EXAMINING THE IMPACT OF FINANCIAL INCLUSION ON POVERTY AND HUMAN DEVELOPMENT: AN EMPIRICAL EVIDENCE FROM THE POST-LIBERALIZED INDIAN STATES

PhD Thesis

By RAJESH BARIK



DISCIPLINE OF ECONOMICS INDIAN INSTITUTE OF TECHNOLOGY INDORE

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Submitted in the partial fulfillment of the requirements for the award of the degree

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DOCTOR OF PHILOSOPHY

By

RAJESH BARIK



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INDIAN INSTITUTE OF TECHNOLOGY INDORE

I hereby certify that the work which is being presented in the thesis entitled "EXAMINING THE IMPACT OF FINANCIAL INCLUSION ON POVERTY AND HUMAN DEVELOPMENT: AN EMPIRICAL EVIDENCE FROM THE POST-LIBERALIZED INDIAN STATES", 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 November 2015 to March 2021,under the supervision of Dr. Pritee 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.

Rajesh Barrik 16.Sep.2021

Signature of the student with date (NAME OF THE PhD STUDENT)

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

September 20, 2021 **Dr Pritee Sharma** Signature of Thesis Supervisor #1 with date Signature of Thesis Supervisor #2 with date (NAME OF THESIS SUPERVISOR) (NAME OF THESIS SUPERVISOR)

Rajesh Barik has successfully given his/her Ph.D. Oral Examination held on 06. September. 2021.

2021.

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September 20, 2021 Dr Pritee Sharma

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Rajesh Barik

Dedicated

to my parents and family members.

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SYNOPSIS

Examining the Impact of Financial Inclusion on Poverty and Human Development: An Empirical Evidence from the Post-liberalized Indian States

Introduction

An easy and affordable access to financial products and services through financial inclusion is an imperative policy instrument to reduce poverty, inequality and improve basic livelihood or human development (Kapoor, 2014). The accessibility of basic financial services allows transferring economic power to the poor and vulnerable section of people. On the contrary, the condition of poverty and human development is understood as the process of deprivation of income/consumption or other basic economic and social entitlements. An easy and adequate provision of financial services like saving, credit, and deposit can assist the poorer section of people in smoothening their consumption, enhancing economic capability by investing in supplementary elements of human development such as spending money on education, health, sanitation, housing and on any other basic privileges. It is very obvious that if people obtain easy credit from the bank, then they would invest that money for their basic well-being like health, education, sanitation, skill development, consumption and other developmental activities. Realizing the significance of finance on human life, Nobel laureate Professor Amartya Sen (2001) has put the argument that the availability and easy access to finance has a very significant effect on economic entitlement. Therefore, it is understood that access to finance also assist individuals in accessing other necessities of life. Excluding a person from the formal financial system yields an inherent negative value for the individual, and it also led the individual to face other kinds of deprivation, thereby limiting further basic living opportunities (Sen, 2001). Thus, financial exclusion is also termed as "social exclusion (Kempson, et al., 2007). As financial exclusion is termed as 'social exclusion, hence the main objective of financial inclusion policy is to include the poorer unbanked people with the mainstream financial system so that they can able to obtain economic benefits.

In this context, while looking at the situation of financial inclusion for India, it was realized that 'India' was the second largest populous country in the world, comprises a large number of unbanked people. Hence, to bring these unbanked people into the banking system, both the Government of India (GoI) and the Reserve Bank of India (RBI) have under-taken many financial inclusion initiatives. The first initiatives of financial inclusion in India can be traced back to the nationalization of banks in 1969. Correspondingly, the preliberalization period has also perceived other policy initiatives like the establishment of RRBs in 1975 and NARARB in 1982. However, the financial reform in 1991 witnessed a paradigm shift in the functioning of India's financial market in general and the banking sector in particular. Firstly, the period of financial reform faced the withdrawal of social banking policy. The social banking policy or bank licensing policy was started in 1977 to spur banking outreach in rural areas. Inorder to provide basic banking facilitates to the rural unbanked people, it was decided that the banks have to open four branches in rural areas to open one branch in urban areas. Research finding from India depicts that the social banking policy had a significant impact on India's poverty reduction (see Burgess and Pande, 2005). The withdrawal of social banking system in 1991 erupted a big debate among the economists and policymakers of India about the future banking service provision to the earlier unbanked rural masses.

Additionally, post-liberalised India welcomed many foreign and private banks to operate in the Indian market. With the operation of these banks, it was expected that the presence of these banks would extend the outreach of banking service in India. Similarly, the postliberalization period also witnessed the speedy operation of Microfinance Institutions (MFIs) by lending microloans to Self-help Groups (SHGs) and linking the members of the SHGs with formal sector banking. Similarly, the period of post-2000 has also seen a number of pro-financial inclusion policy initiatives in India. Such policies are the formation of financial inclusion committee, implication of Know Your Customer (KYC) norms, the introduction of no-frill account, introduction of Direct Benefit Transfer (DBT) scheme and very recent implication of *Pradhan Mantri Jan Dhan Yojana* (PMJDY). Hence, as a consequent of these policy initiatives, researchers on financial inclusion have found that post 2000 period India has witnessed tremendous growth in the financial inclusion process (Lenka and Sharma, 2017). However, despite progress being made in financial inclusion, a large section of poor and marginalised people in India are still out of the formal sector banking outreach. A study conducted by the Centre for Financial Inclusion (CFI), Sharma and Chatterjee (2017) argue that globally 2 billion people and in India 37 per cent people are excluded from the formal financial system.

In this context, as the period of financial reform has been proved as a major structural break in financial policy changes in India, it is necessary to know the journey of financial inclusion among the Indian states in the post-reform period. And how this process of financial inclusion has impacted the condition of poverty and human development in the Indian states. Hence, based on the above arguments, this study here endeavour to find out what are the determining factors which impact the process of financial inclusion in Indian states. Additionally, the study discusses how financial inclusion through the public sector banks has played a major role in reducing poverty and improving human development condition across the Indian states in the post-liberalized period.

Literature Survey

There are a substantial number of empirical studies available with context to determinants of financial inclusion and its impact on poverty and human development. Some studies have been conducted with context to India, and others have been examined with other countries background. Studies conducted to examine the determinants of financial inclusion have demonstrated that all the social, economic, cultural and institutional factors which exclude individuals from basic financial services can be categorized into two main sides (i.e., Demand and Supply factors). Hence, in other word, it can also be stated that both demand and supply side factors are responsible for the financial exclusion (Ghatak, 2013; Lenka, and Barik, 2018). The demand side factors which affect the chances of financial accessibility includes low income, less education, inadequate financial literacy or awareness, lack of identity prof, less interest, low collateral value to deposit in bank etc. Similarly, the supply side constraints are unavailability of bank branches, lack of bank staffs, bad attitude of the bank staffs, irregularity of electricity/internet supply in the bank, lack of proinclusive bank policies etc. Thus, in-order to have a proper understanding on the constraints of financial inclusion, the researchers need to look into both sides (i.e., demand and supply sides) of financial exclusion. Since, last few years, researchers from India like Kumar 2013; Nandru et al., 2016; Sahoo et al., 2017; Raichoudhury 2020; Kaur and Kapuria in 2020 have tried to find-out the various determining factors of financial inclusion in India. Among all those studies conducted in India, some of the studies are based on state-level analysis and others are based on primary data analysis (micro-level study). Kumar (2013) conducted a study on 29 Indian states only considering the supply side measures. Similarly, Raichoudhury 2020, again conducted a study of 28 Indian states by using a different method (i.e., Wroclaw Taxonomic Approach) and considering some mixed variables both from demand and supply sides. However, this study did not focus on the demand and supply side variables separately for Indian states.

