It promotes economic growth through capital accumulation and technological progress by increasing the savings rate, mobilizing and pooling savings, spreading information about the profitable investment, encouraging the inflows of foreign capital as well as optimizing the allocation of capital. And countries with developed financial systems tend to grow faster over long periods of time. However, financial development and economic growth have a bi-directional relationship, where financial development is not only an outcome of economic growth but it also contributes to the growth (Adu et al., 2013). Additionally, it is the weapon for reducing poverty and inequality by broadening access to finance to the poor and vulnerable group, facilitating risk management by overcoming shocks, and increasing investment and productivity, which result in a high-income generation. Apart from this, it can help in growth of small and medium-scale enterprises (SMEs) by providing them with access to finance. As SMEs are mostly involved with labor-intensive products and create more jobs in rural and unskilled people. So FD plays a major role in economic development and reducing inequality in developing countries like India (Kim, 2015).

1.1.4. Financial Inclusion

Like financial sector development, financial inclusion is an another key objective for the sound financial system and aims to deliver affordable financial services to disadvantaged and low-income segments of the society by mainstreams of institutional players, in contrast to financial exclusion where those financial services are not available as well as affordable for them. As estimated about 2 billion of working age people in the world have no access to financial services from the regulated and formal financial institutions (United Nations, 2006). However, it is argued that affordable and transparent financial services are in nature of public goods as well as the availability of financial services to the entire population without discrimination of caste, gender, religions, and regions are prime objectives of financial inclusion.

Since early 2000, the term financial inclusion gained more importance among governments and policymakers as well as financial institutions for reduction of financial exclusion and poverty especially in developing countries like India. The United Nation defines the objectives of financial inclusion as: (i) to facilitate access of full range of affordable financial services for all households including savings, payment and transfer services, credit facilities, and insurance; (ii) to create a sound and safe institutions governed by clear regulations and industry performance standards; (iii) to ensure financial and institutional sustainability for investments; (iv) to create competition to safeguard the choices and affordability for clients. FI can be done through a drive whereby formal institutions provide (safe guarding) affodable financial services to all sections of society whether it is credit facilities, savings or insurance.

FI differs across countries, regions and persons without having any universal definition because it is a subject of individual need and taste (Kadan and Chhikara, 2013). Though this term gained popularity from early 2000, however in India financial inclusion was used first time in April 2005 in the annual policy statement presented by the then Governor Y. Venugopal Reddy, Reserve Bank of India. Most of the developing countries like India have a large segment of people particularly lowincome groups with very little access to financial services from formal financial institutions. And many of them have to necessarily depend either on their relatives or informal sources of finance at high-interest rates. The importance of financial inclusion has been widely accepted for sound and sustainable financial system. For extending the financial inclusion drive at the grass root level, the Reserve Bank of India (RBI) permitted commercial banks to make use of the financial services of Non-Government Organization (NGOs), Self Help Groups (SHGs), Microfinance Institutions (MFIs), and other civil society organizations as intermediaries for providing affordable financial and banking services as well as use business facilitators in January 2006. RBI asked the commercial banks to start a 100% financial inclusion (spreads fully financial access) in diverse campaign regions on a pilot basis. Therefore,

certain states and union territories like Puducherry, Kerala, and Himachal Pradesh announced 100% financial inclusion in all their districts. The RBI's vision is to open nearly 600 million new customers and provide them various financial services by the year 2020. But, illiteracy, lack of financial awareness, low savings, and lack of bank branches especially in rural areas continue to be a barricade to financial inclusion in many states. To include all people under the umbrella of formal banking for providing affordable financial services, the government of India announced "Pradhan Mantri Jan Dhan Yojna (PMJDY)-a national and universal mission for financial inclusion launched on 28th August 2014.

1.1.5. Importance of Financial Development and Financial Inclusion on Economic Growth

It is well recognized that both financial development and inclusion are an integral part of economic growth for every nation across the globe. A well-developed financial system provides better financial services, which will promote economic growth. The flow of financial resources from debtors to creditors can be possible through sound financial systems. So the aim of the banking personnel and policy makers is to improve financial access to every section of the society in a transparent manner for sound financial systems (Ang, 2008). For the general sense, financial development is a multidimensional concept which defines the development of financial institutions, financial markets, and international capital flows which will work together to reduce the cost of information, enforcement and transactions. Whereas, the motto of financial inclusion is to provide affordable financial services to all sections of society in a reliable and transparent manner. It is intended to connect people to banks with consequential benefits (Swamy, 2014). It looks at bringing unbanked people into the banking fold so that they have access to institutional credit and other services offered by commercial banks. The consensus is that both FD and FI promote economic growth but the magnitude of impact

differs. It has been observed that a country might be financially developed but need not be inclusive due to high-income inequalities with certain segments of people remaining outside the formal financial systems. However, financially inclusive countries are financially developed (Sarma, 2008).

1.2. Financial Sector Reforms and Government Policies related to the Financial Development and Financial Inclusion in India:

In the last decades of the 18th century, modern banking started in India as Bank of Hindustan was the first bank that was established in 1770. After that, Bank of Calcutta in 1806, Bank of Bombay in 1840 and Bank of Madras in 1843 started doing business in India. Later these three banks were merged and formed Imperial Bank of India. After Independence, this Imperial Bank of India was converted as State Bank of India in 1955. The nationalization of 14 private sector banks in the year 1969 and the establishment of the Regional Rural Banks (RRBs) in 1975 to provide banking services to rural people, whose were mostly excluded from formal financial institutions. The bank nationalization phase (1969) in India marked a paradigm shift in Indian banking, as it was intended to shift the focus from class banking to mass banking. Again, six more private sectors banks were nationalized for availing financial services mostly in rural areas. For extending planning, policy and operations in the field of credit for agriculture as well as several economic activities in rural areas, National Bank for Agricultural and Rural Development (NABARD) was established in 1982. It plays an active role in developing financial inclusion policy of India. Moreover, it coordinates with Government of India, state governments, Reserve Bank of India and, national level financial institutions which finance the rural people and contributes in the development of institutions which help the rural economy. Lastly, NABARD also regulates the cooperatives banks and RRBs for the development of rural people. Though financial inclusion as a term was not used in any policy document, it appears that increasing the reach of formal

institutions of finance to a broader set of people in the country as an important policy objective.

In post liberalization period (1991), GOI appointed a high-level committee to look into the structure, organization and, smooth functioning of the financial system. It consisted of nine members headed by Mr. M. Narasimham (former governor of the RBI) and submitted a report to GOI on November 16, 1991. The committee (Narasimham Committee) prepared a detailed review of the organization, structure, functioning and, procedure of the financial systems. On the recommendations of the committee most important changes were implemented in the country like opening up for private sector banks and foreign banks and allowing them to expand their business in India. However, guidelines for the setting of the private sector banks and special recovery tribunals were introduced. The public sector banks were permitted to get financial resources from the stock market up to 49% of their paid of capital. Again, with the recommendations of the Narasimham Committee, RBI granted freedom to commercial banks to rationalize their existing branch network by relocating branches, opening of specialized branches if necessary, establishing new offices without prior approval from RBI. Along with the expansion of financial institutions, governments of India established Securities and Exchange Board of India (SEBI) in 1992 to regulate the stock market.

Credit/Loans to rural poor people by commercial banks have many limitations including lack of securities as well as high hidden charges. Therefore, the need for microfinance- an innovative credit system was developed by Nobel Laureate Muhammad Yunus in Bangladesh which provides loans to the poor and marginalized people without any security or mortgage. In India, the NABARD took this idea and started the concept of microfinance. It provides different financial services such as saving accounts, insurance, and microcredit provided to poor and low-income groups (below poverty line) for improving their standard of living. However, NABARD also provides small and microcredit to poor and lowincome people in the rural areas through Self Help Groups (SHGs). Especially in India NABARD's SHGs linkages program was started in 1992 to empower people especially women, developing leadership abilities among the poor people, and help to increase nutrition and birth control awareness in rural areas. According to NABARD estimates, there are 2.2 million SHGs consisting 33 million members had taken various loans from the banks under its linkages. The SHGs banking linkages programme is playing a dominant role in providing loans (estimated about 57%) in southern states of India such as Andhra Pradesh, Tamil Nadu, Kerala, and Karnataka in the financial year 2005-06.

Subsequently, GOI has taken many major attempts to provide financial access to people of India especially after 2000. Like most of the developing countries, India has a serious concern about the inclusiveness of affordable financial services because half of its population does not have bank accounts. Similarly, three-fourths of the population in India devoid of any form of insurance facilities. To bring people under the umbrella of formal financial institutions to avail credit and insurance facilities, Government of India and Reserve Bank of India promote financial inclusion as one of the primary objectives of the country. Therefore, RBI set up Khan Commission in 2004 to look into financial inclusion policy which leads the basic banking services available for people as well as the opening of 'no frills' account either Zero balance or very minimum balances to include vast sections of the people. Moreover, to extend financial inclusion in India, Government had taken various steps as Pradhan Mantri Jan Dhan Yojana (PMJDY) for opening zero balance account in August 2014 and Jan Dhan Aadhaar Mobile (JAM) articulated in the Government's Economic Survey 2014-15. It helps rural and marginalized people through Direct Benefits Transfer (DBT) for getting a subsidy and Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) payments, which in turn help people to escape from the wrath of middlemen. Moreover, financial inclusion helps rural and marginalized people to avail credit facilities, which will lead economic growth.

1.3. Motivation of the Study

This thesis focuses on India's financial sector development and financial inclusion in relationship to economic growth. From the existing review of literature, it is identified that most of the studies [see King and Levine, (1993); Chakraborty, (2010); Hassan et al., (2011); Jalil and Feridum, (2011); Hussain and Chakraborty, (2012); Masoud and Hardaker, (2012); Sahoo, (2013)] related to the financial development and economic growth used different types of financial proxy variables like private sector credit by banking sector, liquid liabilities or M3, Stock market capitalization, remittance inflows, and inflows of FDI for suitability and availability of data. Usually, prominent proxy variables are taken based on the supremacy of the financial institutions and financial markets in that country. In developing countries like India, financial institutions (say banking sector) and financial markets (i.e. stock market) play a dominant role for financial sector development. Adding to this, international capital flows also play a major to improve the financial sector. Therefore, exclusion of one variable or using single proxy may give a biased result. However, these proxies related to financial development are highly correlated to each other and also there is no uniform definition that establishes a most suitable proxy for measuring financial development. So there is need to construct financial development index which represents the overall development of financial sector using relevant proxies.

Similarly, for measuring financial inclusion most of the existing literature [see Arora, (2010); Gupte et al., (2012); Beck et al., (2012); Demirguc-Kunt and Klapper, (2012); Chakravarty and Pal, (2013); Sarma, (2015)] use different types of proxy variables (like a number of saving bank account per 1,000 adults and number of bank branches per 1,000 adults) in India. However, financial inclusion not only provides a transparent and

secure deposit of money but also gives credit and insurance facility to them. Therefore, it cannot be completely measured by a single proxy variable (like saving bank account or bank branches).

Thus, in the study we use Principal Component Analysis (PCA) method to compute a single composite of financial development index using various proxy variables (private sector credit, credit to government and stateowned enterprises, remittance inflows, central bank deposits, financial system deposits, inflows of FDI, liquidity liabilities or M3, stock market returns, and provident fund deposits). Again using various variables (number of saving and credit bank accounts in proportion to 1,000 populations, number of Bank branches in proportion to 1,000 populations, number of bank employees as a ratio of bank branches, amounts of deposits and credits as a percentage of GDP) from Scheduled Commercial Banks (SCBs) we calculate a Financial Inclusion Index to analyze the level of financial access in the economy from 1980 to 2014. Adding to this, this study attempts to estimate the causality between financial inclusion and financial development in India.

1.4. Objectives of the Study

The research objectives of this doctoral dissertation are:

- To measure financial development and its impacts on economic growth in India.
- To compute financial inclusion index and its impact on economic growth in India.
- To differentiate between financial development and financial inclusion and empirically test the causality between these variables.

1.5. Database and Methods

The study uses country-level aggregate data from 1980 to 2014 and state level data from 2000-2014. The present study uses different data sources including Basic statistical return file from Reserve Bank of India (RBI), World Development Indicators (WDI). International Financial Statistics (IFS) from International Monetary Fund (IMF), Bloomberg, Economic Survey Report (2015-16) from the Office of the Register General of India, Ministry of Home Affairs for secondary data to conduct the empirical investigation. We deal with set of issues related to time series and panel appropriate modeling techniques data bv adopting including Autoregressive Distributed Lag (ARDL), Error Correction Model (ECM), Fully Modified Ordinary Least Squares (FMOLS), Dynamic Ordinary Least Squares (DOLS) model, Two-stage Least Squares (2SLS) and Three-stage Least Squares (3SLS) following existing literature.

For the construction of a multidimensional index, weights can play a significant role in the overall composite indicator. Researchers mostly derive weights in two ways. Either by using participatory methods, like analytical hierarchy process or employing a statistical model like factor analysis-PCA. In PCA, weights can be calculated by eigenvector and factor scores whereas, in Analytical and Hierarchy Process (AHP) weight depends on components that are more influential, depending on expert opinion, and reflect on policy priorities or technical factors. AHP may add subjectivity of the experts regarding the significance of various components. This study relies on the statistical procedure to avoid the subjectivity i.e. PCA for both FD and FI index.

We employ ARDL model because some of our variables that are used in this study are stationary in their level form I(0) and others in first difference I(1). The uniqueness of ARDL-bound testing approach is that it could be applied irrespective of whether variables are I(0), I(1) or combinations of both whereas Ordinary Least Square (OLS) cannot be applied (Pesaran et al.,2001). Further, ARDL method provides unbiased long run estimates with valid t-score even where some of the regressors are endogenous in nature (Owusu and Odhiambo, 2014). Again, in our state level co-integrated data we use FMOLS and DOLS method because it reduces the serial correlation and endogeneity in the regressors and gives robust result (Acharya et al., 2009). Finally, we also use systems of the equation model for removing endogeneity in the data.

1.6. Organization of the Thesis

The present dissertation is organized as follows: Chapter 2 reviews of theoretical and empirical literature that investigates the impact of financial development and inclusion on economic growth in India. The first subsection explains the concept and background of financial development. The existing literature is further classified into the measurement of financial development and its determinants. Then review proceeds to the impact of financial development and economic growth in India. After that second subsection explains the concept and background of financial inclusion. Then related review especially focuses on the measurement of financial inclusion and its determinants. This reviews further proceeds to the impact of financial inclusion on economic growth in India. The next subsection relates to the relationship between financial development and inclusion.

Chapter 3 establishes the conceptual framework of the entire study based on related literature. This framework builds on existing literature on the measurement of financial development and its impact on economic growth in India. Next subsection proceeds to the conceptual framework on financial inclusion where it deals with the measurement as well as the impact of financial inclusion on economic growth in India. The further subsection relate to the impact of financial inclusion on economic growth in Indian states. Further, this chapter deals with econometric specification related to causality between financial inclusion and financial development in India with possible determinants. Lastly, this chapter deals with specific econometric issues related to time series as well as panel data modelings like unit root, and endogeneity issues.

Chapter 4 discusses the result of the empirical model that identifies the relationship between financial development and economic growth in India. Chapter 5 discusses the empirical exercise undertaken to investigate the impact of financial inclusion on economic growth. A further subsection of this chapter discusses the interstate relationship between the Indian states on the effect of financial inclusion on economic growth. Chapter 6 presents the result regarding the relationship between financial inclusion and financial development considering the possible determinants.

Chapter 7 presents a summary of the entire thesis. The next subsection of this chapter synthesizes the empirical results to draw policy implications for India. The last subsection of this chapter notifies certain limitations of the study and outline of the directions for future research.

Chapter 2

Literature Review

There is a significant body of existing literature both from theoretical and empirical perspectives that explain the importance of both financial development and inclusion on economic growth irrespective of countries. Therefore, different schools of thought about how development in financial sectors (that includes both financial institutions and financial markets) relates to the economic growth through various channels. This chapter explores the views on the linkages between financial development and economic growth particularly in the context of the money, saving, investment and credit that are significant aspects of the financial system in the economy. Financial sector development improves mobilization of savings, reduces information asymmetries, leading to better allocation of resources in the economy. As we know, improved and healthy financial system needs financial awareness among the people about financial products and services available to them both from financial institutions and markets. Thus, financial inclusion plays the role of a catalyst for financial sector development in the economy which accelerates economic growth. However, in the current literature, the concept of Financial Development (FD) and Financial Inclusion (FI) has been analyzed separately depending upon the nature, time and purpose of the analysis. Though, the aim of both the concepts is to increase the standard of living of people, to trim down the income inequality among the people and increase the economic growth of the country. For a long time, the attention of the researchers has been focused on the impact of financial development on economic growth, but in the recent period, financial inclusion has sought high attention. Because it is an integral part of economic growth and it does not assure only the progress of financial sector, but also spread of affordable financial services to the weaker

sections of the society, at an affordable cost. We consider both the concepts (FD and FI) in this study as two sides of the same coin. In our understanding, these two concepts are complementary parts of a continuous process of growth of the financial sector. From the general point of view, both are same in context but differ in magnitude and measurement. Basically, in developing countries like India, financial development has been also contributed by the financial globalization of the economy.

This chapter reviews the existing literature that covers both theoretical and empirical aspect of financial development, financial inclusion and economic growth. The present chapter is organized as follows: Section 2.1 discusses the concept and importance of financial development, its quantification and measurement for empirical analysis. Successive subsection 2.1.1 elaborates the impact of financial development on economic growth in India. Section 2.2 discusses the concepts of financial inclusion, its measurement for empirical analysis. Successive subsection 2.2.1provides the empirical evidence between financial inclusion and economic growth in India. Section 2.3 discusses the relationship between the financial development and financial inclusion in India. Lastly, Section 2.4 provides concluding remarks.

2.1. Financial Development (FD)

2.1.1. The Concept

International Monetary Fund (IMF) and World Bank defined financial development broadly as:

"...a process of strengthening and diversifying the provision of ...services to meet the requirement of economic agents in an effective and efficient manner and thereby support, as well as, stimulate economic growth." (World Bank and IMF, 2005:4)

The financial development report (2011), published by World Economic Forum, defined financial development as:

"...the factors, policies, and institutions that leads to effective financial intermediation and markets, as well as deep and broad access to capital and financial services."

Financial development is a multidimensional process. Over the years with the invention of various new products and services, financial sector (both financial institutions and financial markets) across the globe has significantly evolved. As it is multidimensional in nature and there is no unique definition of it. As per the above definitions, finance is necessary for smooth functioning of the economic system in the country. However, financial development can be defined as an increase in the volume of financial services of banks and other financial intermediaries as well as of financial transactions of capital markets (Hussain and Chakraborthy, 2012). The process of financial development in any emerging economy would involve the developments of both financial institutions as well as financial markets (Ray and Prabu, 2013). Financial sector development concerns overcoming "costs" incurred in the financial system. It is usually defined as a process that marks improvement in the quantity, quality, and efficiency of financial intermediary's services. This process involves the interaction of many activities and institutions and possibly is associated with economic growth.

2.1.2. The Background and importance of Financial Development

Financial sector development is an engine for economic development. The role of the financial structure in economic development is not a new premise in the economics literature. More than a century ago, Schumpeter (1911) argued that financial markets play a major role in the growth process by channeling funds to the most efficient investors and by fostering entrepreneurial innovation. He developed his case in vivid language:

"The banker...is not so much primarily a middleman in the commodity 'purchasing power' as a producer of his commodity...He stands between those who wish to form new combinations and the possessors of productive means. He is essentially a phenomenon of development, though only when no central authority directs the social process. He makes possible the carrying out of new combinations, authorizes people, in the name of society as it were, to form them. He is the ephor [overseer] of the exchange economy".

FD promotes economic growth through capital accumulation and advancement of technology by boosting saving rate, delivering information about the investment, facilitating and encouraging foreign capital flows. As we know, the financial sector in earlier times was considered to play only a minor role in the process of economic growth. However, with the development of the sophisticated financial system in every nation across the globe, modern economists conclude that the development of the financial sector of an economy can be interpreted as a valuable aid towards the economic growth and may be a necessity for developing countries (Schumpeter, 1911). Since the beginning of the 1990s, the Indian economy has been undergoing economic reforms which include financial sector reforms among others. It mainly entails reforms of the financial institutions as well as financial markets. With deregulation of the interest rate, Indian banking system has become more marketoriented since 1991. After liberalization, India invited foreign investors to set up their firms and foreign bank to set up their branches in our country for expanding financial systems to the grass root level in a fair and transparent manner. There are mainly five key functions of a financial system in a country such as: (i) information production ex- ante about possible investments and capital allocation; (ii) monitoring investments in the country and exercise of corporate governance after financing; (iii) facilitation of the trading, diversification, and supervision of risk; (iv) mobilization and pooling savings; and (v) promoting the exchange of country's goods and services.

2.1.3. Measurement of Financial Development

Financial development is a multidimensional concept. An appropriate and efficient measure of financial development plays a significant role in estimating the relationship between financial development and economic growth. As it is a multidimensional concept and there is no unique variable or measure that is used to operationalize it. For suitability and availability of data, researchers use various proxy variables to capture the financial development. Previously, most of the researchers used private sector credit (PSC) provided by the banking sector as a prominent proxy variable for financial development and examine the relationship between financial development and economic growth [King and Levine (1993), Hassan et al., (2011), Inoubli (2011), Hussain and Chakraborty (2012), Al-Jarrah et al., (2012)]. Another group of researchers use liquidity liabilities/M3 as one of the key indicators of financial development, and they examine the positive and significant relationship between financial development and economic growth [King and Levine (1993), Jalil and Feridum (2011), Kabir Hassan et al., (2011)]. The stock market has been playing a tremendous role in financial sector development and contributed to the economic growth in Indian economy after 1991. Therefore, some researchers also employ proxies along with stock market as an indicator of financial development and find that financial development and economic growth are positively related to each other [Chakraborty (2010), Masoud and Hardaker (2012) and Sahoo (2013)]. However, some other studies have been using more than one indicator like pension funds, investment banks, life insurance premium as an indicator for financial depth in 13 OECD countries (Neusser, 1998). Due to different proxies, these findings do not establish an effective measurement to capture financial depth. To overcome the above deficiencies and selection of good proxy variable for financial development, we present measurement of financial development by utilizing different proxies from financial institutions and financial markets. Thus, this study employs Principal Component Analysis [Chakraborty (2010), Hussain and Chakraborty (2012), Gounder (2012), Adu et al., (2013), Nain and Kamaiah (2014), Lenka (2015)] to compute a single index based on various financial indicators for measuring financial development in India.

An essential question in the emerging economy's literature on FD is to provide a holistic measure of financial development. However, many previous studies have been using 'distance-based' approach and Principal Component Analysis (PCA) for the construction of composite index. IMF (1999) constructed financial development index with the help of distancebased approach. A more recent group of studies [Chakraborty (2010), Hussain and Chakraborty (2012), Gounder (2012), Adu et al., (2013), Nain and Kamaiah (2014), Lenka (2015), Svirydzenka (2016)] use PCA method for construction of the index. As mentioned earlier FD is a multidimensional concept which cannot be measured in a straight forward way and weights can play a significant role in the overall composite indicator. To evaluate weights in a multidimensional index, researchers use various techniques (see OECD, 2008). For our understanding, researchers mostly derive weights in two ways. One way of using statistical models like factor analysis-PCA and others from participatory methods, like analytical hierarchy process (AHP). In PCA, weights can be calculated by eigenvector and factor scores whereas in AHP weight depends on components that are more influential, depending on expert opinion and reflect on policy priorities or technical factors. AHP may add subjectivity of the experts regarding the significance of various components.

The present study relies on the statistical procedure to avoid the subjectivity i.e. PCA for FD index because no prior information for the importance of appropriate indicator in measuring of financial development is available. PCA requires that the input variables have a similar scale of measurement and therefore variables are commonly standardized to zero mean and unit variance (Baxter, 1995). This is particularly useful when the input variables are in different units. However, Jolliffe (1986) argues that if the variables are measured in same units, standardization amounts to an arbitrary choice of the measurement unit. In our case, all the variables are in percentage of GDP, so there is no need to standardize the variables. All the eight input variables we use include Private Sector Credit (PSC), Credit to Government and state-owned enterprises (CGSE), Remittance inflows (RI), Central bank deposits (CBD), Financial system deposits (FSD), Inflows of FDI (IFDI), Liquid liabilities or M3 (LL), Stock market returns (SMR) from FIs and FMs. All these variables are taken as a percentage of GDP. The study uses eight components of financial development in a single index.

2.1.4. Determinants of Financial Development

A significant number of factors contribute to the financial sector development in an economy. Many macroeconomics factors, such as inflation, investment, income, and economic growth promote it. The role of banking sector development is also sole cause of financial development (Schumpeter, 1911). Initial work on financial development emphasizes that government interventions, such as interest rate ceilings, high reserve requirements and direct credit programmes are main reason for financial development (McKinnon, 1973; Shaw, 1973). These studies conclude that ceilings on interest rates, because of high inflation rates frequently result in negative real interest rate which discourages savings and create an excess demand for the investable fund. Trade openness is another potential factor for financial development. It generates demand for new financial products, increases the size of market and demand for financial services (Svaleryd and Vlachos, 2002). Law and Demetriades (2006) establish that financial development enhances because of capital flows and trade. To support this, Beck (2007) finds that countries with a better financial system have high export share and trade than other countries. So there is a bidirectional relationship between financial markets and trade openness (Svaleryd and Vlachos, 2002). In low-income or high-income countries, (Kim et al., 2010) find that there is a positive relationship between financial development and trade openness in the long run but a negative relationship in short run. Using panel data techniques (Baltagi et al., 2007) prove that trade openness and financial openness together with economic institutions determines the financial development across countries. They conclude that countries that are least open can benefit greatly in financial development if they open either trade or capital accounts. Some studies argue that GDP per capita and trade openness are key driver for financial development, and induces economic growth in long run [Huang, (2005); Law and Demetriades, (2006); Baltagi et al.,

(2007); Sogut, (2008); Nejad, (2010); Law and Habibullah, (2009); Beyah, (2010); Ayadi and Arbak, (2013); Cherif and Dreger, (2014); Naceur et al., (2014); Takyi and Obeng, (2013)]. Many empirical studies explain that trade is positively linked with financial development whereas another factors like tariff rate, inflation, and interest rate are negatively associated with financial development [Sogut, (2008); Ayadi and Arbak, (2013); Takyi and Obeng, (2013); Cherif and Dreger, (2014); Naceur et al., (2014); Khalfaoui, (2015)]. A sound financial system is a fundamental character of an enduring economy, which needs an increase in savings and investments. Enhancement in savings and investments in an economy is a positive sign, which is positive linked with financial development [Nejad, (2010); Naceur et al., (2014)]. Urbanization (share of the urban population) also plays a positive role in enhancing financial development. Human Capital (Secondary School attainment) is positively linked with financial development (Khalfaoui, 2015). The gross capital formation (formerly as a gross domestic investment) also play an active role for financial development (Naceur et al., 2014) in the countries. Because investment will help to increase production as well as employment, which leads to increase financial sector development.