Similarly, with relation to financial inclusion and poverty, recently, there have been significant studies from both theoretical and empirical analysis perspectives that have addressed the effect of financial inclusion on poverty by taking different indicators of financial inclusion. These studies have used few indicators of financial inclusion as per their data availability and analyzed that financial inclusion has a significant effect on poverty reduction (see Chibba, 2009; Inoue, 2011, 2018).

In what follows, it is evident that some studies have conducted to show the linkage between financial inclusion and human development in both cross-country level and Indian context as well. Some studies in Indian sub-continent, like Kuri and Laha, (2011) and Nanda and Kaur (2017) have tried to show the relationship between financial inclusion and human development across the Indian states with the availability and suitability of data. Their research findings have depicted that financial inclusion has played a key role in improving the human development condition in the Indian states.

Research Gaps

From the above literature survey, we find that while constructing financial inclusion index, different studies have used different kinds of financial access proxy variables according to their nature, purpose, and data availability. It has been observed from the literature that most of the studies have used the basic indicators of financial inclusion like deposit and saving accounts while ignoring some other prominent financial access indicators like number of bank employees as a proportion of scheduled commercial bank branches, which facilitate the various financial products and services to the customers. Thus, there is a lack of information in the existing financial inclusion index, especially among the Indian states. Additionally, with context to the determinants of financial inclusion among the Indian states, it is observed that most of the studies have analyzed the determinants of financial inclusion either from demand-side factors or from supply-side factors. As per the availability of existing literature, there are inadequate studies that have been conducted on both the demand and supply side determinants of financial inclusion. As financial exclusion is caused by both demand and supply side factors, a study must consider both the demand and supply-side variables separately for measuring the determinants of financial inclusion.

Likewise, the literature on financial inclusion and poverty reduction in context to Indian states (see Inoue 2011) depicts that financial inclusion has played a significant role on poverty reduction among the Indian states. In that study, the author empirically analyzed the effect of financial inclusion on rural and urban poverty reduction among the 25 Indian states and union territories. However, this study does not focus on the impact of fiancial inclusion on overall poverty reduction. Secondly, the author used five indicators of financial inclusion and empirically tested the effect of each particular financial inclusion indicator on state-wise rural and urban poverty reduction. Furthermore, Inoue (2018) conducted another research to know the effect of financial inclusion on India's poverty reduction. In this recent study, the author used only two indicators to measure financial inclusion. Additionally, using financial deepening term, the author emirically analyses to what extent the breadth and depth of the banking sectors interact with each other to reduce aggregate poverty in India. From the above literature journey, we observed that there are dearth of study conducted to measure the effect of financial inclusion on both overall state poverty and rural-urban poverty reduction in India.

In what follows, from the literature related to financial inclusion and human development in Indian states, it is observed that all the studies have measured both financial inclusion index and human development index using the distance-based approach, which was adopted by UNDP (United Nations Development Programme) to calculate Human Development Index (HDI). Additionally, the existing studies have also used limited proxies to measure both financial inclusion and human development among the Indian states.

Research Objectives

Considering the existing literature and the presence of research gaps in the earlier studies, this study has three main objectives. Such objectives are cited below:

- **1.** To examine the demand-side and supply-side determinants of financial inclusion separately among the Indian states.
- **2.** To investigate the effect of financial inclusion on the overall state poverty and rural-urban poverty reduction as well.
- **3.** To examine the effect of financial inclusion on human development among the Indian states.

Data and Methodology

The study is based on 28 Indian states. Thus, here the study uses state-level data from 1993 to 2015 for its analysis. To provide a basic view of financial accessibility around the world in general and India in particular, this study has gathered data from Global Findex Database (2017), World Bank, and Financial Access Survey data of the IMF. However, for empirical analysis, the study has used state-level data that includes basic statistics of RBI, Census of India, CMIE data, NITI Aayog data, data from NSSO, NFHS and data handbook of statistics on India states (RBI). However, the study uses six financial access indicators to construct the financial inclusion index and nine human wellbeing indicators for the human development index. This present study has relied upon PCA method to calculate both the financial inclusion and human development Index.

Similarly, the study has used different econometric models for different objectives of this study. In order to evaluate the determinants of financial inclusion, this study has relied upon Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Errors (PCSE), and Feasible Generalized Least Square (FGLS) for its analysis. Likewise, for measuring the impact of financial inclusion on poverty and human development, the study uses Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Errors (PCSEs) and Feasible General Least Square Method (FGLS) and Hausman-Taylor Regression (HTR_RE) model. For measuring causality between financial inclusion, poverty and human development, the study uses Panel Granger Causality Test. Moreover, the study has applied the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test for stationarity check before moving for regression analysis. Among the FE and RE, the study chooses the bestfitted model based on the Hausman test. Furthermore, looking at the nature of data (i.e., time and cross-sectional dimensions) and realizing the issues of autocorrelation and heteroscedasticity in the dataset, the study employs Panel Corrected Standard Errors (PCSEs) and Feasible General Least Square Method (FGLS) for the robustness of the results. It has been observed that both PCSEs and FGLS are not sufficient to solve the issue of endogeneity or any potential problem of variables omission, hence the study uses Hausman-Taylor Regression (HTR_RE) model to overcome these problems. Lastly, the final result (i.e., the result of HTR_RE) is interpreted in our result discussion section.

Empirical Finding

Our empirical presentation begins with the findings of both demand and supply-side determinants of financial inclusion in 28 Indian states from the time period 1993 to 2015. But before going for empirical testing, the study first constructed a state-wise financial inclusion index by using the PCA method for 28 Indian states. Then the study analyzed the effect of various demand and supply-side variables on financial inclusion separately. The main results from the demand side variables depict that rate of literacy and per capita state GDP have a positive impact on financial inclusion, whereas other variables like rate of unemployment and percentage of the rural population have a negative impact on financial inclusion (see table 1: Panel A). Similarly, the major findings from supply-side determinants show that all the four variables such as road length, electricity, social sector expenditure, and capital receipt have a positive impact financial inclusion (see table 1: Panel B).

After finding the determinants of financial inclusion, the study then tries to examine the impact of financial inclusion on overall state poverty and state's rural-urban poverty. The estimated results depict that financial inclusion has a negative and significant impact on overall poverty and rural-urban poverty as well (see table 2 and 3). This finding shows that in the post-liberalised period, the process of

financial inclusion among the 28 Indian states has played a major role for the overall state poverty reduction and state's rural-urban poverty reduction as well. After empirically examine the impact of financial inclusion on poverty, the study attempts to test the causality between financial inclusion and poverty. As financial inclusion has helped to reduce poverty by increasing the people's income and consumption, hence, it can also happen that the reduction in poverty can equally inspire the people to involve in the formal banking activities. In-order to demystify the fact, this study tries to check the inter-causality between financial inclusion and poverty among the Indian states. The causality findings show that at the initial stage, financial inclusion is causing poverty reduction but not vice-versa. If we say in a more formal and technical language, then it means that financial inclusion and poverty have a unidirectional causality in 1st lag. However, in the later stage, both financial inclusion and poverty are causing each other. This observation indicts that financial inclusion is helping for poverty reduction and the reduction of poverty also lead to enhance the process of financial inclusion in 2nd and 3rd lag. In other word, we can say that financial inclusion and poverty have bi-directional causality in 2^{nd} and 3^{rd} lag (see table 4).

Further, the study endeavour to examine the impact of financial inclusion on state's human development situation. Before going for empirical testing, the study first constructed the state-wise human development index for 28 Indian states from the time period 1993 to 2015. Then the study employs regression technique to check cause-effect relationship between the constructed human development index and the earlier state-wise financial inclusion index along with some other control variables. The major findings for this objective demonstrate that financial inclusion positively impacts human development (see table 5). This econometric finding shows that financial inclusion has played a significant role in improving the human development condition in post-liberalised Indian states. Additionally, the study also performs causality test between two variables like earlier objective after empirically examining the impact of financial inclusion and human development. The causality of financial inclusion and human development index shows that both variables are causing each other (see table 6), showing bidirectional causality exist between them.

Panel A	Regression Res	ults of the Demand	Side Determinar	nts	Panel B: Regression Results of Supply Side Determinants				
Variables	FE	RE	RE	FGLS	Variables	FE	RE	RE	FGLS
	Model_1	Model_2	Model_2	Model_4		Model_1	Model_2	Model_2	Model_4
LIT	-84.6151	-210.5056	210.5056***	210.5056	LOG_ROAD	0.3176	9.0150***	10.7231***	10.7231***
	(132.2885)	(134.2875)	(42.7362)	(133.2002)		(1.7209)	(1.5524)	(1.7481)	(1.5169)
UNEMP	1.2293***	1.2284***	-1.2284***	-1.2284***	LOG_ELCTY	0.4588	3.5157***	4.5448***	4.5448***
	(0.1195)	(0.1216)	(0.1360)	(0.1206)		(0.9749)	(0.9858)	(0.7925)	(1.0083)
PCSGDP	1657.622***	1690.286***	1690.286***	1690.286***	SSE	8.3045***	2.9616***	6.5127***	6.5127***
	(158.8182)	(93.5273)	(109.1149)	(92.77)		(1.3883)	(1.0271)	(1.5064)	(0.8716)
R_POP	-0.7806***	-0.7670***	-0.7670***	-0.7671***	CR	2.0441*	0.5555	0.7209	0.7209
	(0.1349)	(0.1289)	(0.0811)	(0.1279)		(0.8185)	(0.8506)	(1.0617)	(0.8312)
North	5.3690***	5.5499***	5.5499***	5.5499***	North	6.4083***	7.0645***	7.9264***	7.9264***
	(1.4968)	(1.5156)	(0.4149)	(1.5033)		(1.7895)	(7.0644)	(0.7095)	(2.0517)
Northeast	-6.3846***	-5.9197***	-5.9197***	-5.9197***	Northeast	-10.9124***	-5.4857*	-3.9133***	-3.9133*
	(1.5062)	(1.5471)	(0.7592)	(1.5345)		(2.0480)	(2.1872)	(1.3405)	(2.2756)
East	3.6764*	3.9105*	3.9105***	3.9105*	East	4.5704*	2.6185*	2.5430***	2.5431*
	(1.6119)	(1.6551)	(0.5211)	(1.6417)		(1.9047)	(2.0809)	(0.5849)	(2.1759)
South	8.0253***	8.4474***	8.4474***	8.4474***	South	14.423**	13.4423	13.7071***	13.7071***
	(1.5965)	(1.6264)	(0.8429)	(1.6133)		(1.8647)	(2.0449)	(1.1794)	(2.1389)
West	16.4683***	16.7719***	16.7719***	16.7719***	West	26.6798***	26.0547***	26.5294***	26.52936***
	(1.8358)	(1.7446)	(1.1648)	(1.7305)		(1.9784)	(2.17060)	(1.4552)	(2.269323)
С	163.7409	390.6465	390.6464***	390.6464	С	69.0224***	41.0011***	31.6336***	31.6336***
	(238.9259)	(242.5238)	(76.8496)	(240.56)		(5.6839)	(5.6395)	(5.8891)	(5.6918)
Obs.	620	620	620	620	Obs.	620	620	620	620
R-squared	0.6823	0.6829	0.6829		R-squared	0.6488	0.5025	0.4390	
F-statistics	120.83				F-statistics	69.88			
Prob. (F-	0.0000				Prob. (F-	0.0000			
statistics)					statistics)				
Wald chi2		1313.52	8922.90	1335.05	Wald chi2		479.22	2192.65	485.10
Prob > chi2		0.0000	0.0000	0.0000	Prob > chi2		0.0000	0.0000	0.0000
Log likelihood				-2186.338	Log				-2363.186
					likelihood				
Hausman test		-35.31			Hausman test		97.03***		
							(0.0000)		
No. of States	28	28	28	28	No. of States	28	28	28	28

Table 1: Regression Results of Both Demand and Supply Side Determinants of Financial Inclusion

Source: Author's Estimation

Variable	FE	RE	PCSE	FGLS	HTR_RE
	Model_1	Model_2	Model_3	Model_4	Model_5
FII	-0.0074***	-0.0119***	-0.0119***	-0.0119***	-0.0215***
	(0.0026)	(0.0027)	(0.0030)	(0.0027)	(0.0044)
SSE	0.2149***	-0.2425***	-0.2425***	-0.2425***	-0.3670***
	(0.0676)	(0.0515)	(0.0565)	(0.0510)	(0.0622)
PCSGDP	-69.3727***	-2.7659	-2.7659	-2.7659	-39.2303***
	(11.7799)	(10.0785)	(8.6362)	(9.9887)	(12.9543)
R_POP	0.01523	0.0416***	0.0416***	0.0416***	0.0503
	(0.0122)	(0.0125)	(0.0094)	(0.0124)	(0.0463)
CR	-0.0227	0.1180***	-0.1180*	-0.1180***	-0.0821*
	(0.0469)	(0.0443)	(0.0545)	(0.0439)	(0.0406)
North	-0.5264***	-0.5472***	-0.5472***	-0.5472***	-4.0989***
	(0.1048)	(0.1141)	(0.1063)	(0.1131)	(0.4411)
North-East	0.2509*	0.2419*	0.2419*	0.2419*	1.0488
	(0.1226)	(0.1228)	(0.1354)	(0.1217)	(0.6498)
East	0.0690	0.0126	0.0126	0.0126	0.0532
	(0.1099)	(0.1199)	(0.0749)	(0.1189)	(0.7059)
South	-0.3285***	-0.1322	-0.1322	-0.1323	-4.4929***
	(0.1129)	(0.1209)	(0.1049)	(0.1199)	(0.5448)
West	-0.6596***	-0.3076*	-0.3076***	-0.3076*	-4.4693***
	(0.1330)	(0.1398)	(0.0683)	(0.1385)	(0.5771)
С	1.4291***	4.5841***	4.5841***	4.5841***	6.4884***
	(0.4104)	(0.2752)	(0.3597)	(0.2728)	(0.6799)
Obs.	620	620	620	620	620
R-squared	0.6896	0.7948	0.2589		
F-statistics	19.07				
Prob. (F-	0.0000				
statistics)					
Wald chi2		212.76	214.23	216.61	224.30
Prob > chi2		0.0000	0.0000	0.0000	0.0000
Log likelihood				-554.7552	
Hausman test		102.55***			
		(0.0000)			
No. of States	28	28	28	28	28

Table 2: Results of Overall Sample-Financial Inclusion and Poverty Reduction	
Dependent Variable: Poverty (HCR)	