2.1.5. Theories on the relationship between finance and growth

There has been substantial literature from theoretical perspective that examine the impact of both financial development and inclusion on economic growth. Schumpeter (1911) describes the importance of innovations and credit on economic development. This theory reveals that finance spurs economic growth which is not limited to making capital formation easier within the countries but also favoring the funding of Research and Development (R&D) and innovations. The innovation process of a firm needs financial means for investment activity which comes from the existing financial systems (both from financial institutions and markets). Thus, bank credit is the prerequisite for innovation and the foundation of new enterprises. Along with bank credit, this theory gives importance to savings and considers it as a result of economic development. Thus, the banker is not a mere trader but the producer of purchasing power and plays a catalyst role in financial sector development and economic growth.

Gurley and Shaw Model (1960) argue that savings deposited in various financial institutions and intermediaries are the main cause of financial development and economic growth. They postulate three different stages of financial development through the process of economic development. In the first stage, except legal tender money (or fiat money), the economy has no financial assets. This impedes savings, capital accumulation, and efficient allocation of saving on productive investment. Secondly, a new type of financial assets arises in the economy as it develops. This inside money includes direct claims (i.e. equities and bonds) and indirect claims (i.e. liabilities issued by financial institutions). Lastly, the third stage refers to the diversification or proliferation of various types of financial claims issued by different financial institutions and non-financial institutions. Therefore, savings expands the financial markets, increases the efficiency of the market, and provides benefits to borrowers and lenders (Fry, 1997). Economic development can be achieved as there is a positive relationship between financial accumulation and economic growth. This occures because of per capita income increases which help to accumulate financial assets (that includes instance and tangible claims such as primary securities and indirect securities) leading to higher economic growth

According to Tobin (1965) savings plays multiple roles in the capital formation and economic growth. The theory assumes that increase in saving generates investment in the long-run which leads to capital formation in the economy. Moreover, both financial institutions and markets play effective role in the allocation of savings into capital

26

formation. Therefore, efficient use of capital formation establishes steady long run economic growth in the economy.

McKinnon (1973) in his model establishes the positive association between real interest rate, financial development, and economic growth. This positive relationship between financial development and economic growth is complementary hypothesis between money and capital accumulation. This hypothesis indicates that real deposit rate is a key determinant of capital formation for developing countries. As the increase in the positive real rate of interest lead to increased volume of financial savings to foster economic growth in the developing countries. On the contrary, high rate of real interest discourages investors from low returns projects, which has a negative effect on investment (see Fry, 1997; Levine, 1997). Therefore, this model assumes that there is a complementary relationship between money and physical capital formation where money is treated as only holding assets rather than the creation of credit, which is very much contrast to the traditional theories which defines that there is a substitution effect between money and physical capital (Ghatak, 1995). Further, McKinnon (1974) argues that financial markets are underdeveloped especially in developing countries and government played a very little role in capital accumulation. As, capital accumulation is restricted by the availability of funds rather than investment opportunities available to them. Thus, the real rate of interest increases through liberalization due to the real market forces increased. This has resulted in apositive impact on savings, accumulation of physical capital, which increases economic growth in the developing countries.

The new wave of the growth theories of endogenous growth model emerged in the mid 1980s, and it considered the rate of economic growth as an endogenous outcome of economic activities. This theory argues that, the long-run of economic growth is affected by education, human capital formation, technological improvement, changes in financial policies, the financial structure of financial institutions and markets. Moreover, this theory explains that financial development both directly as well as indirectly is associated with economic growth. Directly through financing on investment and indirectly by stimulating the technical innovation, it helps to foster economic growth.

2.1.6. Impact of Financial Development on Economic Growth

Empirically, there is an extensive literature that explains the relationship between financial development and economic growth. The empirical work related to the role of financial institutions and markets in development process originated with the work of Goldsmith (1969). The significant effort by (Fry 1979, 1980, 1981, 1982) compares the role of finance in the development process as an important area of research and policy analysis for researchers and policymakers systematically. Some studies argue that financial development is a fundamental element for economic growth whereas another group of studies establish that growth also drives financial development. There are several channels through which financial development promotes growth in the economy including efficient allocation of capital, mobilization of savings through the attractive investment, lowering cost of information gathering [see Levine (1991), Ranjan and Zinglas (1998), Bhatacharya and Sivasubramanian (2003), Owusu and Odhiambo (2014), Lopes and Jesus (2015), Lenka (2015)]. There is a substantial literature explaining that there is positive relationship between financial development (that covers development of banking sectors, stock market, and capital inflows) and economic growth [see Schumpeter (1911); Schumpeter (1934); Goldsmith (1969); McKinnon (1974); Gleb (1989); King and Levine (1993); Fry (1997); Christopoulos and Tsionas (2004); Chakraborty (2010); Al-Jarrah et al., (2012); Bojanic (2012); Hussain and Chakraborty (2012); Masoud and Hardaker (2012); Grounder (2012); Adu et al., (2013); Sahoo (2013); Owusu and Odhiambo (2014); Pradhan et al., (2014); Lopes and Jesus

(2015)]. These studies explain that both banking sector and stock market development plays a key factor in economic growth.

Some notable works [see Beck et al., (2000) and Levine et al., (2000)] argue that banking sector development boost economic development as a well-developed financial system helps to improve the legal and accounting standards in the banking industry that facilitate financial development and spurs economic growth. In the light of the rapid expansion of the stock market, Levine and Zervos (1998) first incorporate stock market development as a new potential source of economic growth along with banking sector development. Another study by Beck and Levine (2004), argues that both the stock market and banking sector are equally important in enhancing economic growth. The major indicator of the stock market (stock market turnover and some domestic companies) and banking sector (bank credit) are positively associated with economic growth (Bekaert et al., 2001). Especially, the countries having highly educated labor force benefit more from the opening up of the stockmarket that promote economic growth [Mauro (2000) and Minier (2003)]. Other studies explain that capital flows (inflows and outflows of FDI, Remittance inflows,etc.) are a potential source of economic growth.

Another group of empirical studies investigates that not only financial development helps economic growth but the growth of a country also drives financial development [Rabinson (1952) and Kuznets (1955)]. They argue that increase in growth leads to financial sector improvement and financial markets begin to grow as an economy approaches at the intermediate stage of the growth process and such markets further expand once the economy is completely developed.

India is currently an emerging market-oriented economy in the world, particularly after globalization. The rate of growth of the economy has improved since the 1980s due to various factors. The changes can also be

attributed to financial sector reforms among others, which have changed India immensely. Many considerable signs of progress have been made by government regarding regulations on trade barriers and rapid expansion of financial markets (i.e. stock and bond market), relaxing tax rule for foreign companies and interest rate deregulations. Much empirical evidence also finds that there is a positive and significant relationship between financial development and economic growth in India [see Ahmed and Ansari (1998); Chakraborty (2010); Hussain and Chakraborty (2012); Sahoo (2013); Kar and Mandal (2014); Lenka (2015)]. Also, there is a long-run causal relationship between financial development and economic growth (Pradhan, 2009). Studies by Demetriades and Luintel (1997), Luintel and Khan (1999), and Singh (2008) investigate a bidirectional relationship between financial development and economic growth, whereas some studies find a unidirectional relationship [see Bell and Rousseau (2001); Bhattacharya and Sivasubramanian (2003)]. The recent study by Nain and Kamaiah (2014) computed a Financial Development Index from 1990-2010 using various financial proxies using PCA method and finds that there is no causal relationship between financial development and economic growth in India. For our understanding, the result may differ in different studies due to uses of various proxies (like PSC, LL, STOCK, and IFDI) for financial development in various time periods by the availability and suitability of researchers and different investigation techniques.

From the above existing literature, we conclude that there is a positive relationship between financial development and economic growth except in the few studies. Some studies give mix result (unidirectional and bidirectional) between financial development and economic growth. Keeping in view of existing studies, this study attempts to compute composite financial index and compare with other existing proxy [private sector credit, liquid liability (M3) and stock market, etc.]. It also studies the relationship between financial development and economic growth in India from 1980-2014.

2.2. Financial Inclusion (FI)

2.2.1. The Concept

As per Rangarajan Committee (2008) report, Financial Inclusion is defined:

[...] as the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost.

Financial inclusion refers to the allocation of financial access/services in a reliable and transparent manner to all segments of the society, which were earlier financially excluded. It implies the possibility of use of financial services by enabling economic agents to make use of financial services. However, the objective of it is not only to open bank accounts in formal financial institutions but also provide affordable credit and insurance facilities. Therefore, FI refers to 'potential use' and is different from the 'actual use' of financial services. The motto is to include those who are excluded from using financial services and the involuntarily excluded is (World Bank. 2008:29). It very much essential for individual/households to manage their incomes, to exploit opportunities and to improve their economic positions. This is particularly important for low-income families/individuals who otherwise have limited selffinancing capacity. Hence, better financial access not only contributes to incomes but also reduces income inequality, which hampers economic development (Bhavani and Bhanumurthy, 2012). FI intends to connect people to banks with significant benefits as well as escape from informal sources of finance (Swamy, 2014). It looks at bringing the unbanked people into the banking fold so that they have access to institutional credit and other services offered by banks, which eventually leads to

empowerment and opportunities for economic growth with social security at the individual level. Moreover, FI also focuses attention on the need to bring previously excluded people under the umbrella of financial institutions. There is no universally accepted definition of financial inclusion. As defined by Reserve Bank India, "Financial inclusion is the process of ensuring access to appropriate financial products and services needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost in a fair and transparent manner by mainstream institutional players". In the 21st century with the progress of the Indian economy, especially when the focus is on the achievement of sustainable development, there must be an attempt to include a maximum number of participation from all the sections of the society. However, the lack of awareness and financial literacy among the rural population of the country is an obstacle in the process of smooth economic growth. The majority of the population does not have access to formal financial services. This is a solemn issue for the economic progress of a country such as India, where $2/3^{rd}$ of the populations are living in the rural areas.

2.2.2. The Background and importance of Financial Inclusion in India

Financial inclusion is crucial for reducing poverty among individuals and boosting for common prosperity and economic growth. The poor benefit greatly from basic payments, savings, and insurance services. Although the term financial inclusion is of relatively recent origin, the concept has been in trend in India for the past 47 years. Beginning with the nationalization of banks in 1969, efforts have been made to take the banking system closer to the people. To look into the financial inclusion in our country, the Reserve Bank of India (RBI) set up the Khan Commission in 2004, and the recommendations of the commission were integrated into the mid-term review of the policy in 2005-06. In the report, RBI discussed that the banks in order to (or "intending to") achieve greater financial inclusion make available a basic "no-frills" banking account to all sections of people. Like most developing countries, India has serious concerns about the inclusiveness of financial services because half of its population does not have bank accounts. Similarly, three-fourths of the population in India is devoid of any form of insurance (Shaik, 2015). Therefore, they mostly depend upon the informal credit systems to meet their urgencies. The economists and policy makers of India have been focusing on financial inclusion of Indian rural and semi-rural areas primarily for three primary pressing needs:

- (a) Creating a platform for saving money: In the countryside, most of the people are under lower income category. The stipulated income category people have been living under the constant shadow of financial constraint mainly because of the absence of savings. The lack of saving makes them vulnerable to the situation. Nowadays most attractive banking services and products aim to initiate a habit among customers to save money in the formal bank. Therefore, if people are moving to save money in the formal financial institutions and move away from traditional modes of saving, then it will boost financial inclusion and find a way for capital formation in the country.
- (b) Providing formal credit facilities: Many unbanked people in rural area have been deeply dependent on informal channels of credit like family, friends and rural moneylenders with high rate of interest. If the rural masses join in the race of formal channels of financial institutions, they will get adequate and transparent credit from formal banking systems. Moreover, it will create entrepreneurial spirit in the rural masses to increase output and prosperity in the countryside. Microfinance and rural cooperative banks are the classic examples of easy and affordable credit facility for the poor.
- (c) To reduce gaps and leaks in public subsidies and welfare programs: Government of India realized that sum of money that is

meant for the poorest of the poor does not reach them. Therefore, in the current period government is encouraging for direct cash transfers to the beneficiaries through their bank accounts rather than subsidizing products and making cash payments. This system of direct payments is expected to reduce government's subsidy bill and provide relief only to the real beneficiaries. All these require an efficient and affordable banking system that can reach out to all. Thus, there has been a push for financial inclusion.

To extend the financial inclusion in the country, both formal [Scheduled Commercial Banks (SCBs), Microfinance Institutions (MFIs), Post office banks (POSB), Insurance Companies] as well as informal institutions (Rotating Savings and Credit Associations, shopkeepers, and rural moneylenders) play a vital role (Aduda and Kalunda, 2012). In order to provide a big push towards financial inclusion in India; Government had taken major steps as Pradhan Mantri Jan Dhan Yojna (PMJDY) a national financial inclusion mission which aims to open zero balance savings accounts in August 2014 and Jan Dhan Aadhaar Mobile (JAM) articulated in the Government's Economic Survey 2014-15. It helps rural and marginalized people through direct benefits scheme (DBS) for getting LPG subsidy and MNREGA payments, which in turn help people to escape from the wrath of middlemen. Moreover, to achieve this milestone, it is important for both service providers and policy makers to have readily available information outlining gaps in access and interactive tools that help better understand the context at the district level. RBI's vision for 2020 is to open nearly 600 million new customers' accounts and provide them service through a variety of channels. However, illiteracy and lowincome savings and lack of bank branches in rural areas continue to be a roadblock to financial inclusion in many states.

2.2.3. Measurement of Financial Inclusion (FI)

The measurement of financial inclusion is not easy because there are no unique definitions of financial inclusion. Since measuring financial inclusion is perceived to be difficult, and it has been defended regarding exclusion from the financial system, it focuses on financial access by the mainstream institutional players in a fair and transparent manner. Previous researchers were mostly using the number of bank accounts, the number of bank branches as the prominent indicator for measuring of financial inclusion, and other have measured the proportion of adult population/households having a bank account for the indicator of financial inclusion (Honohan, 2008). However, these indicators ignored some important aspects of an inclusive financial system, such as quality and usage of the financial services. Studies have shown that merely having bank accounts may not imply financial inclusion if people do not use the accounts due to limitations such as remoteness, the cost of transactions, psychological barriers and so on (Diniz et al., 2011). A measure based on the proportion of adults population having a bank account effectively quantifies only one aspect of FI, financial penetration and ignores other important aspects, such as availability, affordability; quality and usage of the financial system that together form an inclusive financial system. Thus, we did not distinguish which indicator is best for capturing complete financial inclusion. To overcome this problem, some researcher has tried to make an index of financial inclusion for measuring financial access of the country, which shows the complete financial inclusion. Like, Sarma (2008a, 2010b, 2012c, and 2015d) proposed a multidimensional index of financial inclusion using banking penetration, availability of banking services and usages. Sarma (2008 a) gives equal weight to the various dimensions and depending upon the value of index of financial inclusion (FI), categorized countries as highly financially inclusive (an index above (0.6), moderately inclusive (an Index lies between (0.4) to (0.6) and least inclusive (an index of less than 0.4). Another study by Arora (2010)

examined financial access in a significant number of countries of both developed and developing. The paper constructed financial access index for banking and non-banking financial institutions separately. The dimensions cover in this study related to outreach, ease of transactions and cost of transactions. The study defined that Belgium ranks highest among all the countries regarding financial access followed by Spain and Germany.

Kumar and Mishra (2011) attempted to measure and understand financial inclusion by looking at the supply of (banking outreach indicators such as number of deposit and credit accounts, number of bank branches, average deposit and credit amount per account and credit utilized) and demand for (indicators of household level access such as the proportion of households having saving, credit and insurance facilities from formal as also informal sources) financial services. They made a separate financial inclusion using both the data sets calculated for the year 2002-03. The study concludes that there is extensive variation across states among the rural and urban regions. It also found that informal sector is providing financial services, which are significant, especially in rural areas. The study by Chakravarty and Pal (2013) defined financial inclusion through an axiomatic method in Indian states covering the period from 1972-2009. Here, the study used supply-side data on banking services employed to measure financial inclusion. It found that social banking policy played a vital role in financial inclusion across the states in India during 1977-90. Again it identified geographic penetration of banks and credit availability as two policy targets to foster financial inclusion in India. Gupte et al., (2012) explained the determinants that measure the extent of financial inclusion in India and focused on the computation of an index that comprehensively capture the multi-dimensional variables of financial inclusion. This study used a geometric mean of four critical dimensions like outreach (penetration and accessibility), usage, ease of transactions and cost of operations for the construction of financial inclusion index for India.

UNDP already used this methodology in computing the HDI in 2010. The study by Bihari (2011) proposed an index of financial inclusion using multi-dimensional approaches like financial access, availability and use of the formal financial system by all members of the economy. The proposed financial inclusion index can be used to compare levels of financial inclusion across economies at a particular period. It can also be used to monitor the progress of policy initiatives for financial inclusion over a period. The computed financial inclusion index that captured information on various dimensions of financial inclusion in one single digit between 0 to 1, where 0 denoted complete financial exclusion and 1 denoted full financial inclusion in an economy. The proposed index was very easy to compute and bring a comparison across countries.

The study by Bagil and Dutta (2012) examines the achievement of the Indian states regarding the financial inclusion using the methodology of rotated principal component analysis. The study computed a comprehensive multidimensional measure of financial inclusion for each Indian state. This study used the state wise secondary cross section data by the Government of India in Economic Survey 2010-2011, census report 2011 and data of SHGs from the status of microfinance 2009-10. For this analysis ten indicators of financial inclusion were considered like number of bank branches per lakh population (aged 7+ year), number of banks per thousand square kilometer, number of SHGs per hundred poor population, number of deposit account per hundred population (aged 7+ year), number of credit accounts per hundred population, percentage of savings to net state domestic product, percentage of credit outstanding to net domestic product, per capita domestic saving, per capita loan outstanding and credit deposit ratio. The composite indicators index indicated that the state of Goa is the best and Manipur was the worst among all Indian states.
The study by Ghosh (2013) provided a review of microfinance in developing countries and a critical assessment of its effectiveness. It examined the experience of India, which has one of the largest microfinance sectors in the world. It concluded that microfinance cannot be seen as a silver bullet for development and that profit oriented microfinance institutions are problematic. Swamy (2014) examined the significance of gender dimension in financial inclusion through microfinance in the economic enhancement of poor households in the Indian economy. The study is purely based on primary survey method that includes all the regions (southern, western, northeastern, and central regions of India) to capture the impact of financial inclusion on economic empowerment of women. Here, a beneficiary who joined the financial inclusion program either through the microfinance approach or no-frill accounts approach of banks was considered for sampling. Further, the required secondary data with regards to SHG-bank linkage program was collected from the authentic sources like; Reserve Bank of India (RBI) publications, National Bank for Agriculture and Rural Development (NABARD) publications, status reports of microfinance in India published by microfinance India, Bharat Microfinance published by Sa-Dhan, etc. This study noticed that women in general category are mostly impacted by the financial inclusion programs because of their awareness levels and access to instruments of economic progress.

2.2.4. Determinants of Financial Inclusion

The process of financial inclusion is determined by various factors including socio-economic factors of education, physical infrastructure, and banking sector. The social and economic variables like a share of the rural population, female population, literacy rate, the income of the people play a dominant role in financial inclusion. The main motto of financial inclusion drive is to include people from grass root level, especially in the small towns and remote villages. Therefore, the shares of the rural population negatively associated with FI [Clamara et al., (2014); Siddik et al., (2015); RBI, (2015)]. In comparison to males, the share of the female population is still to get formal financial services in rural India. So, female population and financial inclusion are expected to be negatively associated with each other (RBI, 2015). In every economy, literate people are an asset for making the sound economy in comparison to illiterate masses. Literacy in India 74.04% is very less as compare to developed countries with 68.0% in rural area. Nowadays spread of financial education, ICTbased banking services, and ATMs facilities are making banking services easier. However, this requires literate masses in our country. So literacy rate expected to be a positive sign with financial inclusion [Clamara et al., (2014); Siddik et al., (2015); Park and Rogelio (2015)]. The main prominent determinants of financial inclusion are income and education. As educated people have basic knowledge about banking products and services in comparison to others, therefore GDP per capita [Allen et al., (2014); Clamara et al., (2014); Fungacova and Weill (2014); Tuesta et al., (2015); Park and Rogelio (2015); Sousa (2015)] and education [Andrew et al., (2013); Pena et al., (2014); Clamara et al., (2014); Fungacova and Weill (2014); Tuesta et al., (2015)] and Age [Pena et al., (2014); Clamara et al., (2014); Tuesta et al., (2014)] play dominant and positive role in financial inclusion. The overall financial inclusion of the unbanked masses is a critical step that requires political will, bureaucratic support and persistent influence by Reserve Bank of India. It is expected to set free the untapped possible marginalized sections of Indian economy. Financial inclusion can begin the next revolution of growth and prosperity in the future.

2.2.5. Impact of Financial Inclusion on Economic Growth

Financial inclusion is distinguished from financial development because the later mostly deals with financial depth position of both financial institutions and markets whereas the former deals with access to affordable financial products and services in a transparent manner (RBI, 2015). Financial inclusion is more related to access to finance services rather than the development of the financial sector in the economy, which helps to foster the economic growth (IMF, 2016). However, it aims not to open a bank account only for the people but also provide them affordable financial services i.e. access to mode of payments and remittance facilities, savings, loans, and insurance services by the formal financial systems (Thorat, 2006). It is broadly referred to a state in which all working class people have efficient and effective access to credits, deposits, payments, transfer of funds, and insurance from formal financial institutions in a transparent manner with affordable cost (Kim, 2016).

There has been substantial literature both from theoretical and empirical perspectives that explain the positive impact of financial inclusion on economic growth. The specialized and cost effective banking sector attracts more banks to conduct business in the financial systems, which will reduce the average distance between banks and borrowers and available of credit in the economy. This, in turn, increases more investment and economic growth [see Diamond's (1984) theory of banks as delegated monitors and Salop's (1979) model of spatial competition]. On the contrary, high economic growth also increases bank's business activity and increases profits, and this will help to new as well as existing banks to give affordable credit to the people and promote financial inclusion. Similarly, there is a substantial empirical evidence that suggesting positive relationship between financial inclusion and economic growth in developing countries like India [see Mohan (2006); Swamy (2010); Dixit and Ghosh (2011); Onaolapo (2015); Sharma (2016)].

It has been observed that even 'well-developed' financial systems have not succeeded to be 'all-inclusive' and certain segments of the population are still behind the use of formal financial services due to high-income inequality (Sarma, 2015). However, financial inclusion reduces poverty and inequality by increasing the income of the poor and marginalized community and increase economic growth (Kim, 2016). Therefore, the importance of an inclusive financial system is widely recognized in the policy circle, and it is seen as a policy priority in many countries. An inclusive financial system is desirable for many reasons. Firstly, it facilitates efficient allocation of productive resources. Second, access to appropriate financial services can significantly improve the day to day management of finances. Thirdly, an all-inclusive financial system can help to reduce the growth of informal sources of credit (such as moneylenders) which often tend to be more exploitative and expensive in nature. Therefore, an all-inclusive financial system enhances the efficiency and welfare by providing avenues for secure and safe saving practices by facilitating a whole range of efficient financial services. Finally, it is an innovative concept, which makes alternative techniques to promote the banking habits of rural people. It was aimed at providing banking and financial services to all people in a fair, transparent and equitable manner at an affordable cost (Paramasivan and Ganeshkumar, 2012). Society will progress only if there is financial independence for all the stakeholders. Therefore, providing access to formal financial services is a form of empowerment of the vulnerable groups. Thus, a sustainable social development can be simultaneously achieved along with financial inclusion (Banerjee and Francis, 2014). The bank would have to involve specific strategies to expand the outreach of their products and services to each section of society to promote financial inclusion (Hameedu, 2014).

Like most of the developing countries, India has serious concerns about the inclusiveness of financial services because half of its population does not have bank accounts. Similarly, three-fourths of the population in India is devoid of any form of insurance (Shaik, 2015).

Different studies [Arora (2010); Gupte et al., (2012); CRISIL (2013); Pradhan et al., (2014); Chakravarty and Pal (2013); Sarma (2015); Lenka and Bairwa (2016)] computed a composite financial inclusion index using various financial proxy variables (like number of saving bank account, number of bank branches and number of ATMs in proportion to 1,000 adults) for measuring financial access depending upon the suitability, nature and motivation of their studies. These studies explain the positive relationship between financial inclusion and economic growth.

For the backdrops of the previous studies, the present study attempts to compute a single and composite financial inclusion index with the help of various financial access variables (like number of saving and credit bank accounts in proportion to 1,000 adults, number of bank branches in proportion to 1,000 adults, number of bank employees as a ratio of bank branches, amounts of deposits and credits as a percentage of GDP) from SCBs in India. Moreover, to capture liberalization effect we use dummy variable (LIB_Dum) in our empirical analysis.