Source: Author's Estimation

	Pa	nel A: Financial	Inclusion and Rur	al Poverty		Panel B: Financial Inclusion and Urban Poverty				
Variables	FE	RE	PCSE	FGLS	HTR_RE	FE	RE	PCSE	FGLS	HTR_RE
	Model_1	Model_2	Model_3	Model_4	Model_5	Model_1	Model_2	Model_3	Model_4	Model_5
FII	-0.0160***	-0.0171***	-0.0171***	-0.0171***	-0.0051	-0.0175***	-0.0179***	-0.0184***	-0.01843***	-0.0198***
	(0.0023)	(0.0023)	(0.0020)	(0.0023)	(0.0038)	(0.0027)	(0.0027)	(0.0026)	(0.0027)	(0.0048)
SSE	0.3036***	0.1069**	0.1028*	0.1028**	-0.1292**	-0.0354	-0.0089	0.0272	0.0272	0.1600*
	(0.0591)	(0.0469)	(0.0528)	(0.0440)	(0.0513)	(0.0712)	(0.0552)	(0.0656)	(0.0524)	(0.0649)
PCSGDP	-10.5751	-47.4022***	-54.0629***	-54.0629***	-33.6174***	-47.6879***	-50.7474***	-53.8692***	-53.8693***	-82.3357***
	(10.3002)	(8.7862)	(10.8542)	(8.6175)	(10.8856)	(12.4150)	(10.3537)	(13.1481)	(10.2529)	(13.7542)
R_POP	0.0005	0.0201*	0.0256*	0.0256**	0.0741**	0.0538***	0.0526***	0.0503***	0.0503***	0.0207
	(0.0106)	(0.0106)	(0.0130)	(0.0107)	(0.0301)	(0.0128)	(0.0125)	(0.0127)	(0.0127)	(0.0388)
CR	-0.0237	-0.0046	-0.0393	-0.0393	-0.0337	-0.0230	-00.0500	-0.0808	-0.0808*	-0.1157**
	(0.0411)	(0.0393)	(0.0448)	(0.0378)	(0.0345)	(0.0495)	(0.0464)	(0.0632)	(0.0450)	(0.0435)
North	-0.8062***	-0.8019***	-0.7882***	-0.7882***	-1.1857***	-0.8015***	-0.7837***	-0.7619***	-0.7619***	-1.3778***
	(0.0916)	(0.0952)	(0.0384)	(0.0976)	(0.3505)	(0.1104)	(0.1123)	(0.1184)	(0.1162)	(0.3389121)
North-	-0.1449	-0.1187	-0.1822***	-0.1821*	-0.7129*	-1.2557***	-1.2653***	-1.2689***	-1.2689***	0.9747***
East	(0.1072)	(0.1038)	(0.0537)	(0.1049)	(0.3522)	(0.1292)	(0.1223)	(0.1853)	(0.1249)	(0.3071)
East	-0.0129	-0.0355	-0.0331	-0.0331	-0.3020	-0.3421***	-0.3341***	-0.3237***	-0.3237**	1.6847***
	(0.0961)	(0.0999)	(0.0395)	(0.1025)	(0.3787)	(0.1159)	(0.1179)	(0.0871)	(0.1220)	(0.4043)
South	-0.8363***	-0.7152***	-0.6795***	-0.6795***	-0.9407***	-0.3458***	-0.3319***	-0.3189***	-0.3189**	-1.5267***
	(0.0987)	(0.1011)	(0.0351)	(0.1034)	(0.3759)	(0.1189)	(0.1192)	(0.0798)	(0.1230)	(0.4105)
West	-0.5364***	-0.3627***	-0.32229***	-0.3223***	-0.97847**	-0.2006	-0.1696	-0.1338	-0.1338	-2.1625***
	(0.1163)	(0.1175)	(0.0907)	(0.1194)	(0.4071)	(0.1403)	(0.1385)	(0.1413)	(0.1422)	(0.4254)
С	1.3512***	3.0168***	3.3401***	3.3401***	5.1623***	4.1656***	4.1690***	4.1279***	4.1279***	3.5993***
	(0.3588)	(0.2569)	(0.2499)	(0.2354)	(0.4329)	(0.4325)	(0.3025)	(0.3806)	(0.2800)	(0.5555)
Obs.	620	620	620	620	620	620	620	620	620	620
R-	0.5564	0.6071	0.5437			0.6138	0.6210	0.4952		
squared										
F-	73.63					50.93				
statistics	0.0000					0.0000				
Prob. (F-	0.0000					0.0000				
statistics)		702.25	1226 60	720 (1	077 49		550 (0	046.75	600.10	212.02
wald		/02.25	4336.69	/38.61	277.48		559.69	946.75	608.19	312.92
chi2		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000
Prob >		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000
Cm2				462 2004					570 0424	
Log				-403.2094					-570.9424	
IIKeiinood			77 75***				6.95			
Hausman			() () () () () () () () () () () () () (0.83			
test	20	20	(0.0000)	20	20	20	(0.6525)	29	29	20
INO. OI	20	20	20	20	20	20	20	20	20	20
chi2 Log likelihood Hausman test No. of States	28	28	73.75*** (0.0000) 28	-463.2094 28	28	28	6.85 (0.6525) 28	28	-570.9424 28	28

Table 3: Results of Financial Inclusion and Rural-Urban Poverty Reduction

Table 4: Pairwise Granger Causality Test between Financial Inclusion and Poverty

Null Hypothesis		Dire			
	Obs.	Lags	F-stat	Prob.	
FI does not Granger Cause POV	619	1	5.2778	0.0116	
POV does not Granger Cause FI	619	1	1.7382	0.1879	
FI does not Granger Cause POV	618	2	6.6848	0.0013	
POV does not Granger Cause FI	618	2	1.7096	0.1818	
FI does not Granger Cause POV	617	3	4.1650	0.0062	
POV does not Granger Cause FI	617	3	4.6338	0.0033	

Source: Author's Estimation

Table 5: Regression Results of Financial Inclusion and Human Development
Dependent Variable: Human Development Index (HDI)

Variable	FE	RE	PCSE	FGLS	HTR RE
vanable	Model-1	Mosel-2	Model-3	Model-4	Model-5
FII	0.0986***	0 1469***	0 1469***	0 1469***	0 3192***
111	(0.0194)	(0.0294)	(0.0187)	(0.0192)	(0.0231)
SSE	-0.8399***	4 2913***	4 2913***	4 2913***	4 8656***
SSE	(0.3352)	(0.5646)	(0.4601)	(0.3652)	(0.3230)
PCSCDP	(0.3332)	1060 654***	1060 654***	1060 654***	(0.5250)
TCSODI	(65 7105)	(116362)	(88 5334)	(71, 4718)	(67,3002)
D DOD	0.2086***	0.5203***	0 5203***	0 5203***	07722***
K_FOF	(0.0214)	-0.3293	(0.0672)	-0.3293	(0.2282)
CD	(0.0314)	(0.0769)	(0.0072)	(0.0888)	(0.2383)
CK	(0.2570)	-0.0839^{+}	-0.0839°	-0.0839°	(0.0420)
N. d	(0.2579)	(0.2897)	(0.4045)	(0.3139)	(0.2111)
North	2.8/68***	2.8822***	2.8822***	2.8822***	24.1923***
N7 .1 .	(0.3579)	(0.4853)	(0.5212)	(0.8096)	(2.2829)
Northeast	2.9014***	8.2544***	8.2544***	8.2544***	1/.044/***
	(0.2897)	(0.7516)	(0.5769)	(0.8/06)	(2.0899)
East	0.3949*	0.9149***	0.9149***	0.9149	25.6136***
	(0.2013)	(0.2858)	(0.2889)	(0.8505)	(2.8002)
South	4.3560***	1.8369***	1.8369*	1.8369*	25.8182***
	(0.6109)	(0.3962)	(0.7988)	(0.8576)	(2.8161)
West	3.4998***	0.8082	0.8082	0.8082	30.8758***
	(0.6678)	(0.5022)	(0.5778)	(0.9910)	(2.9788)
С	11.4159***	-24.4122***	-24.4122***	-24.4122***	-36.2562***
	(1.6265)	(3.6552)	(2.6894)	(1.9522)	(3.4779)
Obs.	620	620	620	620	620
R-squared	0.9189	0.7817	0.7817		
F-statistics	1821.61				
Prob. (F-	0.0000				
statistics)					
Wald chi2		12792.48	8447.86	2219.92	6381.96
Prob > chi2		0.0000	0.0000	0.0000	0.0000
Log likelihood				-1774.821	
Hausman test		361.81***			
		(0.0000)			
No. of States	28	28	28	28	28

Source: Author's Estimation

Table 6: Pairwise Granger Causality Test between Financial Inclusion and Human Development

Null Hypothesis		Dire	ection of causality	,
	Obs.	Lags	F-stat	Prob.
FI does not Granger Cause HDI	619	1	9.1934	0.0025
HDI does not Granger Cause FI	619	1	3.0530	0.0811
FI does not Granger Cause HDI	618	2	4.8291	0.0283
HDI does not Granger Cause FI	618	2	4.3131	0.0138
FI does not Granger Cause HDI	617	3	5.8682	0.0034
HDI does not Granger Cause FI	617	3	2.8348	0.0375

Source: Author's Estimation

Major Findings

- I. The composite index of financial inclusion suggests that financial availability, accessibility, and usability have increased among the Indian states over the years. However, the increment is not identical for every state. Hence, there are high inter-state discrepancies among the states.
- II. The empirical findings from the demand side determinants of financial inclusion suggest that literacy and per capita state GDP have a positive impact on financial inclusion, whereas other two variables like rate of unemployment and percentage of rural population have a negative impact on financial inclusion among the 28 Indian states.
- III. Similarly, the results from supply-side determinants depict that all the used four variables (i.e., road length, electricity supply, social sector expenditure and capital receipt) are positively impacting financial inclusion among the 28 Indian states.
- IV. The estimated empirical results from financial inclusion and poverty show that financial inclusion has a negative and significant impact on the overall state poverty reduction and rural-urban poverty reduction as well.
- V. The control variable results for financial inclusion and poverty illustrate that the per capita state GDP (PCSGDP) and capital receipt (CR) have a negative and significant impact on all three poverty categories (i.e., overall sample, rural and urban poverty). The result of rural population (R_POP) depicts that R_POP positively affects poverty across the three poverty categories analysis. However, the result for social sector expenditure (SSE) varies for three poverty categories. The estimated results for SSE depict that social sector expenditure have a negative impact on the overall state poverty and rural poverty, whereas for urban poverty the social sector expenditure has a positive impact.

- VI. The causality result of financial inclusion and poverty shows that at the initial stage (i.e., in the 1st lag), financial inclusion only causes poverty reduction but not vice-versa (i.e., unidirectional causality). But in the latter stage (i.e., in the 2nd and 3rd lag), both financial inclusion and poverty are causing each other (i.e., bi-direction causality).
- VII. Like the financial inclusion index, the calculated composite index of human development shows that there is a high variation in the condition of human development among the Indian states.
- VIII. The estimated regression results of financial inclusion and human development depict that financial inclusion has a positive and significant impact on human development index. From this econometric result, we can draw a conclusion that financial inclusion has played a key role in improving human development index among the 28 Indian states in the post-liberalization period. The control variable results for this objective suggest that social sector expenditure (SSE), per capita state GDP (PCSGDP) and capital receipt (CR) are having a positive impact on human development. However, the result of the rural population (R_POP) has a negative and significant impact on human development.
- IX. Similarly, the causality result of financial inclusion and human development suggests that both the variables are causing each other. That means financial inclusion is helping to improve human development and the progress in human development also leads to increase the magnitude of financial inclusion. In other word, we can say that both the variables are having bi-directional causality relationship between them.

Conclusion and Policy Implications

Based on the empirical findings, this study suggests that literacy and per capita income have a significant impact on financial inclusion from the demand side factors. Hence, the government should put more efforts to increase the level of education (including financial literacy) and per capita income of the people. Similarly, unemployment and rural population have a negative impact on financial inclusion. Thus, the government should equally look after the negative factors of financial inclusion. In this context, this study suggests that efforts should be made to reduce unemployment and the rural people should be facilitated with basic banking services. Similarly, from the supply side, efforts should be made to enhance the infrastructural facilities (like road and electricity). Likewise, more social sector expenditure and capital receipt should be endorsed to boost the process of financial inclusion. Nevertheless, as financial inclusion through public sector banks has played a key role in reducing poverty (i.e., overall state poverty and rural-urban poverty) and improving human development. It is advised that the government should focus on the extension of more public sector banks to the unbanked remote areas of the country.

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ACRONYMS

AEPS	Aadhaar Enabled Payment System
AHP	Analytical and Hierarchical Process
ATM	Automated Teller Machine
ATP	Ailment to total population
BC	Business Correspondents
BHIM	Bharat Interface for Money
BR	Birth Rate
CMIE	Centre for Monitoring Indian Economy
CR	Capital Receipt
DR	Death Rate
DRI	Differential Rate of Interest
DBT	Direct Benefit Transfer
EBT	Electronic Benefit Transfer
ECLGS	Emergency Credit Line Guarantee Scheme
EHG	Early Health Good
ELCTY	Electricity
EYS	Expected Year of Schooling
FE	Fixed Effect
FGLS	Feasible Generalized Least Square
FI	Financial Inclusion
HDI	Human Development Index
HTR_RE	Hausman-Taylor Regression
IMF	International Monetary Fund
IMR	Infant Mortality Rate
IMPS	Immediate Payment Service
JAM	Jan-Aadhar-Mobile
KCC	Kisan Credit Card
KYC	Know Your Customer
LIT	Literacy Rate
MFIs	Microfinance Institutions

MGNRES	Mahatma	Gandhi	National	Rural	Employment
	Guarantee	Scheme			
MPCE	Monthly P	er Capita C	Consumptior	n Expend	liture
MSME	Micro, Sm	all & Medi	um Enterpri	ises	
MYS	Mean Year	of School	ing		
NABARD	National B	ank for Ag	riculture and	d Rural I	Development
NEFT	National E	lectronic F	und Transfe	r	
NFHS	National Fa	acility Hea	lth Survey		
NITI	National In	stitution fo	or Transform	ning Indi	ia
NSSO	National Sa	ample Surv	vey Organiz	ation	
PAYTM	Pay throug	h Mobile			
PCA	Principal C	Component	Analysis		
PCSE	Panel Corr	ected Stand	lard Error		
PCSGDP	Per Capita	State Dom	estic Produc	et	
PMJDY	Pradhan M	antri Jan D	han Yojana		
PMMY	Pradhan M	antri Mudr	a Yojana		
PoS	Point of Sa	lle			
RBI	Reserve Ba	ank of India	a		
RE	Random E	ffect			
R_POP	Rural Popu	lation			
ROAD	Length of I	Roadways			
RTGS	Real-time	Gross Settl	ement		
UIDAI	Unique Ide	ntification	Authority of	of India	
SRS	Sample Re	gistration S	System		
UNDP	United Nat	ion Develo	pment Prog	gramme	
UNEMP	Rate of Un	employme	nt		
UPI	Unified Pa	yments Inte	erface		
USSD	Unstructure	ed Supplen	nentary Serv	vice Data	1
SSE	Social Sect	or Expend	iture		