2.2.6. Relationship between Financial Inclusion and Financial Development

Numerous academic literature has analyzed the role of both financial inclusion and financial development with economic growth separately; depending upon the nature, time and purpose of the analysis. For a long time the attention of the researchers had been focused on the relationship between financial development and economic growth, but in the recent periods, financial inclusion has sought a considerable attention of economists and policy makers. The aim and objective of both the concept (financial inclusion and financial development) are to provide affordable formal financial services to each and every section of people and make a sound financial system, which will ultimately turn to economic growth. So both financial inclusion and financial development are closely connected to each other (Allen et al., 2014). For our understandings, the present study tries to establish two complementary concepts of finance (*i.e.* financial inclusion and financial development) altogether the first time in India.

Both financial inclusion and financial development are an integral part of promoting economic growth (Chauvet and Jacolin, 2015). However, there is lack of empirical studies connecting financial inclusion and development in India. The well-fledged financial sector development of a nation does not always assure only its progress, but it spreads affordable financial services (or financial inclusion) for the betterment of each section of the society (Sarma, 2010). So the aim of the sound financial systems is to provide better financial access (*i.e.* financial inclusion) which in turns to promote economic growth (Chung et al., 2016).

Financial markets play a dominant role in providing financial services in the modern economy, particularly in processing funds from surplus units to deficits units and the flows of funds and financial services are helpful for financial development and economic growth (Rasheed et al., 2016). So, financial inclusion is a basic determinant of financial sector development whereas, in developing countries, financial development induces financial inclusion. Because developing countries may be financially developed due to various reasons but not always be financially inclusive due to high-income inequalities (Sarma, 2008). Thus, the present study considers both concepts (FD and FI) altogether as these two are like two sides of the same coin.

We conclude by saying that these two concepts are complementary, yet these represent different aspect of the process. Moreover, both these concepts are related to each other and inseparable in nature. So we have to empirically check if the FD is inclusive or not, and thereby contributing to economic growth.

2.3. Concluding Remarks

Finance is positively linked with economic growth in every economy across the globe. The theoretical and empirical literature reviewed in this chapter analyzes the impact of both financial development and financial inclusion on economic growth. The extensive literature in this chapter identifies two channels of finance (i.e. financial development and financial inclusion) and their relationship with economic growth in India. Firstly, this chapter analyses the impact of financial development on economic growth in India. The empirical result shows that the impact of financial development and economic growth is positive irrespective of countries. There are several channels through which financial development promotes growth in the economy including efficient allocation of capital, mobilization of savings through the attractive instrument, lowering cost of information gathering [see Levine (1991); Ranjan and Zinglas (1998); Bhatacharya and Sivasubramanian (2003); Owusu and Odhiambo (2014); Lopes and Jesus (2015); Lenka (2015)]. Though financial development is a multidimensional concept and there is no unique definition of it. Therefore, many researchers have used various proxy variables (like PSC, LL, STOCK, and IFDI) for financial development accordingly to the availability and suitability of their studies.

There is a substantial literature explaining that there is a positive relationship between financial development (that covers the development of banking sectors, the stock market, and capital inflows) and economic growth. Many studies explain that both banking sector and stock market development plays a key factor in economic growth, as well as other groups of studies, explains Liquid liabilities (LL) and inflows of foreign direct investment (IFDI) are responsible for economic growth in India. A few studies support unidirectional relationship between financial development and economic growth. However, another set of studies find bidirectional relationship.

Financial inclusion, as well as financial literacy, is an essential tool for financial development and economic growth. As a well developed financial systems is not always inclusive due to high-income inequality among the societies and the people (Sarma, 2008). So this chapter also explains the impact of financial inclusion on economic growth. The empirical evidence shows that financial inclusion is a positively associated with economic growth irrespective of countries. It helps to access the financial services at an affordable cost, which leads to financial stability of an economy. It may not have a positive impact in all cases. Most of the previous studies talked about the measurement of an Index of financial development but very few studies discussed about the measurement of financial inclusion index. However, many studies have used different types of proxy variables for measuring financial inclusion in India. Financial inclusion not only provides transparent and secure of money accessibility but also it gives credit and insurance facility to the people.

Keeping in view the existing volume of literature on financial development and financial inclusion, the current study seeks to understand the determinants of financial development and financial inclusion further. The study has three specific interests. First, measuring financial development and to examine the impact financial development on economic growth in India. Second, the study measures financial inclusion and its impact on economic growth. Finally, to differentiate between financial development and financial inclusion and empirically test the causality between these variables.

Chapter 3

Conceptual Framework, Data, and Econometric Issues

Using the review of existing literature, this chapter seeks to provide a critical assessment of literature both in financial development and inclusion on economic growth.

This chapter is organized as follows: Section 3.1 indicates the gaps in previous literature. Section 3.2 defines econometric specifications, variables, and data sources. Most specifically, its sub-Section 3.2.1 defines sample period of data used in this analysis, subsection 3.2.2 explores the concept of index of financial development, variables and methodology both country and state level of India. Then subsection 3.2.3 defines the determinants of financial development. Subsection 3.2.4 builds the relationship between financial development and economic growth both in the country as well as for all Indian states. Section 3.3.1 defines the concept of index of financial inclusion (FI) and its variables used. Then subsection 3.3.3 builds the relationships between financial inclusion and economic growth. Section 3.4 defines the causality between financial development and financial inclusion.

3.1. Gaps in previous Literature

From the literature survey related to the impact of financial development and inclusion on economic growth especially in India, we find that different studies use a different number of proxy variables according to nature, purpose, and availability of data. However, very few studies use the index of financial development and financial inclusion for measuring financial depth and financial access in the country using very few financial proxies from financial institutions and financial markets. Though financial institutions (consists of both banking and non-banking sectors) play a major role in financial sector development but most of the studies uses only banking sector variables and ignores the others. Similarly, in the case of financial inclusion index, most of the previous literature ignores the prominent financial access variables i.e. number of bank employees as a proportion of scheduled commercial bank branches, which facilitates the financial products and services to the customers. Thus, there is a lack of information in the existing financial development and financial inclusion index, especially in India. Most of the studies intermixed the various financial proxies for the construction of both financial development and financial inclusion index. Finally, we get from the literature that the country may be financially developed but not always financially inclusive due to high-income inequality especially in developing countries like India. However, we did not find any study that has been empirically investigated the linkages between financial development and financial inclusion in India.

Considering the existing literature and its gaps, this study has three main objectives to extend the analysis. Firstly, the study measures the financial development index using various financial proxy variables from financial intuitions (which consist of both banking and non-banking institutions) and financial markets and international capital flows (i.e. FDI and inflows of remittance) and estimates the impact of financial development on economic growth in India. Secondly, the study measure the financial inclusion index including all financial access variables and empirically estimates the impact of financial inclusion on economic growth. Thirdly, this study establishes the relationship between financial development and financial inclusion with a set of possible determinants, which is the first time in India. Moreover, this study first time empirically estimates all three objectives both in aggregates as well as for states of India.

3.2. Econometric Specifications, Variables, and Data Sources3.2.1. Sample

This study defines Indian time series data from 1980 to 2014 at country level and from 2000 to 2014 for all Indian states. The variation in data is due to limitation in data availability that is explained later in detail.

3.2.2. Financial Development Index (FD)

Framework, Variables and Data Sources

Financial Development is a multidimensional concept, and its measurement is thorny for the researchers. Previously, researchers have used various types of proxy variables for Financial Development. We have calculated a Financial Development Index (FD) to analyze the level of financial depth in India. FD is calculated by eight financial proxy variables like (i) Private Sector Credit as a percentage of GDP (PSC), (ii) Credit to Govt. and State-owned Enterprises as a share of GDP (CGSE), (iii) Central Bank Assets as a share of GDP (CBA), (iv) Provident fund as a share of GDP (PF), (v) Remittance Inflows as a share of GDP (RI), (vi) Inflows of FDI as a share of GDP (IFDI), (vii) Liquid Liabilities (M3) as a share of GDP (LL), and (viii) Stock market returns (%, year on year) (SMR) from various financial institutions and financial markets using Principal Component Analysis (PCA) method. This variables extend the exsting literature by introduction of CGSE and PF variable. This variable capture credit to Government and State-owned enterprises and PF capture the non banking financial institutions variable and in therefore both are very important for the composite financial development index.

Similary, for construction of financial development index of all Indian states we have used three prominent variables associated with financial depth namely, (I) Amount of Banking and Insurance as a percentage of SDP (B&I), (II) Net Provident Fund as a percentage SDP (PF), and (III) Remittance inflows as a percentage of SDP (RI) using PCA method. We are not using all the variables we used for construction of aggregate financial development, as the data for all those variables is not available for all states.

PCA involves the linear transformations of correlated variables to pairwise uncorrelated variables. Mathematically PCA defined as an orthogonal linear transformation that transforms the data to a new coordinate system such that the greatest variance by some projection of the data comes to exist on the first coordinate (called the PCs), the second greatest variance on the second coordinate and so on. Each component of eigenvalue represents how much variance it explains. The method is well known to be scale dependent. The goal of the PCA is to summarize the correlation among the set of observed variables with a smaller set of linear combinations, as it tries to capture the total variance in a set of variables. PCA requires that the input variables that have similar scale of measurement and variables are commonly standardized to zero mean and unit variance. This is particularly useful when the input variables are in different units, and if the variables are measured in the same units, however, standardization arguably amounts to an arbitrary choice of measurement unit (Jolliffe, 1986). Another choice that needs to be made in practice is whether or not to transform variables before a PCA; for example, data measured on a ratio scale format might be logarithmically transformed (Arnold and Collins, 1993). After datails transformed, it may or may not be subsequently standardized.

According to PCA procedure, the FD_i can be expressed as:

$$FD_t = W_1 PSC_t + W_2 CGSE_t + W_3 CBA_t + W_4 PF_t + W_5 LL_t + W_6 SMR_t + W_7 RI_t + W_8 IFDI_t$$
(3a)

where FD_i is the index of financial development of the ith year, W_1 , W_2 W_8 are the respective weights (factor scores) of different factors.

The explanation of components of FD follows:

Private Sector Credit as a percentage of GDP (PSC): It is a primary indicator of financial sector development. This is equal to the value of credits by financial intermediaries to the private sector divided by GDP. This measure includes the credit issued to the private sector by all the financial institutions in addition to the traditional depository money banks. This measure isolates credit issued to the private sector as opposed to credit issued to the government and public enterprises and concentrates on credit issued by intermediaries other than the central bank. PSC gives the degree of financial intermediation and measures the financial resources provided to the private sector through for example, loans, purchases of nonequity securities, and trade credits.

Credit to Govt. and State-owned Enterprises as a percentage of GDP (CGSE): Credit to Govt. and State-owned enterprises as a ratio of GDP is defined as a major proxy for measuring financial development. CGSE includes ratio between credit by domestic money banks to the government and state-owned enterprises and GDP.

Central Bank Assets as a percentage of GDP (CBA): This is another proxy variable for financial development in the country. It includes the ratio of Central Bank assets to GDP. Central bank assets are claims on a domestic real nonfinancial sector by the Central Bank (RBI).

Provident Fund as a percentage of GDP (PF): In order to capture the nonbanking financial institutions aspect that plays an essential role in financial sector development we have included provident fund as a percentage of GDP. Non-Banking financial institutions play an essential role in financial sector development. It includes provident fund, pension funds, saving institutions, and insurance companies, etc. PF is one of the major indicators from non-banking financial intermediaries, which helps in the financial development of the country. However, the provident fund and pension funds are a group of financial intermediaries intended to provide members and their families with a measure of social security and welfare. Adding to it, PF is a direct source of saving for salaries people, which is helpful for financial sector development in the long run.

Remittance Inflows as a percentage of GDP (RI): Remittance inflows play a dominant role in financial development. A remittance is a transfer of money by a foreign worker to an individual of his or her home country. Money sent home by migrants complete with international aid are part of the largest financial inflows to developing countries like India. Here, workers' remittances and compensation of employees comprise current transfers by migrant workers and wages and salaries earned by nonresident workers.

Inflows of FDI as a percentage of GDP (IFDI): Foreign Direct Investment inflows as a share of GDP investing from rest of the world is a strong indicator for the financial development of the country. Inflows of FDI are the net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.

Liquid Liabilities (M3) as a percentage of GDP (LL): Liquid liabilities or M3 is another traditional measure of financial development. LL includes liabilities of the financial system and is currency plus demand and interest-bearing liabilities of financial intermediaries and non-banking financial intermediaries as a percentage of GDP. This is the broadest available indicator of financial intermediation since it includes all three financial actors (central bank, commercial bank, and other financial institutions). It is one of the standard measure of financial depth and thus of the overall size of financial sector without distinguishing between the financial sectors or between the use of liabilities. It indicates the degree of monetization on the real economy.

Stock market returns (%, year on year) (SMR): Stock market plays a major role in financial development. So, the stock market can also be considered as one proxy for financial development. We have used the growth rate of an annual average of the stockmarket index. The annual average stock market index is constructed by taking the average of the daily stock market index available at Bloomberg.

Data for PSC, RI, and IFDIare collected from WDI (2015). CBA, CGSE, and LL are collected from International Financial Statistics, IMF (International Monetary Fund). Again, data for PF is also collected from EPWRF (2015). All the data are collected for India over the sample period from 1980-2014 whereas from 2000-2014 for all Indian states. We considered period from 2000 onwards in our state level analysis because three more states created as Jharkhand, Chhattisgarh, and Uttarakhand and reconstituting Bihar, Madhya Pradesh, Uttar Pradesh respectively. Adding to this, there are major policies towards inclusive finance for the country.

3.2.3. Determinants of Financial Development

Framework, Variables, and Data Sources

We have used different macro variables which include both socioeconomic and infrastructure variables as determinants of financial development. GDP per capita and trade openness have positive impact on financial development [Huang (2005); Law and Demetriades (2006); Baltagi et al., (2007); Sogut (2008); Nejad (2008); Law and Habibullah (2009); Beyah (2010); Ayadi and Arbak (2013); Cherif and Dreger (2014); Naceur et al., (2014)]. Tariff rate, inflation, and interest rate are negatively associated with financial development [Sogut (2008); Ayadi and Arbak (2013); Takyi and Obeng (2013); Cherif and Dreger (2014); Naceur et al., (2014); Khalfaoui (2015)]. Savings is positively associated with financial development [Nejad (2008); Naceur et al., (2014)]. Urbanization (share of the urban population) also plays a positive role in enhancing financial development. Human capital (Secondary School attainment) is positively linked with financial development (Khalfaoui, 2015). Lastly, gross capital formation (formerly as a gross domestic investment) also plays a positive role in financial development (Naceur et al., 2014). The final empirical specification is as follows:

$$FD_t = f(GDPPC_t, TO_t, INF_t, HUM_t, URB_t)$$
(I)

Where FD represents Index of Financial Development, GDPPC stands for GDP per capita; TO is Trade openness, INF is inflation as a percentage of GDP, HUM is human capital. Here secondary school attainment was used for human capital and URB is urban population as a percentage of total population. The detailed explanation of explanatory variables is as follows:

Real GDP per capita (GDPPC): RGDPP is expected to be positively linked with financial Development (FD) because the volume and the sophistication of financial activities demanded are greater in richer countries and the richer economies can better exploit its economies of scale through the provision of financial services.

Trade openness (TO): TO is an important determinant of financial development. It is calculated as the total export and import divided by the GDP of the country. Due to globalization, India is liberalizing their trade practices and that is expected to have a positive impact on financial development.

Inflation (INF): Inflation is a situation of the economy where price level increases and the value of money decreases. World Bank (2011) defined it as "a sustained increase in the general price level of the price of goods and services. It is measured as a percentage change in the cost to the average consumer for acquiring a fixed basket of goods and services at specified intervals, such as yearly, monthly, daily,etc". Inflation is expected to be negatively linked to financial development. We use inflation measured by consumer Price Index (CPI).

Human Capital (HUM): Secondary School Enrolment (SSE) is a proxy for the quality of human capital. SSE play a crucial role in financial development as a well-educated population is necessary for the wellfunctioning of the financial system.

Urbanization (URB): Urbanization plays a dominant role in the financial development and economic growth in the country. Urbanization refers to people living in the urban areas as defined by National statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations' World Urbanization Prospects. It is expected to be positively linked with financial development.

All Marco-level Data like GDPPC, TO, INF, HUM, and URB are collected from WDI (2015) sample period from 1980-2014.

3.2.4. Financial Development and Economic Growth

Framework, Variables and Data Sources

Voluminous literature that has attempted to identify the FD as the main drivers of economic growth has documented a positive relationship between financial development and economic growth [Schumpeter (1911); Goldsmith (1969); McKinnon (1973); Gleb (1989); King and Levine (1993); Fry (1997); Chakraborty (2010); Al-Jarrah et al., (2012); Bojanic (2012); Hussain and Chakraborty (2012); Masoud and Hardker (2012); Grounder (2012), Adu et al., (2013); Sahoo (2013); Lopes and Jesus (2015)]. Much empirical literature [Glodsmith (1969); McKinnon (1973); Jalil and Feridun (2011); Hussain and Chakraborty (2012)] deals with the casual relationship that runs from FD to economic growth. Some studies [Diamond and Dybvig (1983); Schumpeter (1991); Smith 1991)] suggest that both financial institutions and financial market play a major role in promoting economic growth. The unique study by Nain and Kamaiah (2014) suggests that there is no causal relationship FD and economic growth. Empirical literature concludes that earlier researchers used a

different proxy variable (like broader money (M2) to nominal GDP, private sector credit to GDP, Liquid Liability to GDP, stock market capitalization and the stock traded) for measuring financial depth. Our study uses a single financial development Index based on various financial proxies from financial institutions and financial markets.

The objective of this study is to examine whether the financial development promotes economic growth in India from 1980 to 2014. There has been an affluent body of empirical work that tests the relationship between financial development and economic growth. Using Cobb-Douglas production function Mankiw, Romer and Weil (1992) focus on labor, capital and human capital on the basic ingredient of economic growth with many controls, as an extension of Solow model (1965). Taking a view of Mankiw, Romer and Weil (MRW), this study introduces financial variables (i.e. financial development) as a shift variable into the production function. Based on literature survey, this study uses various financial proxies (PSC, LL, and STOCK) along with FD Index. The empirical model can be displayed as:

$$Y_t = \beta_0 + \beta_1 F D_t + \beta_2 X_t^* + \mu_t \tag{II}$$

Where Y is the real GDP per capita (a proxy for economic growth), FD is the Index of financial development. *X**denotes a vector of control variables based on literature *i.e.* INF-inflation, TRADE-trade openness (exports and imports as a percentage of GDP), HUM-human capital (indicated by secondary school enrollment), GOV- Govt. expenditure. In India, new economic policy improved financial institutions (FIs) and financial markets (FMs). In order to capture this liberalization effect, we introduce a liberalization dummy (LIB_Dum) variable into the models. Considering the influence of above specific control variables, the new financial MRW production can be turned as follows:

$$Y_t = \beta_0 + \beta_1 F D_t + \beta_2 X_t^* + \alpha_1 L I B_D u m_t + \mu_t$$
(III)

Before going to estimate, we have used (Augmented Dickey-Fuller) ADF and PP (Philips-Perron) test to know if the series is stationary or not. However, the result of both tests shows that some variables are stationary in level form I(0) and some are in I(1). This study employs ARDL method, introduced by Pesaran et al., (2001) as it can be applied irrespective of whether the underlying variables are I(0), I(1) or combinations of both (Pesaran and Pesaran, 1997). Besides, ARDL model takes sufficient lags to capture the data generation process in general to specific modeling framework (Laurenceson and Chai, 2003). Also, the Error correction model (ECM) can be derived from ARDL through simple linear transformation (Benerjee et al., 1993). ECM investigates short run adjustments with long run equilibrium without losing long run information (Pesaran and Shin, 1999). Moreover, small sample properties of ARDL approach are more superior to that the Johansen's cointegration technique (Pesaran and Shin, 1999). The ARDL approach to cointegration involves the estimation of the following model:

$$\Delta Y_{t} = \beta_{0} + \sum_{i=1}^{p} \psi_{i} \, \Delta Y_{t-i} + \sum_{i=1}^{p} \phi_{i} \, \Delta FD_{t-i} + \sum_{i=1}^{p} \varpi_{i} \, \Delta X_{t-i}^{*}$$
$$+ \sum_{i=1}^{p} \gamma_{i} \, \Delta LIB_{-}Dum_{t-i} + \theta_{1}Y_{t-1} + \theta_{2}FD_{t-1} + \theta_{3}X_{t-1}^{*}$$
$$+ \theta_{4}LIB_{-}Dum_{t-1} + \mu_{t}$$
(IV)

Where β is the drift component, Δ is the first difference operator, μ_t is an error term (white noise) assumed to be independently and identically distributed (iid) and the other variables are as explained earlier. The beginning of ARDL bound test approach is to test for a long run relationship among variables using F-test (Pesaran et al., 2001). In this ARDL framework, the null hypothesis of long run relationship between variables is H₀: $\theta_1=\theta_2=\theta_3=\theta_4=0$. This shows the non-existance of the relationship between variables in long-run. On the other hand, the

alternative hypothesis shows the existance of long-run relationship (cointegration) between financial developemnt and economic growth, irrespective of whether the regressors are I(0) or I(1). After that, (Pesaran et al., 2001) provide lowerbound and upperbound ctitical value for F-test. The lowerbound are the variables that are I(0), while the upper bound critical values assume variables to be $I(1)^2$. If F-statistics value exceeds the upper critical value, then the null hypothesis of no intergration is rejected, otherwise we accept null³. In this ARDL model, the selection criteria for the optimal lags can be obtained by Akaike Information Criterian (AIC) and Schwarz Bayesian Criterian (SBC).

After the variables are co-integrated for establishing a long-run relationship, the causality can be evaluated by Error Correction Model (ECM). ECM can be derived from ARDL model where ECT (Error Correction Term) investigates the short-run relationship of variables without losing any long-run information. The ECM model in our paper is as follows:

$$\Delta Y_{t} = \beta_{0} + \sum_{i=1}^{p} \psi_{i} \Delta Y_{t-i} + \sum_{i=1}^{p} \phi_{i} \Delta F D_{t-i} + \sum_{i=1}^{p} \varpi_{i} \Delta X_{t-i}^{*} + \sum_{i=1}^{p} \gamma_{i} \Delta LIB_D u m_{t-1} + \alpha E C T_{t-1} + \mu_{t}$$
(V)

Here ECT indicates the speed of adjustment back to long run equilibrium after a long run shock. The statistical significance of F-stat using Waldtest gives the result of the short run causality.

²Pesaran*et al.* (2001) defined that in bound testing approach the critical values (upper bound and lower bound) are very sensitive to the number of regressors (n) present in the model. And critical values of the F-test depend on the sample used in the model (Narayan and Narayan, 2005).

³ Another way of establishing co-integration is by testing the error correction term which was significant negative and significant in nature (Kremers et al, 1992 and Bahmani, 2001).

Using panel data set, to analyze impact of financial development on economic growth in all states of India, we rely on the fully modified OLS (FMOLS) method. This method proposed by Phillips and Hansen (1990) and it takes care of simultaneous bias and the problem of non-stationary repressors⁴. As noted by Christopoulos and Tsionas (2004), OLS give us biased result when the regressors are non-stationary in nature. The FMOLS gives optimal estimates of cointegrating regressions, whereas as the link between non-stationary series lead to endogenity in the regressor that cannot be simply eradicated by using vector auto regression (VAR) as if they were purely reduced form (Acharya et al., 2009). Hence, this nonparametric technique predominantly transforms the residuals for the cointegration regression and avoids serial correlation. Moreover, this method avoids the problem of endogenity of the regressors and serial correlation in the error term and gives robust results (Bhanumuthy and Singh, 2013). Due to unavailability of controls variables (which were uses in our macro level study) particularly for all Indian states, we use State Domestic Product (SDP) for economic growth and FD index for financial development. The FMOLS approach to cointegration involves the estimation of the following model:

$$Y_{i,t} = \alpha_{i,t} + \beta_1 F D_{i,t} + \mu_{i,t} \tag{VI}$$

where *i* stand for cross-section dimension and *t* denotes time dimension. $Y_{i,t}$ denotes the measure of economic growth (uses proxy as SDP) and $FD_{i,t}$ is the state financial development index calculated by PCA method over the 2000-2014 period of time.

⁴ When data are in facing non stationarity and simultaneouslybias, both FMOLS and DOLS method are suitable for giving reliable and robust result with endogeneity effect (Pedroni, 2001) and for methodological details [see, Stock and Watson(1993); Kao and Chiang (2000) and Sul (2003)].

3.2.5. Financial Inclusion Index (FI)

Framework, Variables and Data Sources

We have calculated a financial inclusion index (FI) to analyze the level of financial access in the economy. Like FD, financial inclusion index (FI) is calculated by employing various financial access related variables like: (i) Number of Bank Accounts (Deposit) in proportion to 1,000 populations (DBA), (ii)Number of Credit bank accounts in proportion to 1,000 populations (CBA) (iii) Number of Bank branches in proportion to 1,000 populations (BB), (iv) Number of Bank employees as ratio of Bank branches (BE), (v) Amounts of Deposits as a % GDP (DEP) and, (vi) Amounts of Credits as a % GDP (CRE) from scheduled commercial banks (SCBs) from 1980 to 2014. Similarly using all the above variables for all Indian states from 2000-2014. For an index of FI at both macro and state level, we use Principal Component Analysis (PCA) method.

According to PCA procedure, the FIt can be expressed as:

$$FI_{t} = W_{1}SBA_{t} + W_{2}CBA_{t} + W_{3}BB_{t} + W_{4}BE_{t} + W_{5}DEP_{t} + W_{6}CRE_{t}$$
(3b)

Where FI_t is the index of financial inclusion of tth year and W1, W2.....W6 are the respective weights (factor scores) of different factors. The detail explanation of components of Index of FI is as follows:

Number of Deposit bank accounts per 1,000 adults (DBA): Number of deposit bank accounts (of SCBs) as a share of 1,000 adults' populations is commonly used as an indicator for banking penetration (Sarma, 2008). To achieve a fully inclusive financial system, it should have many users possibly from each section of the society. Therefore, increase in banked people (people having a formal bank account) is very much essential for financial inclusion.

Number of Credit bank accounts per 1,000 adults (CBA): Like other factors, the credit facility is also one of the most important elements in the measurement of financial inclusion. A number of credit bank accounts to 1,000 adults' population (CBA) is shown the banking penetration regarding loans.