Chapter 1

Introduction

1.1. The Concept of Financial Inclusion

Financial inclusion means the access of various basic financial products and services to the individual and business at an easy and affordable way to meet their elementary requirements like saving, insurance, credit, payment transaction and other financial activities in a secure and sustainable mode. On the other word, it can be said that the provision of secure, adequate and affordable financial services to the unbanked and underbanked people is the basic condition for the financial inclusion of a country. The successes of financial inclusion necessitate inclusion of financially excluded and unbanked people under the purview of the formal banking system. For an easy understanding of the term 'financial inclusion', the United Nation has defined the term in a very eloquent and precise way: As per United Nation, the concept of financial inclusion refers to (a) the provision of easy and affordable financial services to all households; (b) establishment of a sound financial institution for the safe regulation of the market; (c) and providing assurance for a safe and sustainable investment ecosystem to all the financial clients. Similarly, other financial institutions and eminent economists in the world have well-defined the concept of financial inclusion in the following manner.

Table 1. Definition of Financial Inclusion by Various Financial

Institution/Author	Definition
Asian Development Bank	Financial Inclusion is the provision of a wide range of financial
(2000)	services like credit facilities, deposits, payment services, insurance
	and remittances to poor and underprivileged households and their micro-enterprises".
Reserve Bank India (2014)	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.
Rangarajan (2008)	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.
Crisil, (2018)	Financial inclusion, in its broadest sense, refers to the delivery of financial services at affordable costs to all sections, including disadvantaged and low-income groups.

Institution/Author(s)

Source: Prepared by the Author

An easy and affordable accessibility of finance allows transferring economic power to the poor and vulnerable section of people. Correspondingly, this economic power can be extended to the lower section of people through the improvement in saving habits, enhancing investment, providing adequate credit and reducing their financial risk. An inclusive financial structure is essential to build an effective, efficient and sustainable financial system that will assist to distribute the financial products and services equally among all sections of people. The absence of formal financial system in an economy can provoke the indigenous banks to exist which are severely exploitative in nature. High financial inclusion can resolve the problem of financial availability, accessibility and usability among the marginalized groups of people.

However, as the public sector banks and other financial institutions are coming under government jurisdiction, the availability of banking products and services is always considered as public goods. Moreover, it is argued that banking products being a public good, it should be accessible to each group of people in the society without any kinds of discrimination.
Therefore, the exclusion of people from the formal financial inclusion process is also termed as 'social exclusion". In a study, conducted by the Center for Financial Inclusion (CFI) Sharma and Chatterjee (2017) argue that globally 2 billion people and in India 37 per cent people are excluded from the formal financial system. Again, this financial exclusion is divided into two categories that are voluntary and involuntary exclusion. Voluntary exclusion refers to the groups of people or firms who are willingly excluded from the formal financial system either because they simply do not need that service or because of some social, cultural and religious constraints to participate in the formal financial market. Since, the voluntary exclusion is not directly associated with market failure, hence it needs more social and religious responsiveness than any economic market solution. Though financial institutions play an important role here to provide more financial literacy programmes to educate and spread financial awareness among the voluntarily excluded population, but along with the efforts of financial institutions, social and religious institutions also play a vital role to include the excluded population into the formal financial system. Oppositely, involuntary financial exclusion refers those groups of people or firms those who are excluded from the formal financial market either because of insufficient income or because of some institutional constraints like discrimination in the bank, inaccessible of banking facility in the nearby areas, unavailability of credit to the poor or small firms due to information asymmetry etc. (see Kempson and Whyley 1999). Since, these problems are related to market imperfections and government failure. Hence these problems can be rectified by taking essential preventive measures both by the market and government as well.

1.2. Financial Inclusion: Global View

According to the recent findex database (2017), worldwide 515 million adults have opened their accounts in between 2014 to 2017. That means almost 68 percent of adults have bank accounts in their name, shifting from 64 percent in 2014 and 51 percent in 2011. Similarly, there have been a slight improvement in active usage of bank accounts. In 2011, only 47 percent people were using their bank account regularly, whereas in 2014 and 2017 the number of active usages of bank accounts have slightly increased to 52 and 53 percent respectively. While looking the usage of saving account, it merely depicts a satisfactory statistic. Though the world has progressed a lot in the opening of bank account but in case of saving, it has not progressed as it was expected. In 2011 only 23 percent of people were able to hold a saving account, where as in between 2014 and 2017 no improvement has been observed in saving accounts (see figure 1).



Figure 1. Global Picture of Financial Inclusion

Similarly, within the various regions or countries there are high variation in the degree of financial inclusion. Among the high-income countries, 94 percent of adult people have access to basic financial services whereas in developing countries only 63 percent people have access to basic financial services. Correspondingly, high gender inequality persists in

Source: World Bank, Global Findex Database, 2017

different indicators of financial inclusion. Among the all-adults, 72 percent men own account where this number downs to 65 percent in case of women. The 7 percent gender gap in financial inclusion had been observed in the earlier two arounds of findex database (i.e., 2011 and 2014). Moreover, a similar kind of financial gap has been observed in other population groups (i.e., within poor 40 percent and richest 60 percent, rural-urban people, younger and older age people and among the primary educated and secondary educated people).

Figure 2. Gender Gap in Account Ownership



Men

Women

Source: Global Findex database.

1.3. Brief History of Financial Inclusion in India

In India, the process of financial inclusion started a long time ago. Just after getting Independence from the colonial empire, the government of India took some pro-active measures to bring reform in the Indian banking sector. In this process, the government passed the State of Bank of India (SBI) Act and the Imperial Bank of India became re-named as the State Bank of India in 1955. In- order to extend the banking service to the rural and semi-urban areas, again in 1959, the government of India passed SBI (Subsidiary Bank) Act and took over eight banks that are earlier belonged to the Princely states into the subsidiaries of SBI.

Similarly, during the Prime Minister Shrimati Indira Gandhi, 14 major banks were nationalized in 1969 and again six more banks were nationalized in 1980s. Correspondingly, before the introduction of financial liberalization in India, some other major financial inclusion policies were also implemented to boost the drive of financial inclusion in India. These include bank licensing policies in 1977, the establishment of Regional Rural Banks (RRBs) in 1975 and the National Bank for Agriculture and Rural Development (NABARD) in 1982. The prime motto of all these financial inclusion policies was to provide easy and affordable financial services to the poor and marginalized community, so that they could overcome from their economic hardship. Research finding from India shows that these financial inclusion policies have facilitated to reduce poverty in India and also have benefited the lower-income people to a large extent. Researchers (like Burgess et al., 2005; Burgess and Pande, 2005) have claimed that the implementation of social banking policy in India between 1977 to 1990 has reduced rural poverty by extending credit to the rural people through the establishment of bank branches in rural areas. Additionally, these studies also argue that this policy has enabled the low income groups of people including Schedule Caste and Schedule Tribe to access financial services through formal financial institutions.