Number of Bank Branches per 1,000 adults (BB): This reflects the outreach of financial services, such as bank branches, the number of bank offices, and ATMs, agents and POS (point of scale) devices in remote areas and villages helps a lot to increase the accessibility of banking services. Moreover, increase in the number of bank branches in rural and remote areas as well as urban areas are very much helpful for financial inclusion. Availability of banking services can be merely indicated by a number of bank outlets (per 1000 population), or by the number of ATMs outlets (per 1000 population), or internet users, or mobile banking user, etc. In the absence of large-scale time series data on the number of ATMs, a number of internet users and number of bank branches in proportion to 1,000 populations to measure the availability of banking penetration, which is the major ingredient of financial inclusion index.

Some Bank employees as a ratio of bank branches (BE): Number of bank employee (BE) as a proportion of bank branches are very important component for financial inclusion. The BE is the ratio of a number of Bank employees to the number of Bank branches which shows the facility/accessibility of bank services provided to the customer in the bank offices. This indicator shows the healthy conditions of banks regarding providing customer satisfaction.

Amounts of Deposits (DEP): Apart from banking penetration and availability of financial services of scheduled commercial banks (SCBs), banking usage penetration is very much essential for financial inclusion. Because merely having a bank account is not enough for an inclusive

financial system, if it is not properly used (Sarma, 2010). Hence, the amount of deposit as a proportion of GDP is a basic indicator for working account, which is very much essential for financial inclusion. However, in case of state level analysis, we have used amount of deposit as a proportion of SDP.

Amounts of Credits (CRE): Like Deposits is an indicator for banking usage penetration, amounts of credit in proportions to GDP is also important for it. People depend more on SCBs for various credit requirements. Thus, amount of credit in proportions to GDP is a vital indicator for financial inclusion index. Whereas, amount of credit in proportions to SDP in state level analysis.

The entire macro level time series as well as state-level data are collected from Basic Statistical Returns, Reserve Bank of India. Moreover, total adult population (ages 15-64) is collected from WDI (2015), World Bank. All data are collected for India over the sample period from 1980-2014 for macro level and all-Indian state from 2000-2014.

3.2.6. Determinants of Financial Inclusion

The present study considers socio-economic factors related to physical infrastructure, and banking variables as determinants of FI. The socioeconomic variables like a share of the rural population [Clamara et al., (2014); Siddik et al., (2015); RBI (2015)] negatively related with financial inclusion. However, GDP per capita [Allen et al., (2014); Clamara et al., (2014); Fungacova and Weill (2014); Tuesta et al., (2015); Park and Rogelio (2015); Sousa (2015)], Literacy [Clamara et al., (2014); Siddik et al., (2015); Park and Rogelio (2015)], and education [Andrew et al., (2013); Pena et al., (2014); Clamara et al., (2014); Tuesta et al., (2014); Clamara et al., (2014); Tuesta et al., (2014)], Age [Pena et al., (2014); Clamara et al., (2014); Tuesta et al., (2014)] play a positive role in financial inclusion. The functional form of financial inclusion is as follows

$$FI_t = f(GDPPC_t, RPOP_t, AGE_t, LCY_t)$$
(VII)

The detail explanation of explanatory variables is as follows:

Real GDP per capita (GDPPC): RGDPP is expected to be positively linked with FI, because the volume and the sophistication of financial activities demanded are greater in richer countries to better exploit the economies of scale in the provision of financial services.

Rural Population (RPOP): RPOP stands for a share of the rural population in total population. The rural population is a crucial determinant of financial inclusion. The mission of financial inclusion drive is to include all the people into aformal node of the financial system. Moreover, we know that most of the rural masses are still excluded from the formal banking systems [Clamara et al., (2014); Siddik et al., (2015); RBI (2015)]. It is expected to be negatively linked with financial inclusion.

Age: Variables such as age plays a major role in financial inclusion. Financial service providers usually target the middle age group and economically active population, often overlooking the design of appropriate financial products for older or younger potential customers [Pena et al., (2014); Clamara et al., (2014); Tuesta et al., (2014)]. Here we take adult population which is [ages 15-64 (% of total)] expected to be positively related with financial inclusion.

Literacy (LCY): LCY stands for literacy, and it is an essential ingredient for financial inclusion drive. Literate people can understand easily about the services and financial product provided by the financial institutions. So literate people are very much essential for spreading financial inclusion drive [Clamara et al., (2014); Siddik et al., (2015); Park and Rogelio (2015)]. So it is expected to be positively linked with financial inclusion.

The above variables like GDPPC, RPOP, AGE and LCY are collected from WDI (2015) database. Data are collected for India in states over the sample period from 1980-2014.

3.2.7. Financial Inclusion and Economic Growth

As discussed earlier, FI could impact economic growth and remove inequality; there is a need for clarity on how financial inclusion is linked with economic growth and reduction of inequality for formulating effective public policies for maximizing social welfare (Wong, 2015). Inclusive finance that extends the availability and uses of a formal financial system to all members in an economy especially vulnerable and financially excluded group at an affordable cost will ultimately influence economic activities. Moreover, FI serves as a catalyst for economic development.

The target of the present study is to estimate the relationship between financial inclusion and economic growth in India from1980 to 2014. Solow (1956) proposed that the study of economic growth using neoclassical production function with increasing returns to capital while taking the rate of savings and population growth as exogenous variables. However, Solow (1956) pointed that both variables generate the steadystate level of income per capita because they vary across countries. Using Cobb-Douglas production function Mankiw, Romer and Weil (1992) focus on labor, capital and human capital as the basic ingredient of economic growth with many controls, as an extension of Solow model (1965). We based our model on Mankiw, Romer and Weil (MRW), as our study attempts to empirically verify the impact of financial inclusion index on economic growth. It is introduced as a shift variable into the production function with other controls. The empirical model can be displayed as:

$$Y_t = \beta_0 + \beta_1 F I_t + \beta_2 X_t^* + \mu_t \tag{VIII}$$

Where Y is the real GDP per capita (a proxy for economic growth), FI is the Index of financial inclusion. *X**denotes a vector of control variables based on literature review of INF-inflation, TRADE-trade openness (exports and imports as a percentage of GDP), HUM-human capital (indicated by secondary school enrollment), GEXP- Govt. expenditure. As we know, liberalization period in the Indian economy was called a new age of financial institutions and financial markets as it drastically changed banking and financial sector after 1991. To capture this liberalization effect, we introduce a liberalization dummy (LIB_Dum) variable into the models. Considering the influence of above specific control variables, the new financial MRW production can be turned as follows:

$$Y_t = \beta_0 + \beta_1 F I_t + \beta_2 X_t^* + \alpha_1 L I B_D u m_t + \mu_t$$
(IX)

Where LIB_Dum is the dummy variable used for capture structural break (liberalization) and μ_t is an error term.

Similarly, to analyze the impact of financial inclusion on economic growth in all states of India, we rely on the fully modified OLS (FMOLS) method. This method which is proposed by Phillips and Hansen (1990) takes care of simultaneous bias and the problem of non-stationary repressors⁵. As noted by Christopoulos and Tsionas (2004), OLS give us biased result when the regressors are non-stationary in nature. The FMOLS gives optimal estimates of cointegrating regressions, whereas as the link between non-stationary series lead to endogeneity in the regressor that cannot be simply eradicated by using vector regression (VAR) as if they were purely reduced form (Acharya et al., 2009). Hence, this nonparametric technique predominantly transforms the residuals from the co-

⁵ When data are in facing non stationarity and simultaneously bias, both FMOLS and DOLS method are suitable for giving reliable and robust result with endogeneity effect (Pedroni, 2001) and for methodological details [see, Stock and Watson (1993); Kao and Chiang (2000) and Sul (2003)].

integration regression and avoids serial correlation. Moreover, this method avoids the problem of endogeneity of the regressors and serial correlation in the error term and gives robust results (Bhanumuthy and Singh, 2013). Due to unavailability of controls variables (which were uses in our macro level study) particularly for all Indian states, we use State Domestic Product (SDP) for economic growth and FI index for financial inclusion. The FMOLS approach to cointegration involves the estimation of the following model:

$$Y_{i,t} = \alpha_{i,t} + \beta_1 F I_{i,t} + \mu_{i,t} \tag{X}$$

Where i stand for cross-section dimension and t denotes time dimension. $Y_{i,t}$ denotes the measure of economic growth (uses proxy as SDP) and $FI_{i,t}$ is the state financial inclusion index calculated by PCA method over the 2000-2014 period of time.

3.2.8. Causality between Financial Development and Financial Inclusion

In the journey of a literature survey, we did not find any study that has been empirically investigated the causality between financial development and inclusion in India. So there are many difficulties and challenges that need to overcome to set the stage for this analysis. However, the measurement of financial inclusion and financial development are multidimensional in nature. Here we used Principal Component Analysis (PCA) method for making the financial inclusion and financial development Index.

Finance not only influences the efficiency of resources allocation throughout the economy but also the comparative economic opportunities of individuals from relatively rich or poor household. We propose to establish the relationship financial inclusion and financial development with a set of possible determinants that are robustly associated. Therefore, this study brings these two kinds of literature (financial inclusion and financial development) together and intends to contribute comprehensive idea on the interaction between financial development and inclusion to the existing research. The problem cannot be dealt with simple OLS method because of endogenous shocks both from independent as well as from dependent variables in the models. For this analysis, we consider simultaneous equations systems to allow for the interaction between these concepts with its possible determinants. To deal with endogenous variables, our study relies on the approach of three-stage least squares (3SLS) regression instead of instrumental variables techniques to examine the interrelationships because of no acceptable instruments can be justified in our knowledge. So this method is justified and appropriate in solving simultaneous equations model when there are no perfect instruments available. Moreover, it is suitable and efficient over 2SLS because it captures all information all together in whole systems of equations.

Particularly, this 3SLS approach allows us to examine the effect of financial inclusion on financial development and financial development on financial inclusion while controlling the possible reverse effect possible interlinked variables. Moreover, this simultaneous equations model (SEM) can give information on how financial inclusion affects financial development and vice-versa. This interrelationship between variables financial development (FD) and financial inclusion (FI) of structural form can be displayed as follows:

$$FD_{t} = \beta_{0} + \beta_{2}Y_{t} + \beta_{3}HUM_{t} + \beta_{4}TRADE_{t} + \beta_{5}INF_{t} + \beta_{6}URB_{t} + \varepsilon_{1}$$
(XI)

$$FI_{t} = \beta_{0} + \beta_{1}FD_{t} + \beta_{2}Y_{t} + \beta_{3}RPOP_{t} + \beta_{4}AGE_{t} + \beta_{5}LCY_{t} + \varepsilon_{2}$$
(XII)

Where, FD and FI are the index of financial development and financial inclusion respectively constructed by PCA method. Y is the real GDP per capita, HUM is human capital (indicated by secondary school attainment), TRADE denotes trade openness (exports and imports as a percentage of GDP), INF is inflation, and URB stands for urbanization (indicated by share of the urban population) in equation (XI).

Similarly, in Equation (XII) other variables are RPOP the rural population, AGE denotes working age of populations (between15-64), and LCY is literacy rate (indicated by adult literacy rate of both sexes). Considering the influence of above specific control variables (Ctrl), the system of equations can be rewritten as:

$$FI_t = \beta_0 + \beta_1 FD_t + \beta_2 Ctrl_t^* + \varepsilon_1 \tag{XIII}$$

$$FD_t = \beta_0 + \beta_1 Y_t + \beta_2 Ctrl_t^* + \varepsilon_2 \tag{XIV}$$

If we assume that this is the whole system between financial inclusion and financial development with other controls, then financial inclusion and financial development will be endogenous variables with other controls (Ctrl) are exogenous variables related to this system. Moreover, this whole system cannot be estimated separately by OLS regression method because of endogeneity issues. So we estimate this issue through systems of equations altogether by endogeneity covariates method (2SLS or 3SLS) to find out the linkages between two variables.

For empirical causality estimates between the financial inclusion and financial development with possible determinates, we use Indian annual time series data for the period of 1980-2014. Most of the financial inclusion data (number of Bank Accounts, the number of Bank Branches, Amounts of Deposits and Credits, the number of employees in SCBs)

were collected from Basic Statistical Returns (BSR), Reserve Bank of India. Again, data for financial development (Private sector credit, Credit to Government and state-owned enterprises, remittance inflows, inflows of FDI, Central bank assets, Financial Systems deposits and liquid liabilities or M3) are collected from World Development Indicators (WDI), and Stock market returns data collected from Bloomberg database. The detailed information of data sources can be display in appendix table.

Similarly, to estimates the causality financial inclusion and financial development in all states of India, we use panel Ganger causality method between 2000-14.

3.3. Econometric Issues

In the analysis of financial development and financial inclusion on economic growth India, we faced some econometric issues related to time series as well as panel data that have a tendency to render the empirical estimation biased. These problems come from the nature of dataset used in the study, omission of important variables from the econometric model, serial correlation, and simultaneity bias problem, which creates serious doubts about the accuracy and consistency of the coefficient estimates. So there is need to apply remedial measures for taking care of this problem and give robust estimates. The followings econometric issues that we face in the estimations process:

3.3.1. Time-series and Panel Data Modeling

All the frameworks related to three objectives uses Indian times series data for the period of 1980-2014 and 28 states for the period of 2000-2014. The time series is a sequence of datathat are taken over a period whereas, panel data (consist of 28 Indian states) refers to pooling observations on cross sections over the period. However, the prime objectives we get from the panel data are to increase the number of observations used in the empirical estimations.

3.3.2. Unit Root Test for Time-series and Panel Data

Series use for time series as well as panel data regressions includes the impact of financial development and financial inclusion on economic growth in our study is non-stationary in nature. As we already know from the econometric literature that, the regression having unit root in data produces the spurious results (Granger and Newbold, 1974). So before going to regress between independent and dependent variables, we perform unit root test. For time series data, we use popular unit root test (i.e. ADF and PP) whereas, for panel data Im, Pesaran and Shin (IPS) panel unit root test. The IPS (2003) unit root test for panel data is based on the average value of t-stat of Dicky-Fuller test calculated for each data individually. After checking unit root in the dataset (whether time series or panel data) uses in the study, we select the appropriate method for regressions.

3.3.3. Endogeneity

This is a very important issue that we need to deal with time series, and panel data is that of reverse causality and endogeneity. The problem of endogeneity arises when the explanatory variables are corrected with the error term. However, if the data are having the presence of endogeneity, then simple OLS method cannot give robust results. This serious problem arises due to several reasons such as omitted variables, simultaneous causality, and errors in variables bias. Sometimes it happens due to linkages of variables between equations (independent variable of an equation is used as dependent variable of another in the system of equations). Therefore, this problem of endogeneity is needed to be specific attention in our study with a system of equation methods (2SLS and 3SLS). In our study, there is a possibility of endogeneity between financial development and financial inclusion. For instance, financial inclusion tends to increase financial development whereas; the aim of the sound financial sector is to provide better financial services (i.e. financial inclusion) for the welfare of each section of society. However, the efficient financial sector will give affordable financial services to its people. Hence, this may be the reason for reverse causality and hence to the endogeneity in our study.

To solve the presence of endogeneity, researchers may rely on the instrumental variables. Instead of instrumental variables, others trust the approach of identification through method by Rigobon (2003) and using a system of equations by 2SLS or 3SLS method. To deal with endogenous variables, our study relies on the approach of 3SLS regression instead of instrumental variables techniques because of no acceptable instruments can be justified.

3.4. Concluding Remarks

This chapter presented a conceptual framework to analyze the impact of financial development and financial inclusion on economic growth in India. The framework identifies the measurement of both financial development and financial inclusion using various financial proxies from financial institutions (from both banking and non-banking) and financial markets. Firstly, this chapter identifies various proxy variables related to financial development from financial institutions and markets for the construction of financial development index in both aggregate and all states of India. Secondly, it models the impact of financial development on economic growth using financial development index. We know from the existing literature that country may be financial developed but may be not always financial inclusive due to financial inequality especially in developing countries like India. So, thirdly this chapter also models various financial access variables for measuring financial inclusion and estimates the impact of financial inclusion on economic growth India. Adding to this, the chapter presents empirical model to explore the linkages between financial development and financial inclusion with the possible set of determinates. However, the entire analysis of the study

includes both aggregate (from 1980 to 2014) and state level (from 2000 to 2014) analysis, especially in India.

Variables	Definition	Data Sources
	Components of Financial Development Ind.	ex (FD)
PSC	Private Sector Credit as Percentage of	WDI (2015)
	GDP	× /
CGSE	Credit to Govt. and state-owned	International
	enterprises as a percentage of GDP	Financial
		Statistics, IMF
CBA	Central Bank asset as a percentage of	
	GDP	
RI	Remittance Inflows as a percentage of	WDI (2015)
	GDP	
IFDI	Inflows of Foreign Direct Investments as	WDI (2015)
	a percentage of GDP	
LL (M3)	Liquid Liabilities (M3) as a percentage of	International
	GDP	Financial
		Statistics, IMF
SMR	Stock market returns	Bloomberg
PF	Provident Fund as a percentage of GDP	EPWRF
	Determinants of Financial Developme	ent
Y	Real GDP per capita	WDI (2015)
ТО	Trade openness (Export + Import/ GDP)	WDI (2015)
	as a percentage of GDP	
INF	Inflation as measured by consumer price	WDI (2015)
	index (annual %)	
HUM	Human capital (Secondary school	WDI (2015)
	attainments)	
URB	Urbanization (people living in urban	WDI (2015)
	areas)	
	Financial Development and Economic G	rowth
FD	Index of Financial Development (Authors
	Composite Index)	calculation
Y	Real GDP percapita	WDI (2015)
HUM	Total secondary school enrolment of both	WDI (2015)
0.000	sexes	
GEXP	Government Expenditure as a percentage	WDI (2015)
	of GDP	
INF	Inflation as measured by consumer price	WDI (2015)
	index (annual %)	
TRADE	Trade openness (Export + Import/ GDP)	WDI (2015)
	as a percentage of GDP	

Table 3.4.1: Variables used to verify different Hypothesis, theirDefinition, and Data Sources (aggregate analysis)
Variables	Definition	Data sources		
	Components of Financial Inclusion Index	;		
SBA	Number of scheduled commercial saving	Reserve Bank		
	bank accounts per 1000 adult	of India		
CBA	Number of scheduled commercial credit	Reserve Bank		
	bank accounts per 1000 adult	of India		
BB	Number of scheduled commercial bank	Reserve Bank		
	branches per 1000 adult	of India		
BE	Number of Bank employees as a proportion	Reserve Bank		
	to scheduled commercial bank branches	of India		
DEP	Amounts of Deposits as a percentage of	Reserve Bank		
	GDP	of India		
CRE	Amounts of Credits as a percentage of GDP	Reserve Bank		
		of India		
	Determinants of Financial Inclusion			
FD	Composite financial development index	Authors		
	calculated by PCA method	calculation		
Y	Real GDP per capita	WDI (2015)		
RPOP	Rural population	WDI (2015)		
AGE	Total population between the age 15 to 64 as	WDI (2015)		
	a percentage of the total population			
LCY	Adult literacy rate of both sexes	WDI (2015)		
	Financial Inclusion and Economic Growth	h		
FI	Index of Financial Inclusion (Composite			
	Index)			
Y	Real GDP percapita	WDI (2015)		
INF	Inflation as measured by consumer price	WDI (2015)		
	index (annual %)			
TRADE	Trade openness (Export + Import/ GDP) as	WDI (2015)		
	a percentage of GDP			
GEXP	Government Expenditure as a percentage of	WDI (2015)		
	GDP			
HUM	Total secondary school enrolment of both	WDI (2015)		
	sexes			

Variables	Definition	Data Sources
	Components of Financial Development Index (F	D)
BI	Amount of Banking and Insurance as a	EPWRF
	percentage of GDP	
LL (M3)	Liquid Liabilities (M3) as a percentage of GDP	International
		Financial
		Statistics,
		IMF
PF	Provident Fund as a percentage of GDP	EPWRF
	Financial Development and Economic Growth	i
FD	Index of Financial Development (Composite	Authors
	Index)	calculation
Y	State Domestic Product (SDP)	Central
		statistical
		organization
	Components of Financial Inclusion Index (FI)	
SBA	Number of scheduled commercial saving bank	Reserve
	accounts per 1000 adult	Bank of
		India
CBA	Number of scheduled commercial credit bank	Reserve
	accounts per 1000 adult	Bank of
		India
BB	Number of scheduled commercial bank	Reserve
	branches per 1000 adult	Bank of
		India
BE	Number of Bank employees as a proportion to	Reserve
	scheduled commercial bank branches	Bank of
		India
CRE	Amounts of Deposits as a percentage of SDP	Reserve
		Bank of
		India
DEP	Amounts of Credits as a percentage of SDP	Reserve
		Bank of
		India
	Financial Inclusion and Economic Growth	
FI	Index of Financial Inclusion (Composite	Authors
	Index)	calculation
Y	State Domestic Product (SDP)	Central
		statistical
		organization

Table 3.4.2: Variables used to verify different Hypothesis, theirDefinition, and Data Sources (for Indian states)

Chapter 4

Financial Development and Economic Growth in India: Empirical Results

The preceding chapter establishes a set of the models based on existing literature and by theoretical reasoning to be verified by the empirical investigation. In this chapter, we measure financial development index with the help of various proxies from Financial Institutions (FIs) and Financial Markets (FMs). Then we investigate the relationship between financial development and economic growth both at aggregate and state level in India.

This chapter is organized as follows: Section 4.1 discusses the measurement of financial development index. Section 4.1.1 discusses the measurement of financial development index of Indian states in details. Section 4.2 explores the relationship between financial development and economic growth. Section 4.3 discusses the relationship between financial development and economic growth in Indian states. Section 4.4 provides concluding remarks.

4.1. Measurement of Financial Development Index (FD)

We have calculated a financial development index to analyze the financial depth in India using Principal Component Analysis (PCA) method. According to the PCA procedure, the empirical result of financial development index can be discussed in the following sequential steps. Firstly, we use this method to reduce multidimensionally and convert into a single composite index. By this approach, we can extract information about all the indicators as well as avoid subjectivity and the potential multicollinearity problem.

Before going to compute financial development index by PCA method, the primary test is the Kaiser-Meyer-Olkin (KMO) and Bartlett's test, which give the information about data adequacy for computing a composite index. The test shows that 81 percent, which is suitable for an index construction. Table 4.1.1 shows that first principal component that explains more than 78% of the standardize variance and has eigenvalue greater than one is considered for the analysis. Hence, the first principal component is a relevant measure of financial development. Because it gives better information and explains the variation of dependent variable better than any other linear combination of explanatory variables. It is also clearly displayed in the scree plot that first component captures more information than others (see Fig 4.1.1). Therefore, the first principal component is considered for construction of a composite index. The individual factor scores related to the first principal component are displayed in Table 4.1.2. So finally, we compute index by taking factors score calculated by PCA, and multiplying it with respective variables and adding them all for getting the index value for each year. The constructed FD index indicates that financial depth position is increasing in India year by year. However, it changes according to the economic state of affairs and policy changes during the sample period (1980 to 2014). This index indicates gradual increase from 1981 onwards because of various financial sector developments in India (i.e. active participation of RRBs, nationalization of private sector banks, the establishment of NABARD for proving credit facility and coordination of central with the state government for development of rural people, etc.). Then it sharply increases again from 1991 due to new economic policy (a new phase of financial liberalization). Then after 2004-05, the index begins to increase and reach its peak in the year 2007-08. However, the FD index decreases in the year 2007-08 due to the global financial crises that has created instability in the whole world. Finally, the FD index recovers and starts

moving forward after the global recession and reaches at the top in the year 2014.

Principal component	Eigenvalues	Variance (%)	Cumulative (%)
1	6.252	78.152	78.152
2	0.976	12.195	90.347
3	0.437	5.464	95.811
4	0.227	2.836	98.647
5	0.055	0.689	99.335
6	0.047	0.587	99.923
7	0.006	0.076	99.999
8	0.001	0.001	100.000

Table 4.1.1: PCA for financial development index

Table 4.1.2: Components scores

	Variables	Component 1		
A: Financial	Private Sector Credit (PSC)	0.169		
Institutions (FIs)				
	Credit to Govt. and State-owned	0.152		
	Enterprises (CGSE)			
	Liquid Liabilities (LL) or M3	0.157		
	Central Bank Assets (CBA)	0.051		
	Provident Fund (PF)	0.139		
B: Financial	Stock Market Returns (SMR)	0.046		
Markets (FMs)				
C: International	Inflows of Foreign Direct Investment	0.152		
capital inflows	(IFDI)			
	Remittance inflows (RI)	0.134		

Figure 4.1.1: Scree Plot in Principal Component Analysis



Figure 4.1.2: Financial Development Index in India (1980-2014)



4.1.1. Measurement of state wise Financial Development Index in India

Likewise, the financial development index at the aggregate level of India, we have calculated state wise financial development index to explore the interstate variation of financial depth position in 28 states of India from period 2000-2014. By using PCA procedure, we have calculated financial development index in each state of India separately. Due to deficiency in data sources for all states of India, we use three main financial proxies such as (I) amount of banking and insurance as a percentage of SDP (B&I), (II) net provident fund as a percentage SDP (PF), and (III) remittance inflows as a percentage of SDP. The financial development index of each state of India is increasing during the period 2000-2014 (see Fig 4.1.3). The FD index shows that Manipur at the bottom position whereas, the state Goa reaches the top positionduring the sample period. After Goa, Maharastra and Punjab are placed 2nd and 3rd position respectively. In the year 2000, the state Maharastra secures rank one among all 28 states of India. However, Goa and Punjab was ranked 2nd and 3rd respectively. However, the three states Manipur, Mizoram, and Chhattisgarh are placed at last three positions of 26th, 27th, and 28th respectively. However, after 15 years (i.e. 2014), the state of Goa shifts to 1st rank, and Maharashtra and Punjab are 2nd and 3rd position respectively. Lastly, the states Mizoram, Sikkim and Manipur are in last three positions in financial sector development (see Table 4.1.3). The ranking varies mostly because of three basic indicators i.e. banking and insurance, remittance inflows and provident fund. The state Goa is at 1st position mainly due to high remittance inflows and banking and insurance, whereas the state Maharashtra is lower than Goa (2nd position) because of its low remittance flows, which is lower than Goa's remittance flows. However, in terms of banking and insurance Maharashtra is higher than Goa. Finally, the state Punjab is ranked at 3rd due to low remittance inflows and

provident fund in compare to the states like Goa and Maharashtra. Moreover, the Northeast states (mainly like Mizoram, Sikkim and Manipur) are placed in last three positions in financial index manly due to very low in all three financial indicators compares to other states of India.