1.3.1. Financial Sector Reform and Financial Inclusion in the Postliberalized Period

The Indian financial institutions in general and banking sector in particular show a significant change with the implementation of new financial liberalization policy in 1991. There was major economic and financial policy reform that happened during that time. Because of the sluggish functioning of the Indian financial market in the earlier time, with the introduction of financial liberalization, the government immediately formed a high-level committee to make road map for the smooth and efficient function of future financial market in India. In-order to infuse greater competition, and efficiency in bank working system and to make it profitable, one committee was appointed by nine members, which was headed by M. Narasimham (the former governor of India) in 14. August, 1991. The committee is famously known as Narasimham Committee-I. Similarly, again in 1998 the government formed another committee under the chairmanship of Mr. Narasimham. The second committee (Narasimham committee-II) was formed to look after the progress in banking reform and to plan concrete design for the further strengthening of the financial sector in India. The various outstanding recommendations forwarded by the Narasimham committee has helped immensely for the improvement of the financial market of India. Some of the important suggestions were that giving more autonomy to the banks, allowing more private and foreign banks to operate in India, three tire banking system, raising the capital adequacy ratio and tightening of provisioning norms etc.

Additionally, the liberalization of financial institutions provided an opportunity to many private and foreign banks to participate in the Indian financial market. Looking into the inflow of large number of private and foreign banks to Indian market, it was quite obviously expected that the presence of these banks will enhance the outreach of banking services to all sections of people equally. But over the year it is found that private and foreign banks have mostly operated in urban and semi-urban areas of India and have more favoured to the middle class or elite class people by extending their financial services. Hence, realizing the negligence of private banks towards the poor and rural people, the government of India initiated so many policy measures to include the earlier unbanked people into the banking fold.

It was realized that because of information asymmetry, lack of financial knowledge, low collateral value and other hidden factors, commercial banks in India are reluctant to provide basic financial services such as credit and deposit to the rural poor people. Hence, in 1992 the government tried to offer micro loans to the rural women through the help of local Self-Help Group (SHGs) members and linked those SHGs members with the formal sector banks. On the basis of the joint-liability system, microcredits were provided to the poor and low-income household women. According to the data given by National Bank for Agriculture and Rural Development (NABARD), as of 31 March 2020 56.77 lakhs SHGs members have taken microcredits from NABARD covering nearly 1,241 lakh families in India (See the NABARD website). Furthermore, in-order to provide easy loan to the framers of India, NABARD provided Kisan Credit Card (KCC) to them in 1998.

Year	Name of the scheme	Basic Objectives
1992	Establishment of Self-Help Group-	To bring banking services to the door of the poor
	Bank Linkage	people.
	Programme (SHG-BLP)	
1998	Introduction of Kisan Credit Card	To provide easy credit to the farmers.
	(KCC) through National Bank for	
	Agriculture and Rural	
	Development (NABARD)	
2005	Introduction of No-frill account	Opening of bank account with nil or zero balance.
2008	Committee on financial inclusion	To recognize key challenges and suggesting
		recommendations to expand the outreach of
		financial inclusion in the country.
2013	Introduction of DBT in Banks	To send money direct to the beneficiaries'
		bank/post office account.
2014	Pradhan Mantri Jan-DhanYojana	Providing easy and affordable banking services to
		the rural poor.
2015	Mudra Yojana	To promote entrepreneurial culture in the country
		through providing loans to the small/micro
		enterprises.
2015	Digital India Programme	To make the country digitally empowered through
		the use of digital technology.
2015	Internet Sathi	To enhance the use of Internet among the rural
		women.
2020	RBI introduced National Strategy	To promote financial literacy in the country
	of Financial Education	

Table 2. India's Major Financial Inclusion Schemes in Post-Liberalization Period

Source: Author's Preparation

Subsequently, in-order to allow poor people to open a bank account with a minimum balance, the government introduced 'no-frill account' in 2005. Similarly, in 2008, the government established a committee under the supervision of Shri. C. Rangarajan to monitor the major hurdles in the process of financial inclusion. Moreover, looking the rising trend of digitalization and rampant corruption in delivering government subsidies, DBT scheme was introduced in in 2013. The objective of this DBT program is to reduce corruption in the system by directly transferring money to the beneficiaries bank account without any middlemen.

Similarly, the National Democratic Alliance (NDA) under the leadership of Prime Minister Narendra Modi, has shown much interest in

the expansion of financial inclusion and digital finance in India. Just after joining the office, Prime Minister Shri. Narendra Modi declared Pradhan Mantri Jan-DhanYojana or Prime Minister's People's Wealth Scheme to boost the process of financial inclusion in India. Within these six years, a number of initiatives have been commenced by the government of India to promote financial inclusion in general and digital finance in particular. Under the Mudra Scheme, which was initiated in 2015, the people are allowed to withdraw up to 10 lakhs rupees from any commercial banks, RRBs, Small Finance Banks, and other NBFCs to invest in their noncorporate, non-farming small and micro enterprises. Similarly, digital finance has been given equal importance to promote the use of digital technologies in the banking sectors. Programmes such as internet *Sathi*, digital India and National Strategy of Financial Education have played a pioneering role to promote financial/digital literacy in rural India.



Figure 3. Recent Initiatives on Financial Inclusion (FI) in India

Source: Author's Preparation

Note: KYC_ Know Your Customer, EBT_ Electronic Benefit Transfer, UIDAI_ Uniq Identification Authority of India, DBT_ Direct Benefit Transfer, PMJDY_Pradhan Mantri Jan Dhan Yojana.

1.3.2. Current Status of Financial Inclusion in India

Though financial inclusion in India has a long history starting from the independence to till now but the term 'financial inclusion' gained more popularity in the post 2000 period. For the first time the term was used in a policy statement presented by Y.V Reddy (the then governor of India) and K.C. Chakrabarty (the then Chairman and Managing Director of Indian Bank) to the chief minister of India Pondicherry for suggesting the government to provide a bank account to each and every household in Pondicherry. Consequently, in the same day evening (December 30, 2005) one draft on financial inclusion was prepared and Mangalam village in Pondicherry was selected for introducing the financial inclusion programme in the village. Then again in 2008, the government formed a committee

under the supervision of Shri. C. Rangarajan to monitor the progress and major hurdles of financial inclusion in India. Subsequently, since then many programmes were undertaken both by the government of India and RBI to extend an easy and affordable financial services to the earlier unbanked or under banked population in India.

As a result of all these collective efforts, India has progressed a lot in the quest for financial inclusion. In the current years, while comparing the progress of financial inclusion in India with other emerging countries, it can be understood that India has seen massive growth in the availability and usability of financial services. It can be recalled that when the RBI celebrated its Platinum Jubilee in 2010, commercial banks were advised to implement 3-tire financial inclusion policy agenda in their strategic business plan. Moreover, financial inclusion witnessed massive growth after the implementation of PMJDY in 2014. It has been reported that under the PMJDY, 40 crore bank accounts have been opened as off August 2020. The opening of new accounts has tremendously increased the overall deposit in banks which is a good sign for the economy. Similarly, the PMJDY has also enabled the people to have an overdraft facility up to 10.000 rupees, which have certainly increased the overall loans from the commercial banks. Likewise, over the years, the number of commercial banks per 100.000 adult population and per 1000 square kilometre has also increased in India.



Figure 4. Progress of Financial Inclusion in India

Source: Author's preparation using Financial Access Survey Data of IMF

Though the overall financial inclusion has increased drastically over the period of time but the disaggregate level of data analysis depicts that till now, many sections of people in India are deprived of the formal financial system. While looking at the data between various groups of people, it can be observed that the basic objective of financial inclusion (i.e. opening a bank account) has been fulfilled in a great extent. It can be witnessed from the below table that almost 80 percent of Indian adult populations have owned bank account in their names. Across the various population groups, ownership of bank account has been increased over time. The irony is that despite of significant improvement in financial inclusion, huge gap exists among the various population groups. Another worrying factor is that India has significantly progressed with respect to opening of deposit accounts, whereas in the case of saving and credit account, India has not shown any satisfactory result. Moreover, though much progress happened in account opening due to the implementation of PMJDY but half of the accounts are not used for a single time by the users. It is argued that the mere opening of a bank account does not fully satisfy the aim of financial inclusion, rather

proper utilization of these accounts through accessing saving and credit extension is also required to meet the true objective of financial inclusion. Among the total adult population, only 20 percent of people have able to open a saving account in their name.