	All states of India	Ranking of States on the basis of financial			
		develop	ment index		
	1	Year:2000	Year:2014		
1	Haryana	12	12		
2	Himachal Pradesh	13	15		
3	J & K	17	17		
4	Punjab	3	3		
5	Rajasthan	18	21		
6	Arunachal Pradesh	10	10		
7	Assam	9	8		
8	Manipur	26	28		
9	Meghalaya	19	18		
10	Mizoram	27	26		
11	Nagaland	23	24		
12	Tripura	11	13		
13	Sikkim	21	27		
14	Bihar	22	20		
15	Odisha	24	19		
16	West Bengal	14	14		
17	Madhya Pradesh	20	22		
18	Uttar Pradesh	15	16		
19	Gujarat	16	11		
20	Maharashtra	1	2		
21	Andhra Pradesh	6	9		
22	Karnataka	4	6		
23	Kerala	5	4		
24	Tamil Nadu	8	5		
25	Chhattisgarh	28	25		
26	Jharkhand	25	23		
27	Uttarakhand	7	7		
28	Goa	2	1		

Table 4.1.3: Ranking of Indian States on the basis of FinancialDevelopment: 2000-2014

4.2. Impact of Financial Development on Economic Growth in India

This section analyzes the impact of financial development on economic growth both at aggregate and state level in India. Before going to estimate, the primary test is to know if the series is stationary or not because of the nature of the individual time series financial data. We use unit root test i.e. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) in this analysis over the sample period from 1980-2014. The results of both ADF and PP testare reported in Table 4.2.1. It shows that Financial Development Index (FD) constructed by PCA, Inflation (INF) and Govt. expenditure (GEXP) are stationary in level form whereas, GDP per capita (Y), trade openness (TRADE) and human capital (HUM) are stationary in first difference [I(1)].Moreover, no series are I (2). The study applies ARDL method to check the co-integration between these series because dependent variables (Y) itself is stationary in first difference (non-stationary in its level form) and all variables are a mixture of I (0) and I (1) and no variable is I (2)⁶.

Variable	ADF test		PP test	
	I(0)	I(1)	I(0)	I(1)
Y	-0.745	-5.638***	-0.464	-6.830***
FD	-3.420*	-8.188***	-3.418*	-9.431***
INF	-5.413***	-3.480**	-3.366*	-10.497***
TRADE	-2.941	-5.142***	-2.941	-5.131***
HUM	-2.190	-3.952**	-2.100	-3.928**
GEXP	-4.070**	-4.166**	-3.490*	-3.697**

Table 4.2.1: Unit Root results

Note: (i) ***, ** and * indicates significant at 1%, 5% and 10% level. (ii) Optimal lags for ADF is determined based on AIC and PP test; it is Newey-West bandwidth selection using Bartlett kernel. (iii) Probability values for ADF and PP test are as per MacKinnon one-sided p-values.

Before conducting ARDL test, we run a diagnostic test to check the correlation and heteroscedasticity in the dataset. The diagnostic tests indicate that all test values for serial correlation, functional form,

 $^{^{6}}$ If we would have got any variable that is I(2) then the F-test would be spurious (Ouattara, 2004) because the assumption of critical bounds is based on variables I(0) or I(1) not I(2) (Pesaran et al., (2001) and Narayan (2005)).

normality and heteroscedasticity are more than 0.5, which are highly insignificant (see Table 4.2.2). Therefore, we cannot reject null hypothesis and that shows there are no serial correlation and heteroscedasticity in this dataset (1980-2014) and suitable for further analysis.

Table 4.2.2: Financial Development and Economic Growth: ARDL-ECM model diagnostic tests

Diagnostic Tests: LM test statistics					
A:Serial Correlation	CHSQ(1)= 1.122 [0.829]				
B:Functional Form	CHSQ(1)= 5.037 [0.734]				
C:Normality	CHSQ(2)= 0.224 [0.503]				
D:Heteroscedasticity	CHSQ(1)= 2.019 [0.993]				

Note: A: Lagrange multiplier test of residual serial correlation, B: Ramsey's RESET test using the square of the fitted values, C: Based on a test of skewness and kurtosis of residuals, D:Based on the regression of squared residuals on squared fitted values.

To know the long run relationship between variables, we apply the bound test. The results of the cointegration based on the ARDL bound test approach are reported in Table 4.2.3.

	F-	Critical	values:	Critical	values:	Decision
Model with structural break		95% bou	95% bound		ınd	
		I(0)	I(1)	(1)	I(0)	
(I) $f_y(Y PSC)$, INF, TRADE, HUM, GEXP, LIB_Dummy)	5.03	2.87	4.00	2.53	3.59	H ₀ :Reject
(II) <i>f_y</i> (<i>Y</i> / <i>LL</i> (<i>M3</i>), <i>INF</i> , <i>TRADE</i> , <i>HUM</i> , <i>GEXP</i> , <i>LIB_Dummy</i>)	5.01	2.87	4.00	2.53	3.59	H ₀ :Reject
(III) $f_y(Y STOCK, INF, TRADE, HUM, GEXP, LIB_Dummy)$	4.65	2.87	4.00	2.53	3.59	H ₀ :Reject
$(IV) f_y(Y/FD index, INF, TRADE, HUM, GEXP, LIB_Dummy)$	6.83	2.87	4.00	2.53	3.59	H ₀ :Reject
Endogeneity: reverse causality check						
$(V) f_{y}(PSC/Y, INF, TRADE, HUM, GEXP, LIB_Dummy)$	4.99	2.87	4.00	2.53	3.59	H ₀ : Reject
(VI) <i>f_y</i> (<i>LL</i> (<i>M3</i>)/ <i>Y</i> , <i>INF</i> , <i>TRADE</i> , <i>HUM</i> , <i>GEXP</i> , <i>LIB_Dummy</i>)	2.98	2.87	4.00	2.53	3.59	Inconclusive
(VII) fy(STOCK/Y,INF,TRADE,HUM,GEXP,LIB_Dummy)	2.42	2.87	4.00	2.53	3.59	H ₀ : Accept
$(VIII) f_{y}(FDindex/Y, INF, TRADE, HUM, GEXP, LIB_Dummy)$	5.47	2.87	4.00	2.53	3.59	H ₀ : Reject

under E test for an integratio Table 1 2 2. Desult of h

Notes: Source of critical bounds values, Pesaran et al., (2001). ** Rejection of null hypothesis of no cointegration at the 5% significance level. The critical value for unrestricted intercept and unrestricted trend model.

This study compares three different financial development proxy (PSC, LL (M3) and STOCK respectively) variables with constructed Financial Development Index (FD) and economic growth in India. Again to know the structural break (liberalization effect), this study uses dummy variable. Therefore, we have four models to check the existence of a long run relationship between variables. The result (of Wald test) indicates that Fstatistics (5.038, 5.017, 4.651, and 6.832) at 5% level is higher than that upper bound value calculated by Pesaran et al., (2001) that indicates long run relationship between financial development and economic growth. Finally, to check the loop of reverse causality between independent variables (PSC, LL, STOCK, and FD index) and dependent variable (Y) in the model, we use independent variables as dependent in the models. The result shows that F-statistics (4.99, 2.98, 2.42, and 5.47) at 5% level is falling above and within the bounds; value or some are below the lower bound (see Table 4.2.2). If the value of F-statistics falls within the bounds value, then the co-integration test becomes inconclusive. Moreover, if the value falls below the lower bounds, then the null hypothesis of no integration cannot be rejected (Odhiambo, 2010). Our result indicates that there is a co-integration between economic growth (Y) and financial development (PSC, LL, and FD) but not in the case of the stock market. Also, the study finds a bidirectional causal flow from financial development to economic growth except for stock market context where the relationship is unidirectional.

Based on three mentioned proxy indicators (PSC, LL, and STOCK) and financial development index (FD), we test long run relationship with economic growth using ARDL approach in column I-IV at Table 4.2.4 respectively. The result of our estimations of long-run effects of financial development and economic growth in India are presented in Table 4.2.4. The empirical result shows that financial development and economic growth are positively associated with each other. Again, it clearly indicates that PSC, LL, and FD Index have a positive impact on economic growth whereas stock market negatively influences economic growth in the long-run during 1980-2014. It clearly indicates that in long run, there is no role of stock market in economic growth. Other control variables (like TRADE, HUM, and GEXP) are positively linked with economic growth whereas inflation (INF) and economic growth are negatively associated but not statistically significant. These results show that trade openness influences economic growth positively as it brings competition for domestic firms that make them efficient, provide them opportunity to explore foreign markets and broadens the basket of goods available for the consumption. Human capital that captures the skill level of labor in the economy also enhances economic growth. As government spends on public goods a boost is provided to the private economic activity that stimulates the growth in the country. To capture the impact of structural break (liberalization effect), we introduce dummy variable (LIB_Dum) in the equation (2). The empirical result shows that liberalization dummy is positive as well as significant that indicates economic reforms positively impact economic growth in the long-run (details in Table 4.2.4).

Table 4.2.4: ARDL approach: Financial development and economic growth with structural break

Variable	Ι	II	III	IV
С	0.668**	0.588**	0.588	0.762**
	(2.118)	(2.065)	(1.344)	(2.674)
PSC	0.171*			
	(1.900)			
LL (M3)		0.238***		
		(3.412)		
STOCK			-0.002*	
			(-1.854)	
FD (Index)				0.248**
				(2.705)
INF	-0.007*	-0.001	-0.054	-0.006**
	(-1.840)	(0.177)	(-0.002)	(-2.597)
TRADE	0.185*	0.165***	0.231***	0.273**
	(1.716)	(3.088)	(3.091)	(2.256)
HUM	0.212***	0.517***	0.195*	0.265**
	(3.480)	(3.733)	(1.814)	(2.012)
GEXP	0.243	0.049	0.375*	0.421
	(0.550)	(0.220)	(1.864)	(1.194)
Fin_DUM	0.006**	0.006*	-0.037	0.023***
	(2.271)	(1.819)	(0.025)	(3.914)
Obs.	35	35	35	35
\mathbf{R}^2	0.748	0.769	0.611	0.803
$Adj.R^2$	0.479	0.602	0.330	0.562
LM	0.077	1.090	0.128	0.926
	(0.828)	(0.146)	(0.776)	(0.118)
DW	1.970	2.222	1.887	1.960

Dependent variable: Y (growth)

Notes: Values in parenthesis are t-statistics and *, **, *** null hypothesis of at the 10%, 5%, and 1% level of significance respectively. PSC, LL, and STOCK are three proxy variables use for financial development whereas; FD is the index of financial development.

To get the short run relationship between the variables, we use ECM models. Empirical evidence from ECM shows that financial development has a positive and statistically significant impact on economic growth (see Table 4.2.5). Other control variables TRADE, HUM, and GEXP is be positive and significant in either 1%, 5% or 10% whereas inflation (INF) negatively impact economic growth. The coefficient of ECT (-1) is found

to be statistically significant either in 1%, 5%, and 10%, with the expected negative sign. This clearly shows the speed of adjustment from the short run towards the long term. Thus, it indicates the deviations in the short runtowards the long runare corrected by 30%-36% each year. The result of the dummy variable (FIN_DUM) shows that liberalization has a positive and significant effect on economic growth (see Table4.2.5).

Table 4.2.5: ECM approach: Financial development and economic growth with structural break

Dependent variable: Y (growth)

Variable	V	VI	VII	VIII
ΔC_t	0.031**(2.686)	0.025*(1.808)	0.041***(4.101)	0.030**(2.340)
ΔPSC_t	0.185**(2.415)			
ΔPSC_{t-1}	0.169**(2.542)			
ΔLL_t		0.139***(2.929)		
ΔLL_{t-1}		0.126**(2.128)		
ΔSTOCK _t			0.023*(1.894)	
$\Delta STOCK_{t-1}$			0.009*(1.783)	
Δ FD (Index) _t				0.167**(2.408)
Δ FD (Index) _{t-1}				0.138***(3.409)
ΔINF_t	0.012*(1.904)	0.008(0.535)	0.024**(2.225)	0.016*(1.938)
ΔINF_{t-1}	0.017*(1.892)	0.009(0.879)	0.029*(1.879)	0.019*(1.863)
$\Delta TRADE_t$	0.052*	0.048**(2.733)	0.026*(1.751)	0.016**(2.246)
	(1.806)			
$\Delta TRADE_{t-1}$	0.049**	0.041*	0.019**(2.109)	0.053*(1.792)
	(2.109)	(1.872)		
ΔHUM_t	0.362**	0.326*	0.202*	0.197**
	(2.256)	(1.801)	(1.877)	(2.251)
ΔHUM_{t-1}	0.291*	0.298	0.483	0.191*
	(1.882)	(0.930)	(0.752)	(1.879)
ΔGEXP_{t}	0.333*(1.950)	0.293*(1.859)	0.012(0.043)	0.144*(1.779)
ΔGEXP_{t-1}	0.298(0.229)	0.281(0.973)	0.154(0.027)	0.137*(0.188)
ΔFin_Dum_t	0.015*(1.852)	0.019*(1.765)	0.030(1.159)	0.091*(1.821)
ECT(-1)	-0.341**(-2.532)	-0.365**(-2.298)	-0.307**(-2.575)	-0.325**(-2.242)
Obs.	35	35	35	35
\mathbf{R}^2	0.549	0.515	0.451	0.691
$Adj.R^2$	0.301	0.208	0.189	0.411
LM	0.167(0.747)	0.034(0.939)	1.608(0.098)	0.023(0.959)
DW	1.918	1.835	1.657	1.931

Notes: The values in parenthesis are t-statistics and *, **, *** null hypothesis of at the 10%, 5%, and 1% level of significance respectively. PSC, LL, and STOCK are three proxy variables uses for financial development whereas; FD is the index of financial development.

We need to perform the stability test to avoid the potential bias and misspecification in the executed models. The stability of ARDL parameters was tested by applying the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) developed by Brown et al., (1975). The results of CUSUM and CUSUMSQ show that the coefficients are stable because blue lines are within the critical bounds (red lines) at the 5% significance level (see Fig 4.2.1 and 4.2.2).

Therefore, the study finds that there is bidirectional causal flows from financial development to economic growth expect in a stock market context where the relationship is unidirectional. The study concludes that the financial reforms undertaken in India have resulted in economic growth both in the short run as well as in the long run. This clearly indicates that the implementation of appropriate liberalization policies spurs economic growth. Lastly, financial development index, which incorporates the components from both financial institutions and financial markets, give more reliable result than if single proxy variables like PSC, LL, and STOCK are used to measure financial depth.



Figure 4.2.1: CUSUM and CUSUMSQ test (after ARDL method)

Figure 4.2.2: CUSUM and CUSUMSQ test (after ECM)



4.3. The impact of Financial Development on Economic Growth in all States of India

Now we deal with panel data in order to know the stationarity of series in the Indian state wise data, we use IPS panel unit root test developed by (Im *et. al*, 2003). The result suggests that State domestic product (SDP), Banking and Insurance (B&I), Provident Fund (PF), Remittance Inflows (RI), and Financial Development Index (FD) constructed by PCA are stationary in first difference but not in their level form (see Table 4.3.1). Hence, we estimate long-runrelationship by using co-integration method.

Variables	Test statistic	
	Level	1 st difference
Growth (SDP)	2.250	-17.782***
Banking and Insurance	0.613	-10.871***
(B &I)		
Provident Fund (PF)	3.352	-8.067***
Net Remittance (RI)	3.751	-10.014***
Index of Financial Development	-1.093	-13.788***
(FD)		

Table 4.3.1: Im, Pesaran and Shin (IPS) panel unit root test results

Notes: *** indicates significant at 1% level of significance.

We apply panel co-integration test to know the relationship between variables. The results of the co-integration based on the Pedroni panel co-integration approach are reported in Table 4.3.2. Panel co-integrationis employed with two different types of specifications (i.e. without trend and with the trend) with different combinations of financial proxy variables with SDP to observe whether the variables included in the analysis are having long run co-movement or not. The test shows that majority reported among 7 (4 within the group and three between group) test of the Pedroni co-integration is significant either at 5% or 1% level of significance. We test first all group of the variables (B&I, PF, RI, and FD) with SDP; it shows that most of the variables are not significant indicating that no co-integration relationship. However, when we test individually

with SDP, we found that majority test shows B&I, PF and FD are significant except RI. Therefore, it clearly indicates that B&I, PF, and FD have co-integration relationship with SDP expect RI.

Test	SDP, B&I, PF, RI, and		SDP a	SDP and B&I SDP and		nd PF	F SDP and RI		SDP and FD	
	FD									
	Without	With Trend	Without	With Trend	Without	With	Without	With	Without	With
	Trend		Trend		Trend	Trend	Trend	Trend	Trend	Trend
Panel v-stat	-3.319***	4.935***	-3.211	3.997***	-2.083	3.564***	-1.601	1.264	-1.530	9.211***
Panel rho-stat	0.599	1.587	-0.038	3.637***	-4.213***	0.940	4.635	-0.008	-2.281***	0.943
Panel PP-stat	0.051	0.216	-7.063***	-0.052	-10.022***	-4.155***	7.433**	-6.208***	-6.793***	-5.395***
Panel ADF-stat	0.051	-0.359	-6.916***	-3.784***	-2.910***	-5.403***	7.855***	-6.727***	-7.061***	-7.403***
Group rho-stat	3.067**	2.009	3.802***	4.501	0.568	3.797	5.130	2.706	1.893	3.071
Group PP-stat	3.366**	4.517***	-5.940***	0.287	-6.203***	-0.444	0.680	-0.010	-1.983**	-3.948***
Group ADF-stat	0.331***	0.256	0.626	-2.835***	-0.859	-2.443***	0.726	-0.983	-0.662	-5.720***

Table 4.3.2: Pedroni panel co-integration test result

Notes: **, *** indicates significant at 5% and 1% respectively.

Therefore, we can infer that increase in B&I, PF and FD are important for enhancing state domestic product. After this, we use Pedroni (2001) panel Fully Modified OLS (FMOLS) for heterogeneous co-integrated panels to find out the long-run relationship among the variables with SDP. As FMOLS method takes care of simultaneity bias and the problem of nonstationary regressors and gives robust estimates. The result of FMOLS test shows that B&I, PF, RI are positive and significant at 1% level of significance. However, these variables are very much important for enhancing the progress of the states in India. Adding to these, financial development is very much essential for the growth of the states. Moreover, the magnitude of the B&I is substantially higher than the other financial proxies (PF and RI), which indicates that Banking and Insurance are an integral part of financial sector development and economic growth of the states of India. Thus, our estimates suggest that regional economic growth in India needs substantial growth in banking as well as finance sector. To get robust estimates, we use Dynamic Ordinary Least Squares (DOLS) method, which provides similar kind of estimates of FMOLS method (see Table 4.3.3). Based on these two methods, we conclude that financial sector development is helpful for fostering the progress of the states in India. However, Banking and Insurance sectors are essential factors for economic growth across the states.

Dependent Variable: SDP	FMOLS	DOLS
Banking and Insurance	6.974***	6.103***
(B&I)	(7.823)	(4.393)
Provident Fund (PF)	2.226***	2.021***
	(5.146)	(3.499)
Remittance Inflows (RI)	3.179***	2.474***
	(6.423)	(3.891)
Index of Financial	4.050***	3.841***
Development (FD)	(3.339)	(3.878)

Table 4.3.3: Pedroni panel FMOLS and DOLS result

Note: *** indicates at 1% level of significance and bracket value indicates t-statistics

We use panel Granger causality test to estimates the causality between variables. The result of the panel Granger test indicates that there is a bidirectional relationship between financial development and economic growth in the states of India (see Table 4.3.4). Again, Banking and Insurance sector have a bidirectional relationship between with economic growth. However, there exists a unidirectional relationship between the provident fund and remittance inflows with economic growth. It clearly shows that the direction of causality is only from the remittance inflows and provident fund to economic growth but not the other way.

Dependent	Direction of causality				
Variables	Independent variables				
	SDP	B&I	PF	RI	Index of
					FD
SDP		9.981***	6.199***	1.423***	1.858***
		(0.000)	(0.002)	(0.003)	(0.001)
B&I	8.100***		7.414***	0.429	1.301***
	(0.000)		(0.000)	(0.651)	(0.000)
PF	2.059	2.629		8.307***	6.055
	(0.129)	(0.073)		(0.000)	(0.602)
RI	6.357	5.857***	3.399		3.525
	(0.701)	(0.003)	(0.334)		(0.830)
Index of	4.673***	4.195**	4.779***	10.009***	
FD	(0.009)	(0.015)	(0.008)	(0.000)	

Table 4.3.4: Panel	Granger	Causality	test resu	lt
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Notes: ** and *** indicate at 5% and 1% level of significance

4.4. Concluding Remarks

This chapter establishes relationship between financial development and economic growth in India both at aggregate and state level. It is evident that financial development that includes financial institutions, markets, and international capital flows has a positive impact on economic growth. The main findings of this chapter include:

- I. We find from the financial development index at state level that all states are developing its financial sector (both banking and non-banking) from 2000-2014.
- II. Among all states of India, Goa is at the top and the states Maharashtra and Punjab are ranked 2nd and 3rd respectively. However, the states Mizoram, Sikkim and Manipur are placed at ranks 26th, 27th and 28th respectively in the year 2014.
- III. The empirical results reveal that the financial development, in the long-run as well as in the short run, positively influences economic growth in India.
- IV. The study also finds that there is a bidirectional causal flow from financial development to economic growth except in a stock market context where the relationship is unidirectional.
- V. Again, the empirical estimates posit that banking and insurance, provident fund, remittance inflows are essentials for financial sector development, which will ultimately stimulate regional economic growth in India.
- VI. The study concludes that the financial reforms undertaken in India have resulted in economic growth both in the short run as well as in the long run. This clearly indicates that the implementation of appropriate liberalization policies spurs economic growth.

Therefore, we conclude that financial development is very much essential for economic growth irrespective of short run and long run. In addition to this, especially Northeast states are less financially developed than other states in India. However, a country may be financial developed but not always financially inclusive due to high-income inequality (Sarma, 2008). Therefore, we need inclusive finance in the country rather than financial development. Therefore, the measuring of financial inclusion and it impacts on economic growth is important and that we explore in the next chapter.

Chapter 5

Financial Inclusion and Economic Growth in India: Empirical Results

In the preceding chapter, we discussed the role of financial sector development in fostering economic growth in India. Still our country is far behind from being an inclusive financial system, which is essential for economic development. However, recently it has become a priority and global task for policymakers and banking personnel for promoting financial inclusion for ensuring sustainable long-run economic growth. The main objective is to bring unbanked people into the banking fold by the mainstream of institutional players. This process becomes selfreinforcing and can often be a major factor in particular in social exclusion and for communities with limited access of financial products. First, we need to measure financial inclusion index with the help of various proxies from Scheduled Commercial Banks (SCBs). Then we investigate the relationship between financial inclusion and economic growth both aggregate and state level in India.

This chapter is organized as follows: Section 5.1 discusses the measurement of financial inclusion index. Section 5.1.1 confers the measurement of financial inclusion index of Indian states. Section 5.2 explores the linkages between financial inclusion and economic growth. Section 5.3 discusses the linkages between financial inclusion and economic growth in Indian states. Section 5.4 provides concluding remarks.

5.1. Measurement of Financial Inclusion Index (FI)

We have calculated a financial inclusion index to analyze the financial access situation in India using PCA method. According to PCA procedure, the empirical result of financial inclusion index can be discussed in the following sequential steps. Firstly, we use this method for construction of single composite index. By this approach, we can extract information about all the indicators as well as avoid subjectivity and the potential multicollinearity problem. Table 5.1.1 shows that first principal component explains more than 79% of the standardize variance and eigenvalue is greater than one. Hence, the first principal component is relevant measure of financial inclusion index. Because it gives better information and explains the variation of dependent variables better than any other linear combination of explanatory variables. Further, the scree plot also indicates that first component captures more information than others (see Fig 5.1.1). Therefore, the first principal component is considered for the construction of a composite index. The individual factor score related to the first principal component is displayed in Table 5.1.2. It shows the six variables included in the analysis along with its factor scores. Like FD index, by taking factor scores calculated by PCA, multiplying it with respective variables and lastly adding them all we get the final composite financial inclusion index for each year.

The constructed FI index shows that the financial access position is increasing years by year and significantly changes after 2000 (see Fig 5.1.2). The financial inclusion index varies according to the policy changes by the government during the sample period (1980-2014). The FI index gradually increases from 1980 onwards as many financial institutions (both banking and non-banking) actively participatein the development of the rural economy. Mainly, NABARD, RRBs, and MFIs were providing credit facilities for rural and poor people. After that, a new economic policy is introduced in India in 1991, which changes the

financial sector, which increases the financial services in India. After 2000, FI index sharply increases because government of India took major steps for providing financial inclusion to bring people into the umbrella of formal financial institutions and for providing credit and insurance facilities. RBI has set up Khan Commission in 2004 to look into financial inclusion policy to provide the basic banking services for poor people like theopening of 'no frills' account either zero balance or very minimum balances to include vast sections of the people in the country. Further, Government of India has taken various steps as Pradhan Mantri Jan DhanYojana (PMJDY) for opening zero balance account in 2014, Jan Dhan Aadhaar Mobile (JAM) articulated in the Government's economic survey 2014-15. It helps rural and marginalized people through Direct Benefits Transfer (DBT) for providing LPG subsidy and NREGA payments. The Indian government is now moving forward with the cashless economy (where people purchases goods and services through credit card and electronic fund transfer rather than cash) which is one of the prime objectives of financial inclusion.

Principal	Eigenvalues	Variance (%)	Cumulative (%)
component			
1	4.791	79.846	79.846
2	0.844	14.059	93.904
3	0.213	3.543	97.448
4	0.109	1.825	99.272
5	0.043	0.722	99.995
6	0.000	0.005	100.000

Table 5.1.1: PCA for Financial Inclusion Index

	Variables	Component 1
Scheduled	Number of Deposit Bank Accounts	0.181
Commercial	in proportion to 1,000 adult	
Banks (SCBs)	populations (DBA)	
	Number of Credit Bank Accounts in	0.164
	proportion to 1,000 adult populations	
	(CBA)	
	Number of Bank Branches in	0.176
	proportion to 1,000 adult populations	
	(BB)	
	Number of Bank Employees as ratio	0.119
	of Bank branches (BE)	
	Amounts of Deposits (DEP) as	0.183
	percentage of GDP	
	Amounts of Credits (CRE) as a	0.177
	percentage of GDP	

 Table 5.1.2: Components scores

Figure 5.1.1: Scree Plot in Principal Component Analysis



Figure 5.1.2: Financial Inclusion Index of India (1980-2014)



5.1.1. Measurement of state wise Financial Inclusion Index in India

Likewise the financial inclusion index at the aggregate level of India, we have calculated state wise financial inclusion index to explore the interstate variation of financial services/access in the 28 states of India from the period 2000-2014. By using PCA procedure, we have calculated financial inclusion index in each state of India separately with same the variables used in the aggregate index. The nature of financial inclusion index of each and every state of India is increasing during 2000-2014(see fig 5.1.3). The constructed FI index shows that Goa reaches the top position in financial inclusion whereas, the state Nagaland is at the bottom among all Indian states in 2014. In the year 2000, Goa is at 1st rank among all 28 states of India. However, Kerala and Himachal Pradesh was ranked 2nd and 3rd respectively. However, the three states Mizoram, Manipur, and Nagaland are placed last three positions like 26th, 27th, and 28th respectively. However, after 15 years (i.e. 2014), the Goa maintains its position as 1strank, and Kerala and Tamil Nadu are 2nd and 3rd position respectively. Lastly, the states Mizoram, Manipur, and Nagaland are in last three positions in financial inclusion index (see Table 5.1.3). The ranking varies mostly because of three basic indicators i.e. bank branches, bank account of deposit, credit bank accounts and amount of debit and credit. The state Goa is at 1st position mainly due to high usability of banking services (i.e. debit and credit accounts and amount), whereas the state Kerala is lower than Goa (2nd position) because of its low credit account and amount, which is lower than state Goa's credit amount. Finally, the state Tamil Nadu is ranked at 3^{rd} due to less number of bank branches and deposit bank account in compare to the states like Goa and Kerala. Moreover, the Northeast states (mainly like Mizoram, Manipur and Nagaland) are placed in last three positions in financial inclusion index manly due to less number of bank branches and less usability of banking services compares to other states of India.



Figure 5.1.3: Scenario of Financial Inclusion in all Indian States (2000-2014)

Table 5.1.3: Ranking of India States on the basis of financial inclusion: 2000-2014

	All states of India	Ranking of States on the basis of financial		
		inclusion index		
		Year:2000	Year:2014	
1	Haryana	10	11	
2	Himachal Pradesh	3	4	
3	J & K	25	24	
4	Punjab	6	6	
5	Rajasthan	20	20	
6	Arunachal Pradesh	14	22	
7	Assam	18	17	
8	Manipur	27	27	
9	Meghalaya	23	25	
10	Mizoram	26	26	
11	Nagaland	28	28	
12	Tripura	17	14	
13	Sikkim	13	15	
14	Bihar	22	19	
15	Odisha	16	13	
16	West Bengal	8	7	
17	Madhya Pradesh	19	18	
18	Uttar Pradesh	15	16	
19	Gujarat	12	12	
20	Maharashtra	9	9	
21	Andhra Pradesh	5	5	
22	Karnataka	7	8	
23	Kerala	2	2	
24	Tamil Nadu	4	3	
25	Chhattisgarh	24	21	
26	Jharkhand	21	23	
27	Uttarakhand	11	10	
28	Goa	1	1	

5.2 The impact of Financial Inclusion on Economic Growth in India

This section analyzes the impact of financial inclusion on economic growth at both country and state level in India. Before going to estimate, the primary test is to know if the series of different variables stationary or not because the nature of the individual time series financial data is non-stationary. The results of both ADF and PP testare reported in Table 5.2.1. It shows that financial inclusion index (FI) constructed by PCA, Inflation (INF) and Govt. expenditure (GEXP) are stationary in level form whereas, GDP per capita (Y), trade openness (TRADE) and human capital (HUM) are stationary in first difference (I(1)). Moreover, no series are I (2). The study applies ARDL method to check the co-integration between these series because dependent variables (Y) itself is stationary in first difference (non-stationary in its level form) and all variables are a mixture of I (0) and I (1) and no variable is I (2)⁷.

Variable	ADF test		PP test	
	I(0)	I(1)	I(0)	I(1)
Y	-0.745	-5.638***	-0.464	-6.830***
FI	-4.188**	-5.608***	-6.147***	-6.967***
INF	-5.413***	-3.480**	-3.366*	-10.497***
TRADE	-2.941	-5.142***	-2.941	-5.131***
HUM	-2.190	-3.952**	-2.100	-3.928**
GEXP	-4.070**	-4.166**	-3.490*	-3.697**

 Table 5.2.1: Unit Root results

Note: (i) ***, ** and * indicates significant at 1%, 5% and 10% critical level. (ii) Optimal lags for ADF is determined based on AIC and PP test; it is Newey-West bandwidth selection using Bartlett kernel. (iii) Probability values for ADF and PP test are as per MacKinnon one-sided p-values.

Before conducting ARDL test, we run a diagnostic test to check the correlation and heteroscedasticity presence in the dataset. The diagnostic tests indicate that all test values value for serial correlation, functional form, normality and heteroscedasticity are highly insignificant because the

⁷ If we would have got any variable that is I(2) then the F-test would be spurious (Ouattara, 2004) because the assumption of critical bounds is based on variables that are I(0) or I(1) not I(2) (Pesaran*et al.* (2001) and Narayan and Narayan,2005).
CHSQ values are more that 0.5 (see Table 5.2.2), and that shows there are no serial correlation and heteroscedasticity in this dataset (1980-2014).

Diagnostic Tests: LM test statistics				
A:Serial Correlation	CHSQ(1)= 1.132 [0.950]			
B:Functional Form	CHSQ(1)= 4.127 [0.672]			
C:Normality	CHSQ(2)= 0.394 [0.591]			
D:Heteroscedasticity	CHSQ(1)= 3.021 [0.829]			

 Table 5.2.2: Financial inclusion and economic growth: ARDL-ECM

 model diagnostic tests

Note: A: Lagrange multiplier test of residual serial correlation, B: Ramsey's RESET test using the square of the fitted values, C: Based on a test of skewness and kurtosis of residuals, D: Based on the regression of squared residuals on squared fitted values

To know the long run relationship between variables, we apply the bound test. The results of the cointegration based on the ARDL bound test approach are reported in Table no 5.2.3.

Model with structural	F-	Critica	1	Critic	al	Decision
Break	stat*	values:		values	s:	
	*	95% bo	ound	90% ł	oound	
		I(0)	I(1)	I(0)	I(1)	
$(1)f_y(Y/FI,INF,TRADE,$	4.23	2.87	4.00	2.53	3.59	H ₀ : Reject
HUM,GEXP,LIB_Dummy)						
$(2)f_y(FI/Y,INF,TRADE,$	2.91	2.87	4.00	2.53	3.59	H ₀ :
HUM,GEXP,LIB_Dummy)						Inconclusive

Notes: Source of critical bounds values, Pesaran et al., (2001). **Rejection of null hypothesis of no cointegration at the 5% significance level. The critical value for unrestricted intercept and unrestricted trend model.

This study investigates financial inclusion Index (FI) and economic growth in India. Again to know the structural break (liberalization effect), this study uses dummy variable. In order, to check the existence of a long run relationship between variables, the result (of Wald test) indicates that

F-statistics (4.23) at 5% level is higher than that upper bound value calculated by Pesaran et al., (2001) that indicates long run relationship between financial development and economic growth. Finally, to check the loop of reverse causality between independent variables (FI) and dependent variable (Y) in the model, we use independent variables as dependent in the models keeping others control as same. The result shows that F-statistics (2.91) at 5% level fall within the bounds value (see Table 5.2.3). If the value of F-statistics falls within the bounds value, then the co-integration test becomes inconclusive. Our result indicates that there is a causal flow from economic growth (Y) to financial inclusion (FI) but not vice-versa. Therefore, the study finds a unidirectional causal flow from economic growth to financial inclusion.

Using composite financial inclusion index (FI) constructed by PCA, we test long run relationship with economic growth using ARDL approach. The result of our estimation of long-run effects of financial inclusion and economic growth in India are presented in Table 5.2.4. The empirical estimation shows that financial inclusion and economic growth are positively linked with each other. Again, it clearly indicates that FI Index has apositive impact on economic growth in the long-run during 1980-2014. Other control variables (like TRADE, HUM, and GEXP) are positively linked with economic growth whereas inflation (INF) and economic growth are negatively associated but not statistically significant. These results show that trade openness influences economic growth positively as it brings competition for domestic firms that make them efficient, provide them opportunity to explore foreign markets and broadens the basket of goods available for the consumption. Human capital that captures the skill level of labor in the economy also enhances economic growth. As government spends on public goods a boost is provided to the private economic activity that stimulates the growth in the country. To capture the impact of structural break (liberalization effect),

we introduce dummy variable (LIB_Dum) in the equation (2). The empirical result shows that liberalization dummy is positive as well as significant that indicates economic reforms positively impact economic growth in the long-run (details in Table 5.2.4).

Other control variables (like TRADE, HUM, and GEXP) are positively linked with economic growth whereas inflation (INF), and economic growth is negatively associated but not statistically significant. To capture the impact of structural break (liberalization effect), we introduce dummy variable (LIB_Dum) in the equation (2). The empirical result shows that liberalization dummy is positive as well as significant and it indicates economic reforms positively impact economic growth in the long-run (details in Table 5.2.4).

Table 5.2.4: ARDL approach: Financial inclusion and economicgrowth with structural break: 1980-2014Dependent variable: Y (Growth)

Variable	Coef.	Std.Error	t-stat	Prob.
С	1.131**	0.539	2.098	0.041
FI	0.217***	0.048	4.520	0.004
INF	-0.027	0.019	-1.421	0.166
TRADE	0.251***	0.074	3.391	0.003
HUM	0.181*	0.102	1.774	0.094
GOVT	0.197*	0.115	1.713	0.096
LIB_Dummy	0.504**	0.183	2.754	0.013
Sample	35			
R-squared	0.744			
Adj R-suared	0.487			
DW Stat	1.953			
LM test	0.521			
(Prob.Chi-square(2)	(0.376)			

Notes: *, **, and *** indicate 10%, 5%, and 1% level of significance respectively.

After long run relationship, we use Error Correction Model (ECM) model to get the short run relationship between financial inclusion and economic growth. Empirical evidence from ECM shows that financial inclusion has a positive and statistically significant impact on economic growth (see Table 5.2.5). However, other control variables like TRADE, HUM, and GEXP are positive and significant at 1%, 5% or 10% whereas inflation (INF) negatively impacts economic growth but is not statistical significant here. The ECM model provides the coefficient of ECT (-1) to be statistically significant at 1% level with the expected negative sign. This clearly indicates that the speed of adjustment from the short run towards the long term. Thus, it indicates the deviations in the short runtowards the long runare corrected by 44% each year. In shortrun, the result of the dummy variable (FIN_DUM) indicates that liberalization has a positive and significant effect on economic growth (see Table 5.2.5).

Table 5.2.5: ECM approach: Financial inclusion and economicgrowth with structural break: (1980-2014)

Variable	Coef.	Std.Error	t-stat.	Prob.
ΔC_t	0.034***	0.009	3.777	0.001
ΔFI_t	0.313**	0.116	2.698	0.020
ΔFI_{t-1}	0.297***	0.048	6.187	0.004
ΔINF_t	-0.014	0.008	-1.751	0.190
ΔINF_{t-1}	-0.126	0.118	-1.067	0.251
$\Delta TRADE_t$	0.161**	0.056	2.875	0.039
$\Delta TRADE_{t-1}$	0.149**	0.051	2.921	0.024
ΔHUM_t	0.371**	0.148	2.506	0.020
ΔHUM_{t-1}	0.315***	0.123	2.560	0.013
ΔGOVT_t	0.140	0.116	1.206	0.240
ΔGOVT_{t-1}	0.107***	0.023	4.652	0.002
LIB_Dummy	0.021***	0.004	5.250	0.001
ECT(-1)	-0.449***	0.137	-3.277	0.003
Sample	35			
R-squared	0.601			
Adj R-suared	0.427			
DW Stat	1.801			
LM test (Prob.Chi-	0.812			
square(2)	(0.317)			

Dependent variable: Y (Growth)

Notes: *, **, and *** indicate 10%, 5%, and 1% level of significance respectively.

We need to perform the stability test to avoid the potential bias and misspecification in the executed models. The stability of ARDL parameters was tested by applying the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) developed by Brown et al., (1975). The results of CUSUM and CUSUMSQ shows that the coefficients are stable because black lines are within the critical bounds (dotted lines) at the 5% significance level (see Fig 5.2.1 and 5.2.2).

Figure 5.2.1: CUSUM and CUSUMSQ test (after ARDL method)



Figure 5.2.2: CUSUM and CUSUMSQ test (after ECM)



5.3. The impact of Financial Inclusion on Economic Growth all States of India

Now we deal with the panel data for the state level analysis. In order to know the stationarity of series in the Indian state wise data, we use IPS panel unit root test developed by (Im *et. al*, 2003). The result suggests that State domestic product (SDP), Bank branches (BB), Amount of Deposit (DEP), Amount of Credit (CRE), and Financial Inclusion Index (FI) constructed by PCA are stationary in first difference but not in their level form (see Table 5.3.1). Hence, we estimate long-run relationship by using co-integration method.

Table 5.3.1: Im, Pesaran and Shin (IPS) panel unit root test results(2000-2014)

Variables	Test statistic	
	Level	1 st difference
Growth (SDP)	2.250	-7.782***
Bank Branches (BB)	22.811	-7.355***
Amount of Deposits (DEP)	7.670	-12.240***
Amount of Credits (CRE)	6.503	-10.987***
Index of Financial Inclusion	12.651	-8.873***
(FI)		

Notes: *** indicates significant at 1% level of significance.

We apply panel co-integration test to know the long run relationship between variables. The results of the cointegration based on the Pedroni panel co-integration approach are reported in Table 5.3.2. Panel cointegrationis employed with two different types of specifications (i.e. without trend and with the trend) with different combinations of financial access variables with SDP growth to observe whether the variables included in the analysis are having long run co-movement or not. The test shows that majority reported among 7 (4 within the group and three between group) test of the Pedroni co-integration is significant either at 5% or 1% level of significance. We test first all group of the variables (BB, DEP, CRE, and FI) with SDP growth; it shows that most of the variables are significant. So we can reject the null hypothesis (i.e. nocointegration), and establish that there is co-integration relationship of all variables with SDP Growth. However, when we test all the variables individually with SDP Growth, we find from the majority test that DEP, CRE, and FI index are significant to expect BB. Thus, it clearly indicates that these three variables have co-integration relationship with SDP growth except bank branches.

Test	SDP, BB, D	EP,CRE and	SDP a	and BB	SDP and	d DEP	SDP an	d CRE	SDP and FI	,
	Ι	71								
	Without Trend	With Trend								
Panel v-stat	-0.808	8.341***	-3.426	6.607	-2.407	9.969***	-1.906	3.139***	-1.886	8.917***
Panel rho-stat	5.004	6.291	2.442	0.235	0.498	1.019	1.111	0.776	0.506	0.253
Panel PP-stat	3.400**	-5.424***	-1.340**	-4.499***	-3.948***	-2.278***	-1.888**	-2.660***	-0.747	-4.703***
Panel ADF- stat	-2.979***	-8.509***	6.535	-6.677	-1.460**	-4.764***	4.260	-3.451***	2.547	-7.214***
Group rho-stat	6.539	7.938	3.907	2.865	1.595	4.437	0.679	4.005	2.023	2.916
Group PP-stat	-1.485**	-5.714***	-2.315***	-2.054**	-11.059***	2.452	-10.029***	0.001	-5.900***	-1.853**
Group ADF- stat	-5.194***	-6.884***	3.891	-5.711	-1.460**	-1.076	-4.413***	-2.020**	-0.823	-6.577***

 Table: 5.3.2: Pedroni panel co-integration test result

Notes: ** and *** indicate significant at 5% and 1% respectively

So we can infer that increase in DEP, CRE and FI are important for improving state domestic product. After this, we use Pedroni (2001) panel Fully Modified OLS (FMOLS) for heterogeneous co-integrated panels to find out the long-run relationship among the variables with SDP. The FMOLS method takes care of simultaneity bias and the problem of non-stationary series and gives robust estimates. The result of FMOLS test shows that BB, DEP, CRE are positive and significant at 1% level of significance with SDP. It shows that these factors are very much important for enhancing the progress of the states in India. Adding to this, financial inclusion (FI) is very much essential for the growth of the states. Moreover, the magnitude of bank deposit is substantially higher than any other financial proxies (BB, BI, CRE), which indicates that people deposits in the formal financial institutions are an integral part of financial inclusion and economic growth of the states of India. Thus, our estimate suggests that regional economic growth in India needs substantial growth in formal banking institutions and affordable product and services. To get robust estimates, we use Dynamic Ordinary Least Squares (DOLS) method, which provides similar kind of estimates of FMOLS method (see Table 5.3.3). Based on these two methods, we conclude that financial inclusion is helpful for fostering the progress of the states in India. However, open a bank account in SCBs is not sufficient but the usability (i.e. deposit and credit) is a very much essential factor for economic growth across the states.

Dependent Variable: SDP	FMOLS	DOLS
BB	0.167(5.914)***	0.136(6.417)***
BE	0.153 (6.154)***	0.148(6.328)***
CRE	0.588 (4.328)***	0.473(3.943)***
DEP	0.632 (3.164)***	0.567(4.665)***
Index of Financial	0.803 (2.991)***	0.721(2.893)***
Inclusion (FI)		

 Table 5.3.3: Pedroni panel FMOLS and DOLS result (2000-2014)

Note: *** indicates at 1% level of significance and bracket value indicates t-statistics

We use panel Granger causality test to estimates the causality between variables. The result of the panel Granger test indicates that there is a unidirectional relationship between financial inclusion and economic growth among Indian states (see Table 5.3.4). To know the specific effect of individual indicators of financial inclusion on economic growth, we test Granger causality between these variables. We found that bank branches, bank employees and usability of banking services (credits and deposits) have a bidirectional relationship with financial inclusion. This clearly indicates that each and every indicator is responsible for spread of financial inclusion. Again, both deposit and credit have a bidirectional relationship with economic growth. Thus, it clearly indicates that both more deposit and credit facility of people will encourage setting up more bank branches in all states of India.

Therefore, we find from the Granger causality test that there is a unidirectional relationship between financial inclusion and economic growth. Adding to it, bank branches, bank employees, deposit and credit have a bidirectional relationship with financial inclusion in India during the sample period (2000-2014). However, more deposit and credit will motivate to expand more bank branches in all regions of India but not vice-versa.

Dependent	Direction of causality							
Variables			Indepen	ident variables				
	SDP	BB	BE	CRE	DEP	Index of FI		
SDP		2.394**(0.002)	6.789 (0.071)	2.116**(0.012)	2.360**(0.015)	0.237(0.801)		
BB	2.293(0.102)		7.809**(0.040)	1.598***(0.000)	7.260***(0.000)	4.782***(0.000)		
BE	7.749***(0.001)	7.206***(0.000)		5.221***(0.000)	2.845***(0.000)	2.160***(0.000)		
CRE	3.366***(0.000)	1.059(0.347)	5.054***(0.006)		6.768***(0.001)	0.641***(0.000)		
DEP	9.533***(0.000)	1.195(0.303)	2.914***(0.000)	7.098***(0.000)		7.808***(0.000)		
Index of FI	6.770***(0.001)	2.240***(0.000)	2.706***(0.000)	7.030***(0.001)	1.097***(0.004)			

 Table 5.3.4: Panel Granger Causality test result

Note: *** indicates at 1% level of significance and bracket value indicates t-statistics

5.4. Concluding Remarks

The main motivation behind this chapter is to measure the relationship between financial inclusion and economic growth in India both aggregate as well as in state level. It is evident that financial inclusion has a positive impact on economic growth. The main findings of this chapter include:

- I. We conclude from the state level financial inclusion index that all states are moving forward in the financial access from 2000-2014.
- II. Among all states of India, Goa reach at the top and the states Kerala and Tamil Nadu are in ranked in 2nd and 3rd respectively. However, the states of Mizoram, Manipur and Nagaland are placed in rank 26th, 27th and 28th respectively.
- III. The empirical results reveal that the financial inclusion, in the long-run as well as in the short run, positively influences economic growth in India.
- IV. The study also finds that there is a unidirectional causal flow from financial inclusion to economic growth.
- V. Again, the empirical estimates posit that usability of banking services (deposit and credit) is essentials for financial inclusion, which will ultimately stimulate regional economic growth in India.
- VI. Moreover, the study concludes that the financial reforms undertaken in India have resulted in economic growth both in the short run as well as in the long run.

Therefore, we conclude that financial inclusion is very essential for economic growth irrespective of short run and long run. Moreover, North East states of Mizoram, Manipur and Nagaland are still far behind from the inclusive finance. So, the government of India needs to improve financial institutions in each state of India and specially have more focus on Northeast regions for transparent financial services, which will ultimately foster economic growth. As we have analyzed the role of FD and FI in economic growth we need to understand further the causality between financial development and inclusion and we explore this in the next chapter.

Chapter 6

Causality between Financial Development and Financial Inclusion in India: Empirical Results

The conceptual framework postulates that both financial development and financial inclusion are an integral part of economic growth for every nation across the globe and a well-developed financial system provides better financial services which will promote economic growth. The motive of both financial development and financial inclusion is to bring unbanked people into the banking fold so that they have access to institutional credit and other financial services. It has been observed that country might be financially developed but not be financially inclusive due to high-income inequalities and with certain segments of people remaining outside the formal financial systems (Sarma, 2008). However, the inclusive financial country may be financially developed. So the aim of this chapter is to presents the result of the empirical exercise conducted to explore the interrelationship between financial development and financial inclusion in India, which is a unique contribution to the literature.

The organization of this chapter is as follows: Section 6.1 explores the situation of financial development and financial inclusion in India. Section 6.2 elaborates the result of the linkages between financial development and financial inclusion. Section 6.3 explains the empirical result of the causality between financial development and financial inclusion in Indian states. Section 6.4 concludes the chapter.

6.1 Financial Development and Financial Inclusion in India

In earlier chapter, we find that FD and Economic Growth are bidirectional related whereas Economic Growth and FI are unidirectional. FD and FI are intimately connected and inseparable to each other [see Allen et al., (2014); Chauvet and Jacolin, (2015)]. However, there is very lack of empirical studies conducted on financial inclusion and financial development in India. Thus, the present study tries to establish the causality between financial development and inclusion in India. The wellfledged financial sector development of a nation does not always assure only its progress, but it spreads affordable financial services (or financial inclusion) for the betterment of each section of the society (Sarma, 2010). So the aim of the sound financial systems is to provide better financial access (i.e. financial inclusion) which in turns to promote economic growth (Chung et al., 2016). Moreover, financial inclusion plays a dominant role in providing financial services in the modern economy, particularly in processing funds from surplus units to deficits units and the flows of funds and financial services are helpful for financial development and economic growth (Rasheed et al., 2016). So, financial inclusion is a basic determinant of financial sector development especially in developing countries like India. Financial development sustains in the long run where all people have better financial access. An efficient financial sector will give affordable financial services to all sections of people. So, government and policy makers try to make inclusive financial systems basically in developing countries like India. Therefore, the motto of sound and successful financial systems is to promote economic growth as well as provides affordable financial products and services in the society.

Both financial institutions and financial markets are expanding especially in developing countries like India. Government and policy makers are trying to provide affordable financial services to all sections of society, which resulted for stimulating financial sector development and economic growth. Therefore, it had great attention of governments to make inclusive financial system especially in a developing country like India. India is moving towards inclusive financial systems from 1980 onwards and there is a paradigm shift after 2005 (see Table 6.1.1 and Fig 6.1.1). However, financial development index shows the volatile nature of financial sector development of FIs and FMs. This index indicates gradually increase from 1981 onwards because of many financial sector developments. Then it sharply increases again from 1991 due to new economic policy (a new phase of financial liberalization) in India. Then after 2004-05 FD index begins to starts increases and reaches at the top in the year 2007-08. However, the FD index decreases in the year 2007-08 due to the global financial crises. Finally, the FD index recovers and starts moving forwards after the global recession and reaches at the top in the year 2014.

Year	Financial Development Index	Financial Inclusion Index
1980	14.490	0.348
1981	13.089	0.408
1982	14.714	0.451
1983	15.570	0.519
1984	16.352	0.598
1985	14.533	0.690
1986	16.499	0.768
1987	19.327	0.859
1988	17.278	0.963
1989	16.860	1.097
1990	16.515	1.241
1991	15.751	1.412
1992	14.726	1.571
1993	19.399	1.775
1994	16.837	1.960
1995	19.385	2.227
1996	18.817	2.487
1997	19.442	2.780
1998	21.223	3.177
1999	20.761	3.597
2000	23.685	4.142
2001	26.157	4.687
2002	27.814	5.461
2003	27.748	6.084
2004	27.017	6.987
2005	27.468	8.267
2006	27.345	10.048
2007	29.276	12.390
2008	34.115	15.133
2009	34.928	17.720
2010	32.479	20.290
2011	34.534	23.835
2012	35.005	26.904
2013	34.866	30.448
2014	35.437	33.991

Table 6.1.1: Nature of financial development and financial inclusionin India (1980-2014)





In conclusion, both financial development and financial inclusion are moving forward with the passage of time but financial inclusion in still behind the financial sector development, especially in India. Moreover, financial development changes due to various reasons but financial inclusion increases smoothly in India.

6.2 Relationship between Financial Development and Financial Inclusion

Considring the impact of other determinants both on financial development and financial inclusion we use Ordinary Least Suares (OLS) method in both the equations (XI and XII) to know the impact of independent variables on dependent variables. The empirical estimates our study suggest that GDP per capita posilvey linked with financial

developemnt. However, trade openness, human capital, and urbanization are negatively associated with financial development which is not accepted by academicians (see Table 6.2.2). Similarly, working population are negatively linked with financial inclusion, which is a contrast to the previous studies [see Allen et al., (2014); Clamara et al., (2014); Fungacova and Weill, (2014); Tuesta et al., (2015); Park and Rogelio, (2015); Sousa, (2015)]. This results may diverge due to endogenous variables included in the independent variables. Because this endogenous variable (FI and FD) are associated with other variables which were not included in this model and disturbance term is correlated with the endogenous variables as well as violating the assumptions of OLS. Mainly, the explanatory variable (FD) are the dependent variable of other equation XI in the system and error term is expected to be correlated [Davidson and MacKinnon (1993); Greene (2012)]. To overcome this endogeneity issues, our study relies on endogeneity covariates method (2SLS or 3SLS) to estimates impact of financial inclusion on financial development and vice-versa with controlling other determinants altogether. From endogeneity covariates estimation methods (2SLS and 3SLS), this present study mainly relies on 3SLS method than 2SLS because it is more efficient that 2SLS where it uses cross equations information and heteroscedasticity exist in the error term in the models.

The empirical estimates of 3SLS method reveal that financial development is positively associated with the financial inclusion. Moreover, GDP per capita is positively linked to both financial inclusions as well as financial development. Again, the empirical estimates that Trade openness and urbanization are positively related to financial development whereas inflation is negatively related to financial development. Similarly, literate and working age people are positively linked with financial inclusion whereas the rural population is negatively related to financial inclusion (see Table 6.2.2)

Independent	OLS	2SLS	3SLS
variables	(Financial	(Financial	(Financial
	Development)	Development)	Development)
GDP per capita	0.313	0.445	0.437**
1 1	(0.393)	(0.399)	(0.146)
Human Capital	-0.683**	-0.537	0.888**
	(0.325)	(0.432)	(0.374)
Trade	-0.010	0.057***	0.091***
Openness	(0.061)	(0.016)	(0.017)
Inflation	-0.038**	-0.048	-0.041**
	(0.011)	(0.042)	(0.034)
Urbanization	-1.084***	0.671	1.872**
_	(0.169)	(0.991)	(0.847)
	OLS	2SLS	3SLS
	(Financial	(Financial	(Financial
	Inclusion)	Inclusion)	Inclusion)
Financial	0.241**	0.522	0.801***
Development	(0.110)	(0.326)	(0.272)
(FD)			
GDP per capita	1.091***	1.290**	1.219***
	(0.398)	(0.491)	(0.414)
Rural	-5.032**	-3.014	-2.416***
Population	(1.957)	(3.067)	(0.593)
Age	-0.904	-1.781	2.417**
	(2.744)	(4.192)	(0.946)
Literacy	1.919***	1.899***	1.667***
	(0.256)	(0.284)	(0.243)
Obs.	35	35	35
Endogenous	: Financial Deve	lopment, Financial	Inclusion
variables			
Exogenous	: GDP per capit	a, Human Capital,	, Trade Openness,
variables	Inflation, Urba	nization, Rural	Population, Age,
	Literacy		

 Table 6.2.2: Least squares regression results between financial inclusion and financial development in India

Notes: The Standard errors are in parenthesis. *** and ** denote significance at 1% and 5% level respectively.

To know the causality between financial development and financial inclusion in aggregate level, we use Granger causality test. The empirical estimates suggest that financial development causes financial inclusion in India but not vive-versa. To find out the robustness of the result, we take lag 1, lag 2, and lag 3 and find the similar results (see Table 6.2.3). Therefore, we conclude that financial development causes financial inclusion in India during the specified period of time (1980-2014). However, financial inclusion does not cause financial

development in India. This result reveals that a country may start with financial development and slowly spread financial inclusion among the people, which will further stimulate the economic growth.

Null Hypothesis	Direction of causality					
	Obs.	Lags	F-stat	Prob.		
FI does not Granger	34	1	0.368	0.548		
Cause FD						
FD does not Granger	34	1	7.924***	0.008		
Cause FI						
FI does not Granger	33	2	0.455	0.675		
Cause FD						
FD does not Granger	33	2	5.277***	0.011		
Cause FI						
FI does not Granger	32	3	0.868	0.523		
Cause FD						
FD does not Granger	32	3	5.200***	0.006		
Cause FI						

 Table 6.2.3: Granger causality test between financial development

 and financial inclusion in aggregate level

Note: *** indicates at 1% level of significance

6.3. Causality between Financial Development and Financial Inclusion in Indian States

We know that there is a variation in the position of financial development and financial inclusion across the states of India. Some states may be financially developed but need not be financially inclusive like Maharashtra due to many reasons. To know the causality between financial development and financial inclusion in Indian states, we use panel Granger causality method. The result of pairwise Granger causality test suggests that there is a unidirectional relationship between financial development and financial inclusion in all states of India during the specified period (2000-2014). To find out the robustness of the result, we take lag 2, lag 4, and lag 6 and find the similar results (see Table 6.3.1).

In conclusion, FD is a main ingredient of economic growth whereas; growth of a country also extends financial inclusion as well financial development. On the other hand, FD plays a dominant role in spread of FI in the country. Therefore, these two concepts (FD and FI) are interrelated as well as closely independently to each other.

Null Hypothesis		Direction of causality		
	Obs.	Lags	F-stat	Prob.
FI does not Granger	392	1	0.208	0.648
Cause FD				
FD does not Granger	392	1	4.82***	0.028
Cause FI				
FI does not Granger	364	2	0.519	0.595
Cause FD				
FD does not Granger	364	2	5.868***	0.003
Cause FI				
FI does not Granger	336	3	0.336	0.603
Cause FD				
FD does not Granger	336	3	6.231***	0.002
Cause FI				

 Table 6.3.1: Pairwise Granger Causality Test between financial development and inclusion

Note: *** indicates at 1% level of significance

6.4. Concluding Remarks

The endeavor of this chapter is to discuss the linkages between financial development and inclusion while controlling other possible determinants in India over the period. Then this chapter finds out the causality between financial development and inclusion both at aggregate and for states of India. Significant results of this chapter include:

- I. There is a unidirectional relationship between financial development and inclusion in India. It indicates that the causality flows from financial development to financial inclusion but not vice versa.
- II. Other control variables like GDP per capita and human capital are a positive impact on both financial inclusions as well as financial development in India.
- III. Trade openness and urbanization are positively associated with financial development whereas inflation is negatively related to financial development.
- IV. Literate people and working age people are positively linked with financial inclusion whereas the rural population is negatively related to financial inclusion.

We conclude by saying that financial development in the economy is very much essential for financial inclusion in India. Addition to it, developed financial sector is also responsible for to give affordable financial access in the country. Moreover, this chapter concludes that financial development and inclusion are unidirectional to each other. That clearly indicates that financial development causes financial inclusion in India. Now the aim of the government of India should be improve affordable financial services to every section of society.

Chapter 7

Summary and Conclusion

This thesis attempts to study the impact of both financial development and inclusion on economic growth both at aggregate and state level in India. In addition to this, the study also explores the relationship between financial development and inclusion. In this thesis, chapter 2 reviewed the theoretical and empirical literature regarding measurement of multi-dimensional concepts i.e. financial development and inclusion and its effect on economic growth in India. While theoretical literature extends competing hypothesis regarding the positive relationship between both financial development and inclusion on economic growth whereas empirical studies produce an ambiguous result for the same. Chapter 3 provided the methodology for measurement of financial development and inclusion which shows the financial depth and access respectively in the Indian economy. Moreover, this chapter also provides empirical specifications to verify different hypothesis that establish the relationship between both financial development and financial inclusion and its individual impact on economic growth. Chapter 4, 5, and 6 presents results of these empirical exercises.

The present chapter is organized as follows: Section 7.1 provides the summary of the thesis with main results enumerated in subsection 7.1.1. Section 7.2 synthesizes all empirical findings for the policy implications especially for India. Section 7.3 elaborates upon the contribution of the study. Section 7.4 shows the limitations of the present research and outlines directions for future research. Lastly, section 7.5 provides the concluding remarks.

7.1. Overall Summary

Most of the developing countries like India are still far behind the inclusive finance in the economy. So, the Government of India has taken various steps from time to time to achieve financial inclusion and financial sector development. There is significant body of theoretical and empirical literature, which explains the importance of both financial development and inclusion on economic growth. However, different schools of thought have valued opinions regarding how a financial sector (that includes both financial institutions and financial markets) relates to economic growth through various channels. Some studies argue that financial development is a fundamental element for economic growth whereas another group of studies establishes that growth also drives financial development. Moreover, there are several channels through which financial development promotes economic growth in the economy including efficient allocation of capital, mobilization of savings through attractive investment, and also lowering cost of information [see Schumpeter (1911); Goldsmith (1969); McKinnon (1973); Gleb (1989); Levine (1991); King and Levine (1993); Fry (1997); Ranjan and Zinglas (1998); Bhatacharya and Sivasubramanian (2003); Owusu and Odhiambo (2014); Lopes and Jesus (2015)]. Adding to it, other studies explain that financial market (say stock market) plays a key factor for economic growth including financial institutions [see Levine and Zervos (1998); Beck et al., (2000); Levine et al., (2000); Beck and Levine (2004)]. Moreover, some studies argue that not only financial development helps to increase economic growth, but the growth of a country also drives financial development [see Robinson (1952) and Kuznets (1955)]. These studies include that increase in growth lead to increase in financial development and financial markets begin to grow as an economy approaches at the intermediate stage of the growth process and develops once the economy is completely developed.

Much empirical evidence also finds that there is a positive and significant relationship between financial development and economic growth especially in India [see Ahmed and Ansari (1998); Acharya et al., (2009); Chakraborthy (2010); Hussain and Chakraborthy (2012); Bhanumurthy and Singh (2013); Sahoo (2013); Kar and Mandal (2014); Lenka (2015); Sarma and Bardhan (2016)]. However, there exists a bidirectional relationship between financial development and economic growth [see Demetriades and Luintel (1997); Luintel and Khan (1999); Singh (1998) and Pradhan (2009)] whereas as some studies finds unidirectional relationship [Bell and Rousseau (2001); Bhatachary and Suvasubramanian (2003)]. Moreover, the recent study by Nain and Kamaiah (2014) computed financial development index using various financial proxies through PCA method and investigates that there is no causal relationship between financial development and economic growth.

The ambiguity in understanding the impact of financial development on economic growth in India due to use of various proxies for financial development different period and also valued investigation techniques by various researchers. Considering the existing gaps, we computed composite financial development index for measuring financial depth. Using financial development index the present study estimates positive impact on economic growth both in long run and in short run. Also, the empirical estimates find a bidirectional relationship between financial development and economic growth. The uniqueness of our study lies in that it unravels a unidirectional relationship between stock market and economic growth.

Similarly, there has been substantial literature from theoretical and empirical perspectives that explains the positive impact of financial inclusion on economic growth [see Schumpeter (1911); Salop (1979); Mohan (2006); Swamy (2010); Dixit and Ghosh (2011); Onaolapo (2015); Sharma (2016)]. As financial inclusion reduces poverty and inequality by increasing the income of the poor and marginalized community and increase economic growth (Kim, 2016). Thus, a sustainable social development can be simultaneously achieved along with financial inclusion, which is helpful for economic growth (Banerjee and Francis, 2014). However, different studies [Arora (2010); Gupte et al., (2012); CRISIL (2013); Pradhan et al., (2014); Chakravarty and Pal (2013); Sharma (2015);] compute a composite financial index using various financial proxy variables but these studies have not included the number of banking personnel as a ratio of bank branches, which is essential for financial inclusion. Therefore, this study includes this factor in the composite index by PCA method for measuring financial access in the Indian economy. Using the composite index, this study finds the positive impact of financial inclusion and economic growth both the long run and short run. Also, this study finds there is a unidirectional relationship between financial inclusion and economic growth. Moreover, this study reports that financial liberalization policy has contributed to the economic growth in India. Lastly, this study estimates that there is a unidirectional relationship between financial development and financial inclusion in India.

In terms of data and methodology, the present study uses country-level aggregate data from 1980 to 2014 and state level data from 2000-2014. The present study uses different data sources including Basic statistical return file from Reserve Bank of India (RBI), World Development Indicators (WDI). International Financial Statistics (IFS) from International Monetary Fund (IMF), Bloomberg, Economic Survey Report (2015-16) from the Office of the Register General of India, Ministry of Home Affairs for secondary data to conduct the empirical investigation. We deal with set of issues related to time series and panel data by adopting appropriate modeling techniques including Autoregressive Distributed Lag (ARDL), Error Correction Model (ECM), Fully Modified Ordinary Least Squares (FMOLS), Dynamic Ordinary Least Squares (DOLS) model, Two-stage Least Squares (2SLS) and Three-stage Least Squares (3SLS) following existing literature.

For the construction of a multidimensional index, weights can play a significant role in the overall composite indicator. Researchers mostly derive weights in two ways. Either by using participatory methods, like analytical hierarchy process or employing a statistical model likes factor analysis-PCA. In PCA, eigenvector and factor scores can calculate weights whereas, in Analytical and Hierarchy Process (AHP) weight depends on components that are more influential, depending on expert opinion, and reflect on policy priorities or technical factors. AHP may add subjectivity of the experts regarding the significance of various components. This study relies on the statistical procedure to avoid the subjectivity i.e. PCA for both FD and FI index.

We employ ARDL model because some of our variables that are used in this study are stationary in their level form I(0) and others in first difference I(1). The uniqueness of ARDL-bound testing approach is that it could be applied irrespective of whether variables are I(0), I(1) or combinations of both whereas Ordinary Least Square (OLS) cannot be applied (Pesaran et al., 2001). Further, ARDL method provides unbiased long run estimates with valid t-score even where some of the regressors are endogenous in nature (Owusu and Odhiambo, 2014). Again, in our state level co-integrated data we use FMOLS and DOLS method because it reduces the serial correlation and endogeneity in the regressors and gives robust result (Acharya et al., 2009). Finally, we also use systems of the equation model for removing endogeneity in the data.

7.1.1. Main Findings of the Study

The main findings of the study include:

- I. We conclude from the financial development index that all states in India are developing the financial sector (both banking and non-banking) from 2000-2014.
- II. Among all states of India, Goa reach at the top and the states Maharashtra and Punjab are in ranked in 2nd and 3rd respectively. However, the states Mizoram, Sikkim and Manipur are placed in rank 26th, 27th and 28th respectively in the year 2014.
- III. In addition to this, we conclude from the financial inclusion index that all states of India are moving forward in the financial access from 2000-2014 like financial development.
- IV. Among all states of India, Goa reach at the top and the states Kerala and Tamil Nadu are in ranked in 2nd and 3rd respectively. However, the states Mizoram, Manipur and Nagaland are placed in rank 26th, 27th and 28th respectively in the year 2014.
- V. The empirical results reveal that the financial development, in the long run as well as in the short run, positively influences economic growth in India.
- VI. The study also finds that there is bidirectional causal flows from financial development to economic growth expect in a stock market context where the relationship is unidirectional.
- VII. The empirical result shows that the financial inclusion, in the long run as well as in the short run, positively influences economic growth in India.
- VIII. However, the study also finds that there is a unidirectional causal flow from financial inclusion to economic growth.
- IX. Again, the empirical estimates posit that usability of banking services (deposit and credit) is essentials for

financial inclusion, which will ultimately stimulate regional economic growth in India.

- X. The study concludes that the financial reforms undertaken in India have resulted in economic growth both in the short run as well as in the long run. This clearly indicates that the implementation of appropriate liberalization policies spurs economic growth.
- XI. The study finds that there is a unidirectional relationship between financial development and inclusion in India. That indicates causal flows from financial development to inclusion but not vice versa.
- XII. Other control variables GDP per capita and human capital have a positive impact on both financial inclusions as well as financial development in India.
- XIII. Trade openness and urbanization are positively associated with financial development whereas inflation is negatively related to financial development.
- XIV. Literate people and working age people are positively linked with financial inclusion whereas the rural population is negatively related to financial inclusion.

7.2. Synthesis and Policy Implications

7.2.1. Synthesis

We have synthesized our empirical findings that are clearly explained in chapter 4, 5, and 6 to understand the effect of both financial development and inclusion on economic growth as well as how financial development is related to financial inclusion in India with controlling all possible determinants. One common thread we find in our result that both financial development and inclusion, are positively linked with economic growth in India not only in short run but also in long run.

Direction of causality between FD, FI and Y					
	Financial	Financial	Economic		
	Development	Inclusion (FI)	Growth (Y)		
	(FD)				
Financial		FI does not	Y causes FD		
Development		causes FD			
(FD)					
Financial	FD causes FI		Y causes FI		
Inclusion (FI)					
Economic	FD causes Y	No clear result			
Growth (Y)		between FI			
		and Y			

Table 7.2.1: Relationship between FD, FI and Y

Moreover, there is a bidirectional relationship between financial development and economic growth whereas unidirectional relationship exists between financial inclusion and economic growth (see Table 7.2.1). It implies that with respect of financial development, Indian economy has reached a state where by economic growth and financial development feed into each other. Considering this unidirectional relationship, it is likely that developed financial sector is moving towards being more inclusive. An empirical study suggests that financial development and inclusion are positively associated with economic growth on theoretical assumptions. However, there exists a unidirectional relationship between financial development and inclusion in India.

7.2.2. Policy Implications

The main policy implication for Government of India includes:

I. Our estimates suggest that the most important task for the Government of India (GOI) is to improve the functioning of both FIs and FMs, which will simultaneously stimulate financial development and economic growth.

- II. Again, important duty of GOI is to focus especially on Northeast region for improving financial institutions, which will helps to increase financial services in their states.
- III. We find from our empirical estimates that some states like Maharashtra is financial developed but not financially inclusive. So, the responsibility of the state government is to find out the relevant causes and appropriate measures to solve this issue.
- IV. To increase in the financial inclusion and cashless society, GOI is to spreads awareness, financial education as well as set up infrastructure on financial institutions in all sections of society.
- V. Further, the government has to maintain high economic growth to boost demand for financial services, which ultimately will lead to financial development in India.
- VI. Moreover, the most important task for the RBI as well as SBBs is to improve the functioning of financial institutions, which will simultaneously stimulate financial inclusion as well as economic growth.

7.3. Contribution of the Study

Considering the existing literature and its gaps, this study has three main objectives to extend the analysis. Firstly, the study measures the financial development index using various financial proxy variables from financial intuitions (which consist of both banking and nonbanking institutions) and financial markets and international capital flows (i.e. FDI and inflows of remittance) and estimates the impact of financial development on economic growth in India. Secondly, the study measure the financial inclusion index including all financial access variables and empirically estimates the impact of financial inclusion on economic growth. Thirdly, this study establishes the relationship between financial development and financial inclusion with a set of possible determinants, which is the first time in India. Moreover, this study empirically estimates all three objectives both at aggregates as well as at all states of India.

7.4. Limitations and Future Research

This study has some limitations that, it uses few variables from nonbanking financial institutions (like insurance and provident fund) for construction of the financial development and not includ other variables related (mutual funds, investment trusts, small savings organizations, etc.) which are also essential for the development of the financial sector. Similarly, this study is a limited to scheduled commercial banks related variables to capture financial inclusion due to data availability in India and does not include MFIs, SHGs, and POSB, which play a significant role in financial inclusion especially in rural areas. Therefore, there is ample scope for gathering information regarding their role towards financial Inclusion may through survey data, which can be a good area for further research

7.5. Concluding Remarks

This thesis attempts to understand the impact of financial development and financial inclusion on economic growth, especially in India. Results highlight two aspects of finance (i.e. financial development and inclusion) are significantly for the economic growth both in longrun as well as in short-run. Secondly, there exists a unidirectional relationship between financial development and financial inclusion. Now financial inclusion is an emerging topic for inclusive growth, so we need to create sufficient research linkages to human development and human capital in future.

References

- Adu, G, G Marbuah and JT Mensah. (2013). Financial development and economic growth in Ghana: Does the measure of financial development matter? Review of Development Finance,3(4), 192-203. doi:10.1016/j.rdf.2013.11.001
- Aduda, J, and Kalunda, E. (2012). Financial Inclusion and Financial Sector Stability With Reference To Kenya: A Review of Literature. *Journal of Applied Finance & Banking*, 2(6): pp.95-120.
- Ahmed, S. M. and Ansari, M. I. (1998). Financial sector development and economic growth: the South-Asian experience, *Journal of Asian Economics*, 9(3), 503
- Akinlo, A.E., and Egbetunde, T. (2010). Financial Development and Economic Growth: The Experience of 10 Sub-Saharan African Countries Revisited. *The Review of Finance and Banking*, 2(1):17-28.
- Al-Jarrah, I.M., Al-Zu'bi, M.F., Jaara, O.O. Alshurideh, M., (2012). Evaluating the impact of Financial Development on Economic Growth in Jordan.*International Research Journal of Finance* and Economics, Vol. 94.
- Allen, F, E Carletti, R Cull, J.Q Qian, L Senbet, and P. Valenzuela. (2014). The African Financial Development and Financial Inclusion Gaps. *Journal of African Economics*, 23 (5), 614-642.
- Alter, A and B Yontcheva (2015). Financial Inclusion and Development in the CEMAC. *IMF Working Papers*, 235, 1-30.
- Ang, JB (2008). What are the mechanisms linking financial development and economic growth in Malaysia? *Economic Modeling*,25(1), 38-53. doi:10.1016/j.econmod.2007.04.006
- Arora, R. U. (2010): "Measuring Financial Access". Griffith University, *Discussion Paper Economics*, No-7, Australia.
- Ayadi, R ,Arbak, E, Naceur, S.B and Groen, W.P (2013). Determinants of Financial Development across the Mediterranean. *MEDPRO Technical Report No. 29/February*.
- Bagil, S. and Dutta, P. (2012). A study of financial inclusion in India. Journal of Radix International Educational and Research Consortium. 8(1).

- Bahmani-Oskooee, M. (2001). Nominal and real effective exchange rates of middle eastern countries and their trade performance. Applied Economics,*33*(1), pp.103-111. doi:10.1080/00036840122490
- Baltagi, B, P Demitriades and SH Law (2007). Financial Development, Openness, and Institutions: Evidence from Panel Data. Conference on New Perspectives on Financial Globalization Research Department, IMF, 1-31.
- Banerjee, S. and Francis, G. (2014). Financial Inclusion and Social Development. *International Journal of scientific research and management*, special issue, pp.13-18.
- Baxter, M. J. (1995). Standardization and Transformation in Principal Component Analysis, with Applications to Archaeometry. *Applied Statistics*, 44(4), pp.513. doi:10.2307/2986142
- Beck. T and Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance*, 28, 423–442
- Beck, T., Demirguc., Kunt, A. and Martinez, M. S. (2007).Reaching out: Access to and use of banking services across countries. Journal of Financial Economics, 85:234-266.
- Behera, H.K., and Ranjan, R. (2009). Dynamics of Financial Globalization and Growth: Some Evidence from Emerging Market Economics. *Reserve Bank of India Occasional Papers*, 30(2), 1-36.
- Bekaert, G. Harvey, C.R (2002). Research in emerging markets finance: looking to the future. *Emerging Markets Review*, *3*(*4*), pp. 429–448.
- Bell C, Rousseau P. L., (2001). Post-independence India: a case of finance-led industrialization? *J Dev Econ* ,65,153–175.
- Bencivenga, V. R., Smith, B. D., (1991). Financial Intermediation and Endogenous Growth. *The Review of Economic Studies*,58(2), 195. doi:10.2307/2297964
- Benyah, FEK (2010). The Determinants of Financial Developments: A Focus on African Countries. *Master Thesis in Economics*, Jonkoping University, 1-24.
- Bhanumurthy, N., & Singh, P. (2013). Financial sector development and economic growth in Indian states. *International Journal of*

Economic Policy in Emerging Economies,6(1), 47. doi:10.1504/ijepee.2013.054472

- Bhaskar, P. (2013). Financial inclusion in India-an assessment. Speech at the MFIN and Access-Assist summit, New Delhi, 10 December.
- Bhatia, N. and Chatterjee, A., (2010). Financial inclusion in the Slums of Mumbai. *Economic & Political weekly*, Vol. XLV, No. 42, pp.23-26.
- Bhattacharya P.C. & Sivasubramanian M.N. (2003). Financial development and economic growth in India: 1970–1971 to 1998–1999. *Applied Financial Economics*, 13, 925–929.
- Bhavani, TA and N. R Bhanumurthy (2012). Financial Access in Postreform India. *Oxford University Press*, 1-169.
- Bihari, S. C. (2011). Growth through financial inclusion in India. Journal of International Business Ethics, 4(1):28<41.
- Bojanic, A. N. (2012). The Impact of Financial Development and Trade On The Economic Growth Of Bolivia. *Journal of Applied Economics*, 15(1), 51-70. doi:10.1016/s1514-0326(12)60003-8
- Brown, R.L., J. Durbin, and J.M. E., (1975). Techniques for Testing the Constancy of Regression Relations over Time, 1975, *Journal of the Royal Statistical Society*, Vol. 37, pp.149-163.
- Burgess, R and R Pande (2005). Do rural banks matter? Evidence from the Indian social banking experiment, *The American Economic Review*, 95, 780-795.
- Chakraborty, I (2010). Financial Development and Economic Growth in India: An Analysis of the Post-reform Period. *South Asia Economic Journal*,11(2), 287-308. doi:10.1177/139156141001100206
- Chakravarty, S. R. and Pal, R. (2013). Financial Inclusion in India: An axiomatic approach. *Journal of Policy Modeling*, 35 (5), pp.813-837.
- Chauvet, L and L Jacolin (2015). Financial inclusion and firms performance. *FERDI conference paper*, Banque de France, 1-24.
- Cherif, M, and Dreger, C. (2014). Institutional Determinants of Financial Development in MENA Countries. WID Discussion Paper, 1-15.
- Cheriff, M and C Dreger(2014). Institutional Determinants of Financial Development in MENA Countries. *DIW BERLIN Discussion Papers*, 1422, 1-15.
- Christopoulos, D. K., & Tsionas, E. G. (2004). Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics*, 73(1), 55-74. doi:10.1016/j.jdeveco.2003.03.002
- Chung, PT, Sun S and DT Vo(2016). How Does Financial Development Interact With Economic Growth In Five Asian Countries? *The Singapore Economic Review*, 61(2), 1-20. doi:10.1142/s0217590816500120
- Clamara, N, X Pena and D Tuesta (2014). Factors that matter for Financial Inclusion: Evidence from Peru. *BBVA Working Paper*, 14/09, 1-26.
- Crisil (2013). A report on Index to measure Indian's progress on financial inclusion, *CRISIL*. Available at: https://www.crisil.com/about-crisil/crisil-inclusix.html
- Davidson, R and J.G Mackinnon (1993). Estimation and Inference in Econometrics, *Oxford university Press*, New York.
- Demetriades P.O. Luintel K.B. (1997). The direct costs of financial repression: evidence from India. *RevEcon Stat*, 79, 311–320.
- Demetriades, P. O., & Hussein, K. A. (1996). Does financial development cause economic growth? Time-series evidence from 16 countries. *Journal of Development Economics*, 51(2), 387-411. doi:10.1016/s0304-3878(96)00421-x
- Demirguc-Kunt, A., and Klapper, L. (2012). Measuring financial inclusion. *The Global findex Database*, World Bank.
- Diamond, D. W. (1984). Financial Intermediation and Delegated Monitoring. *The Review of Economic Studies*, *51*(3), 393. doi:10.2307/2297430
- Diamond, D. W., Dybvig, P. H.(1983). Bank Runs, Deposit Insurance, and Liquidity. *Journal of Political Economy*,91(3), 401-419. doi:10.1086/261155
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*,74(366a), 427-431. doi:10.1080/01621459.1979.10482531

- Dickey, D. A., Fuller, W. A.(1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. Econometrica,49(4), 1057. doi:10.2307/1912517
- Diniz et. al. (2008). Eigenvector estimation of phylogenetic and functional diversity. Functional Ecology, 25, 735–744, doi: 10.1111/j.1365-2435.2011.01836.x
- Dixit, R., and Ghosh, M. (2013). Financial inclusion for inclusive growth of India-A study of Indian states. *International Journal of Business Management & Research*, 3(1), pp.147-156.
- E. Sogut (2008). The Determinants of Financial Development and Private Sector Credits: Evidence from Panel Data.*Master Thesis in Economics*, Middle East Technical University, 1-35.
- Egbetunde, T., & Akinlo, A. E. (2015). Financial Globalization and Economic Growth in Sub-Saharan Africa: Evidence from Panel Cointegration Tests. *African Development Review*,27(3), 187-198. doi:10.1111/1467-8268.12140
- Ellis, K, A Lemma and J Rud (2010). Financial inclusion, household investment and growth in Kenya and Tanzania. *Project Briefing, Overseas Development Institute*, 43, 1-4.
- Engle, R. F., and Granger, C. W., (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing, *Econometrica*, Vol. 55, No. 2, 251. doi:10.2307/1913236
- Fry, M. J. (1980). Saving, investment, growth, and the cost of financial repression. *World Development*, Vol. 8(4), pp. 317-327.
- Fry, M. J. (1981). Interest rates in Asia: an examination of interest rate policies in Burma, India, Indonesia, Korea, Malaysia, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, Taiwan, and Thailand. *Study prepared for the IMF Asian Department*, Washington, DC.
- Fry, M. J. (1997). In Favour of Financial Liberalisation. *The Economic Journal*, *107*(442), 754-770. doi:10.1111/j.1468-0297.1997.tb00041.x
- Fry, M.J. (1979). Money and capital or financial deepening in economic development? *Journal of Money, Credit and Banking*, Vol. 10(4), pp. 464-475.

- Fry, M.J. (1982). Models of financially repressed developing economies. World Development, Vol. 10(9), pp. 731-750. doi.org/10.1016/0305-750X(82)90026-2
- Fungacova, Z and L Weill (2014). Understanding financial Inclusion in China. *BOFIT Discussion Papers*, 10, 1-27.
- Gerschenkron, A. (1962). Economic Backwardness in Historical Perspective: A Book of Essays. Cambridge, MA, *Harvard University Press*.
- Ghosh, A. (2007). Financial inclusion through Micro Finance in India and Emerging Role of POSB: An Analysis. Presented in 60thAll India Commerce Conference, Osmania University, Hyderabad, India. avaible at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1655737
- Ghosh, J. (2013). Microfinance and the challenge of financial inclusion for development. *Cambridge Journal of Economics*,37(6), pp.1203-1219. doi:10.1093/cje/bet042
- Gleb, A.H. (1989). Financial policies, growth and efficiency. *Policy Planning and research working* Papers No. 202, Washington DC, World Bank.
- Goldsmith, R.W. (1969). Financial structure and development. *Yale University Press*.
- Gonzalo, J. (1994). Five alternative methods of estimating long-run equilibrium relationships. *Journal of Econometrics*,60(1-2), 203-233. doi:10.1016/0304-4076(94)90044-2
- Gounder, N. (2012). Financial Development and Economic Growth in Fiji: New Empirical Evidence. *Discussion Papers Economics, Griffith University*, Australia.
- Green, WH (2012). Econometric Analysis. 7th ed, Upper Saddle River, NJ: Prentice Hall.
- Guevara, J.F.D. and Maudos, J.(2012). Financial integration and economic growth in Europe: the impact of the crisis. *INDICSER Discussion paper*, No.18.
- Gupte, R, B Venkataramani and D Gupta (2012). Computation of financial inclusion index for India. *Procedia-Social and Behavioral Sciences*, 133-149.

- Gurley. J and E. Shaw (1960). Money in a Theory of Finance. Washington: Brookings.
- Hameedu, M. S. (2014). Financial Inclusion- Issues in Measurement and Analysis. *International journal of Current Research and Academic Review*, 2(2):pp.116-124.
- Hassan, M. K., Sanchez, B., & Yu, J. (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of Economics and Finance*,51(1), 88-104. doi:10.1016/j.qref.2010.09.001
- Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking & Finance*, 32.(11), pp. 2493–2500. doi.org/10.1016/j.jbankfin.2008.05.004
- Huang, Y (2005). What Determines Financial Development? *University of Bristol*, 1-45. URL: http://www.ecn.bris.ac.uk/www/ecxyh/huangyf.htm.
- Huang, Y. (2005). Will political liberalization bring about financial development? Department of Economics, University of Bristol: Bristol, UK, Economic Discussion Papers No. 05/578.
- Hussain, F. and Chakraborty, D.K. (2012). Causality between Financial Development and Economic Growth: Evidence from an Indian State, *The Romanian Economic Journal*, 45, pp.27-48.
- International Moneytary Fund (2011). Pursuing Equitable and Balanced Growth. Annual Report of the Exucative Board for the financial Year Ended April 30, 2011.
- International Moneytary Fund.,(2016). Introducing a New Broad-based of Financial Development, ,https://www.imf.org/external/pubs/cat/longres.aspx?sk=43621.0
- Inoubli, C. (2011). Does financial development impact on growth? Empirical evidence with threshold effect in the MENA Region. *ERF 17th Annual Conference Paper*. Economic research forum.
- Jalil, A., & Feridun, M. (2011). Impact of financial development on economic growth: Empirical evidence from Pakistan. *Journal of* the Asia Pacific Economy, 16(1), 71-80. doi:10.1080/13547860.2011.539403
- Johansen, S. (1988). Statistical analysis of cointegration vectors. Journal of Economic Dynamics and Control, 12(2-3), 231-254. doi:10.1016/0165-1889(88)90041-3

- Johansen, S., & Juselius, K. (2009). Maximum Likelihood Estimation And Inference On Co-integration - With Applications To The Demand For Money. Oxford Bulletin of Economics and Statistics, 52(2), 169-210. doi:10.1111/j.1468-0084.1990.mp52002003.x
- Jolliffe, I. T., (1986). Principal component analysis"., New York: Springer-Verlag.
- Jovi, D. (2011). Microfinance, Financial Inclusion, and Financial Development: An Empirical investigation with an international perspective. *Managing Services in the Knowledge Economy international conference proceedings*, 385-398.
- Kabir Hassan, Sanchez, B and Yu, J,S (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of Economics and Finance*, 51, 88–104. <u>doi.org/10.1016/j.qref.2010.09.001</u>
- Kar, S., & Mandal, K. (2014). Re-Examining the Finance-Growth Relationship for a Developing Economy: A Time Series Analysis of Post-Reform India.*The Journal of Developing Areas*,48(1), 83-105. doi:10.1353/jda.2014.0017
- Kelkar, V (2010). Financial inclusion for inclusive growth. ASCI Journal of management, 39, 55-68.
- Khalfaoui, H (2015). The Determinants of Financial Development: Empirical Evidence from Developed and Developing Countries. *Applied Economics and Finance*, 2(4):1-9.
- Kim, D.H., Lin, S.C., and Suen, Y.B. (2010). Dynamic effects of trade openness on financial development. *Economic Modelling*, Vol.27(1), pp.254-261. <u>doi.org/10.1016/j.econmod.2009.09.005</u>
- Kim, J. (2016): "A Study on the Effect of Financial Inclusion on the Relationship Between Income Inequality and Economic Growth". *Emerging Markets Finance and Trade*, 52(2), pp.498-512. doi:10.1080/1540496x.2016.1110467
- King, R. G., & Levine, R. (1993). Finance and Growth: Schumpeter Might Be Right. *The Quarterly Journal of Economics*, 108(3), 717-737. doi:10.2307/2118406
- King, R., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108, 717–738. doi.org/10.2307/2118406

- Kremers, J., Neil E., and Juan D. (1992). The Power of Co-integration Tests. Oxford Bulletin of Economics and Statistics 54, pp.325– 348. DOI: 10.1111/j.1468-0084.1992.tb00005.x
- Kumar, N (2013). Financial Inclusion and Its Determinants: Evidence from India. *Journal of Financial Economic Policy*, 5 (1), 4-19.doi.org/10.1108/17576381311317754
- Kumar, C. and Mishra, S. (2011). Banking Outreach and Household level Access: Analyzing Financial Inclusion in India, IGIDR, Mumbai.
- Kuri PK and A Laha (2011). Determinants of Financial Inclusion: A Study of Some Selected Districts of West Bengal, India. *Indian Journal of Finance*, 5(8).
- Kuznets, S. (1955). Economic growth and income inequality. *American economic review*, 45, 1-28.
- Laurenceson, J., and Chai, C.H.J. (2003). Financial reform and economic development in China, Edward Elgar, UK.
- Law SH and P Demetriades (2006). Openness, Institutions and Financial Development. *WEF Working Paper Series*, 1-28.
- Law, SH and MS Habibullah (2009). The determinants of financial development: Institutions, openness, and financial liberalization. *South African Journal of Economics*, 77 (1): 45-58.
- Lenka, S. K. (2015). Does financial development influence economic growth in India? *Theoretical and Applied Economics*, 22 (4), 159-170.
- Lenka, S. K., (2015) Measuring financial development in India: A PCA approach. *Theoretical and Applied Economics*, Vol. 22, No. 1, pp.187-198.
- Lenka, SK and A Bairwa (2016). Does financial inclusion affect monetary policy in SAARC countries? *Cogent Economics & Finance*, 4(1), 1-8. doi.org/10.1080/23322039.2015.1127011
- Levine, R. (1991). Stock Markets, Growth, and Tax Policy, *The Journal of Finance*, 46, (4) pp. 1445-1465.
- Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda, *Journal of Economic Literature*, 35, 688-726.

- Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*,46(1), 31-77. doi:10.1016/s0304-3932(00)00017-9
- Levine. R and Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. *The American Economic Review*, 88, (3), pp. 537-558
- Lopes, T. H., & Jesus, C. S. (2015). Financial liberalization and economic growth. *Journal of Economic Studies*,42(2), 207-223. doi:10.1108/jes-08-2013-0118
- Luca, O and N Spatafora (2012). Capital Inflows, Financial Development, and Domestic Investment: Determinants and Inter-relationships. *IMF working paper*, 1-21.
- Luintel K.B, Khan M, Arestis P, Theodoridis, K. (2008). Financial structure and economic growth. *J Dev Econ*, 86,181–200.
- Mahadeva, M. (2008): Financial Growth in India: Whither Financial Inclusion? *Margin: The Journal of Applied Economic Research*,2(2), pp.177-197. doi:10.1177/097380100800200202
- Mankiw, N. G., Romer, D., & Weil, D. N. (1992): A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics*, 107(2), pp.407-437. doi:10.2307/2118477
- Masoud, N., & Hardaker, G. (2012). The impact of financial development on economic growth. *Studies in Economics & Finance Studies in Economics and Finance*,29(3), 148-173. doi:10.1108/10867371211246830
- Mauro, P. (2000). Stock Returns and Output Growth in Emerging and Advanced Economies, *IMF Working Paper*, 89, 1-35.
- Mckinnon, R. I. (1974). Money and Capital in Economic Development. *The International Economy*, (25), 169-175. doi:10.5652/kokusaikeizai.1974.169
- Mehrotra, A and J Yetman (2015). Financial inclusion issues for central banks. *BIS Quarterly Review*, 476, 1-26.
- Minier, J. (2003). Are small stock markets different? *Journal of Monetary Economics*, 50 (1), 593–602.
- Mohan, R. (2006). Economic Growth, Financial Deepening and Financial Inclusion. *Reserve Bank of India Bulletin*, pp.1305-1320.

- Naceur SB, M Cherif, M Kandil (2014). What drives the Development of the MENA Financial Sector? *Borsa Istanbul Review*, 20, 1-12. <u>http://www.elsevier.com/journals/borsa-istanbulreview/2214-8450</u>
- Nain, M. Z., & Kamaiah, B. (2014). Financial development and economic growth in India: Some evidence from non-linear causality analysis. *Economic Change and Restructuring*,47(4), 299-319. doi:10.1007/s10644-014-9151-5
- Narayan, S., & Narayan, P. K. (2005). An empirical analysis of Fiji's import demand function. *Journal of Economic Studies*, 32(2), 158-168. doi:10.1108/01443580510600931
- Nejad, OD (2010). Determinants of Financial Development in Iran: Do Financial Repression Policies Hinder Financial Development? *Master of Science in Banking and Finance*, Eastern Mediterranean University, 1-71.
- Neusser, K., & Kugler, M. (1998). Manufacturing Growth and Financial Development: Evidence from OECD Countries. *Review of Economics and Statistics*,80(4), 638-646. doi:10.1162/003465398557726
- Odhiambo, N. M. (2010). Finance-investment-growth nexus in South Africa: An ARDL-bounds testing procedure. *Economic Change and Restructuring*,43(3): 205-219. doi:10.1007/s10644-010-9085-5
- OECD (2008). Organisation for Economic Co-operation and Development, *Annual Report*.
- Onaolapo, A. R. (2015): Effects of financial inclusion on the economic growth of Nigeria (1982-2012). *International Journal of Business and Management Review*, 3(8), pp.11-28.
- Ouattara, B. (2004). Modeling the Long Run Determinants of Private Investment in Senegal, The School of Economics Discussion Paper Series, 0413, University of Manchester.
- Owusu, E. L., & Odhiambo, N. M. (2014). Financial liberalization and economic growth in Nigeria: An ARDL-bounds testing approach. *Journal of Economic Policy Reform*,17(2), pp.164-177. doi:10.1080/17487870.2013.787803

- P O Takyi, C K Obeng (2013). Determinants of Financial Development in Ghana. *International Journal of Development* and Sustainability, 2(4), 1-13.
- Paramasivan, C., and Ganeshkumar, V. G. (2012). Performance of Financial Inclusion through other Financial Services in Puducherry. *GRA Global Journal For Research Analysis*,3(1), pp.14-15. doi:10.15373/22778160/january2014/6
- Park CY and R V Mercado (2015). Financial Inclusion, Poverty and Income Inequality in Developing Asia. ADB Economics Working Paper Series, 426, 1-17.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289-326. doi:10.1002/jae.616
- Pesaran, M. H.and Shin, Y., (1999). An autoregressive distributed lag modeling approach to co-integration analysis, *Cambridge University Press*, pp.371-413.
- Pesaran, M.H. and Pesaran, B. (1997). Working with Micro fit 4.0: interactive econometric analysis. Oxford University Press, Oxford.
- Phillips, A. W., (1957). Stabilisation Policy and the Time-Forms of Lagged Responses, *The Economic Journal*, Vol. 67, No. 266, 265. doi:10.2307/2227788
- Pradhan, *et.al.* (2014). Development of banking sector and economic growth: the ARF experience. *Decision*,41(3), pp.245-259. DOI: 10.1007/s40622-014-0056-y
- Pradhan, R. P. (2009). The Nexus between Financial Development and Economic Growth in India: Evidence from Multivariate VAR Model. *International Journal of Research and Reviews in Applied Sciences*, 1(2), 141-151.
- Raghuram G. Rajan and Luigi Zingales. (1998). Financial Dependence and Growth. *The American Economic Review*, Vol. 88 (3): 559-586. : <u>http://www.jstor.org/stable/116849</u>
- Rangarajan, C. (2008). Report of the committee on Financial Inclusion, 2008, <u>https://www.nabard.org/pdf/full_report.pdf</u>
- Rasheed, B, SH Law, L Chin and MS Habibullah (2016). The Role of Financial Inclusion in Financial Development: International

Evidence, *Abasyn Journal of Social Science-Special issue*, Centre for Excellence in Islamic Finance (CEIF), 9(2), 330-348.

- Ray, P. and Prabhu, E. (May 2013). Financial Development and Monetary Policy Transmission Across Financial Markets: What Do Daily Data Tell for India? *Mumbai: Department of Economic and Policy Research, Reserve Bank of India.* http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/WPS070513F DTP.pdf
- Reserve Bank of India,(2015). Report of the committee on Mediumterm path on Financial Inclusion, <u>https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/FFIRA27</u> <u>F4530706A41A0BC394D01CB4892CC.PDF</u>
- Rioja, F., & Valev, N. (2004). Does one size fit all?: A reexamination of the finance and growth relationship. *Journal of Development Economics*, 74(2), 429-447. doi:10.1016/j.jdeveco.2003.06.006
- Robinson, J. (1952). The Rate of Interest and Other Essays. London: MacMillan.
- Rousseau, P. L., & Wachtel, P. (1998). Financial Intermediation and Economic Performance: Historical Evidence from Five Industrialized Countries. *Journal of Money, Credit, and Banking*,30(4), 657. doi:10.2307/2601123
- Sahay, R., Cihak, M and Diaye, P. N et. al. (2015). Rethinking Financial Deepening: Stability and Growth in Emerging Markets. *IMF Staff Discussion Notes*, 15(8), 1. doi:10.5089/9781498312615.006
- Sahoo, S. (2013). Financial Structures and Economic Development in India: An Empirical Evaluation. *RBI Working Paper Series*, WPS (DEPR): 02.
- Saint-Paul, G. (1992). Technological choice, financial markets and economic development. *European Economic Review*, *36*(4), 763-781. doi:10.1016/0014-2921(92)90056-3
- Salop, S. (1979). Monopolistic Competition with Outside Goods, *Bell Journal of Economics*, Vol. 10, pp.141-156
- Sargan, J. D. (1966). Wages and Prices in the United Kingdoms: a Study in Econometric Methodology, *In econometric analysis for National Economic Planning*, ed. by P.E. Hart, G. Mills, and J.N. Whittaker. London : Butterworths.

- Sarma, M (2008). Index of Financial Inclusion. *ICRIER Working paper* no.215.
- Sarma, M (2010). Index of Financial Inclusion. *Discussion Papers in Economics*, CITD, JNU, New Delhi. 1-29.
- Sarma, M (2012). Index of Financial Inclusion- A measure of financial sector inclusiveness", *Berlin Working papers on Money, Finance, Trade and Development*, No.7.
- Sarma, M (2015). Measuring financial inclusion. *Economics Bulletin*, Vol. 35 No. 1, pp. 604-611.
- Sarma, M and Pais, Jesim. (2011). Financial Inclusion and Development. *Journal of International Development*, 23, pp.613-628.
- Schumpeter, J. A.,(1934). The Theory of Economic Development. Harvard University Press,
- Schumpeter, J.A. (1911). The Theory of Economic Development. Cambridge: *Harvard University Press*.
- Shaik, H. (2015). A Study on Recent Measures of RBI on Financial Inclusion plan of Banks, *International Journal of Advanced Research in Computer Science and Management studies*. Vol. 3, No. 10, pp 1-7.
- Shaik, H. (2015). A Study on Recent Measures of RBI on Financial Inclusion plan of Banks. International Journal of Advance Research in Computer Science and Management Studies, 3, (10), ISSN: 2321-7782.
- Sharma, D. (2016).Nexus between financial inclusion and economic growth: Evidence from the emerging Indian economy. *Journal* of Financial Economic Policy, 8(1), pp.13-36.
- Sharma, R., & Bardhan, S. (2016). Finance growth nexus across Indian states: evidences from panel co-integration and causality tests. Economic Change and Restructuring. doi:10.1007/s10644-015-9178-2
- Shaw, Edward (1973). Financial Deepening in Economic Development (New York: *Oxford University Press*).
- Shetty, N. K. (2008). The microfinance promise in financial inclusion and welfare of the poor: Evidence from Karnataka, India. *ISEC Working Paper*, 205, pp.1-34.

- Siddik, M. et. al. (2015). Financial Inclusion and its Determinants: A Study of Bangladesh. *Indian Journal of Finance* 9(6):7-29.
- Singh, T. (2008). Financial development and economic growth nexus: time-series evidence from India. *Appl Econ*, 40, 1615–1627.
- Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. The *Quarterly Journal of Economics*,70(1), pp.65-94. doi:10.2307/1884513
- Sousa, MM (2015). Financial Inclusion and Global regulatory Standards: An Empirical Study of Developing Economics. *New Thinking and the New G20 Series*, 7, 1-12.
- Subbarao, D (2009). Financial Inclusion: Challenges and opportunities. *BIS Review*, 163, 1-8.
- Svaleryd, H., and J, Vlachos. (2002). Markets for Risk and Openness to Trade: How Are They Related?. *Journal of International Economics*, Vol.57, pp.356-395.
- Svirydzenka, K. (2016). Introducing a New Broad-based Index of Financial Development.*IMF Working Papers*, 16(05), 1. doi:10.5089/9781513583709.001
- Swamy, V (2014). Financial Inclusion, Gender dimension, and Economic Impact on Poor Households. *World Development*, 56, 1-15.<u>http://dx.doi.org/10.1016/j.worlddev.2013.10.019</u>
- Swamy, V. (2010). Bank-based financial intermediation for financial inclusion and inclusive growth. *Banks and Bank Systems*, 5(4), pp.63-73.
- Swanson, E. W., & Robinson, J. (1952). The Rate of Interest and Other Essays. Southern Economic Journal, 19(2), 249. doi:10.2307/1054775
- Takyi, P.O. & Obeng, C. K. (2013). Determinants of financial development in Ghana. *International Journal of Development* and Sustainability, 2(4): 2324-2336.
- Thorat, U. (2006). Usha Thorat: Financial inclusion for sustainable development – role of IT and intermediaries, Address by Ms Usha Thorat, Deputy Governor of the Reserve Bank of India, at the Annual Bankers' Conference 2006, Hyderabad, 4 November 2006.

- Thorat, U., (2006). Financial inclusion for sustainable development role of IT and intermediaries, Available at: <u>http://www.bis.org/review/r061107e.pdf</u>
- Tobin, J. (1965). Money and Economic Growth. *Econometrica*, 33 (4), 671-684.
- Tuesta, D, G Sorensen, A Haring and N Camara (2015). Financial Inclusion and its Determinants: The case of Argentina. BBVA Working Paper, 15/03, 1-28.
- World Bank. (2008). The World Bank Annual Report. Year in Review.
- World Bank. (2016). Financial Development. (n.d.). Retrieved December 30, 2016, from http://www.worldbank.org/en/publication/gfdr/background/finan cial-development
- Yule, G. U., (1926). Why do we Sometimes get Nonsense-Correlations between Time-Series?—A study in Sampling and the Nature of Time-Series, *Journal of the Royal Statistical Society*, Vol. 89, No.1, doi:10.2307/2341482

Appendix A

Descriptive statistics (1980-2014)

	FD index	FI Index	GDP per capita	HUM	TRADE	INF	URB	RURAL	AGE	LITERACY
A: Summary Statistics										
Mean	22.841	7.294	6.290	3.835	3.195	2.023	3.303	4.285	4.099	4.000
SD	7.435	9.399	0.437	0.257	0.521	0.424	0.097	0.037	0.043	0.185
Min.	13.089	0.348	5.678	3.352	2.485	1.182	3.139	4.214	4.045	3.682
Max.	35.437	33.990	7.117	4.298	4.017	2.629	3.477	4.342	4.178	4.305
Obs.	35	35	35	35	35	35	35	35	35	35
B : Correlation										
FD Index	1.000									
FI Index	0.964	1.000								
GDP per capita	0.963	0.995	1.000							
HUM	0.730	0.785	0.778	1.000						
TRADE	0.745	0.770	0.774	0.943	1.000					
INF	-0.246	-0.178	-0.151	-0.115	-0.153	1.000				
URB	0.959	-0.699	0.593	0.998	0.966	-0.185	1.000			
RURAL	-0.662	-0.798	-0.998	-0.986	-0.969	0.159	-0.998	1.000		
AGE	0.870	0.692	0.996	0.966	0.982	-0.185	0.989	-0.993	1.000	
LITERACY	0.852	0.788	0.976	0.968	0.952	-0.249	0.989	-0.981	0.977	1.000