Furthermore, in case of lower income people, female, rural people and primary or less educated people, this number shows a more dismal statistic. Oppositely, in the case of the richest 60 percent people, male individuals, older age, labour force and secondary or more educated people, a slight improvement can be noticed. Similarly, with respect to credit, only 7 percent of average adult people are able to obtain credit from the formal financial sectors, whereas this number further declines in case low-income individuals, female, young adults and among the primary or less educated people.

Variable Name		Deposit Account			Saving Account			Credit Account		
	2011	2014	2017	2011	2014	2017	2011	2014	2017	
Adult (% age 15+)		53	80	12	14	20	8	6	7	
Income, poorest 40% (% ages 15+)		44	77	10	7	12	7	5	6	
Income, richest 60% (% ages 15+)		59	82	12	19	25	8	7	7	
Female (% age 15+)	26	43	77	7	10	17	7	5	5	
Male (% age 15+)	44	63	83	16	18	22	9	8	8	
Rural (% age 15+)	33	52	79	11	13	18	8	7	7	
Young adults (% ages 15-24)	27	43	71	8	10	13	4	4	5	
Older adults (% ages 25+)	38	57	83	13	16	22	9	7	7	
Labor force (% age 15+)	44	64	84	16	19	23	9	8	7	
Primary education or less (% ages 15+)	31	43	75	10	11	15	8	6	6	
Secondary education or more (% ages 15+)		64	85	21	19	25	7	7	7	

 Table 3. Financial Inclusions between Different Groups of People (%)

Source: Barik and Sharma, 2019

1.3.3. Recent Advancement in India's Digital Finance

The European countries show a paradigm shift in their technological revolution during the 19th and 20th century. As the colonial empire ruling the Indian subcontinent during that time, India missed the first and second wave of the technological revolution. During the third wave of technological development in early 1980s-90s, India somehow succeeds to initiate some technological development, as the new economic policy in India was not so advantageous to adopt the newly developed technologies. But with the beginning of a new century, when the fourth Industrial revolution started in 21st century, India was fully capable of catch-up its technological advancement like other emerging Asian counties. Hence, early 2000, show a radical alteration in the style of bank functioning in India. The adaptation of new technologies changed both the structure and procedure of banking industry in India. Now, all the financial sectors in general and banking sector in particular has witnessed rapid change in their financial activities. With the adaptation of internet/mobile banking, use of broadband or Wi-Fi connection, and instalment of other sophisticated digital technologies in banking activities have totally transferred the Indian banking industry from a human-driven to a technology-driven Industry. As a result of this, the Indian economy has also witnessed a fundamental transformation during this time, shifting the whole economy from a moneydriven economy to a digital economy or cashless economy.



Figure 5. The Recent Development of Digital Finance in India

Source: Author's Preparation

Note: ATM- Automated Teller Machine, USSD- Unstructured Supplementary Service Data, UPI- Unified Payments Interface, NEFT-National Electronic Fund Transfer, IMPS-Immediate Payment Service, RTGS- Real-Time Gross Settlement, AEPS- Aadhaar Enabled Payment System, BHIM- Bharat Interface for Money, Paytm- Pay through Mobile.

The frequent use of digital technologies in the banking sector such as internet/mobile banking, Phonepe, Paytm, Google pay, Amazone Pay, BHIM, credit/debit card etc., have enabled millions of people to access their banking services just in a single click on their mobile or computer. The use of digital transaction has promoted the culture of cashless transaction in India. People from both the rural and urban areas have significantly gained the benefits of digital transactions. The various modes of digital payment methods have gained much popularity among the young, educated people, urban residents, businessmen and small traders and even small shopkeepers to complete their day-to-day financial transactions. Similarly, the use of digital technology has also equally helped rural residents to access their basic banking services. Because of the intervention of digital technology, people from remote village areas have abled to complete their banking activities. For example, the application of the Jan-Aadhar-Mobile (JAM) trinity by the government allows the people to link their Aadhar and mobile number with their Jan-Dhan bank account. This JAM programme was introduced to reduce the corruption in government subsidy provision (such as pension payment, minimum wage payment etc.) by recognizing the ghost beneficiaries. Now with the help of JAM, millions of rural people are able to receive their government subsidies directly to their bank account through the Direct Benefit Transfers (DBT) scheme. Similarly, the recent use of Aadhar enabled Payment System (AePS) have allowed the rural people to withdraw their saved money at any point sale (Pos) through the Business Correspondent (BC) or Bank Mitra only by providing their authenticated Aadhar number and biometric thumb impression. The primary objective of this scheme is to deliver a safe, easy and secure financial service to the unbanked rural people without bearing any technical complications. Because of its less technicality and easy processing, rural people have easily adopted this method of financial transaction. On the other hand, different banks have appointed their Banking Correspondents to help the rural people in their financial transaction and to gain the confidence of rural people for the respective bank.

1.3.4. The Recent Trend of Digital Finance in India

Moreover, from the below given figure, it can be observed that, how the trend of digital banking is increasing rapidly over the years. We can notice that over the years, all the digital transaction technologies (i.e., Number of credit/debit cards, number of ATM per 100.000 adults and per 1.000 square kilometers and percentage of people using internet) have increased in India.





Source: Author's Preparation using World Bank and IMF Database

However, though it is true that Indian people have accepted the various methods of digital technologies from the very beginning of the 21st century but it cannot be denied that the post-demonetization period in India shows a rapid rise in digital payment transactions. When the government of India suddenly declared the demonetization of \gtrless 1000 and \gtrless 500 on 8th November 2016, the unprepared Indian market faced a cash crunch situation. The market shows a high shortage of cash, and there was a long queue in the bank or ATM machine by the people to deposit the higher currency or to withdraw their money. In order to meet the instant cash crisis caused by the demonetization, many digital payment methods (like PhonePe, BHIM, GoolePay, Amazon Pay, Paytm etc.) was developed in India during that time (see Barik and Sharma, 2019). Since, then the Indian market is seeing a high growth of digital payment in India and the people have easily adopted the various modes of digital payment methods available to them.

1.4. Financial Inclusion, Poverty Reduction and Human Development: Theoretical Foundation

Finance allows transferring economic power to the poor and vulnerable section of people, which have a significant effect on their poverty reduction and human development. This economic power can be extended to the lower section through the improvement in saving habits, enhancing investment, providing adequate credit and reducing their financial risk.

Poverty is understood as the deprivation of consumption/income and other basic economic resources by households or individuals. The easy extension of adequate credit from the banks will assist the poor people in smoothening their consumption expenditure and would enhance the economic capability to invest in other elements of human development such as investing in education, health, sanitation and on any other basic entitlements. It is natural that if people obtain more money through bank credit, then they would invest that money in their health, education, sanitation, skill development and in other developmental activities. Nobel Laureate Professor Amartya Sen (2001) has put the argument that the availability and an easy access to finance has a very significant effect on economic entitlement.

While linking financial inclusion with poverty reduction and improvement in human development, it can be argued that firstly, the process of financial inclusion allows the poor people to be formally associated with the banks and other financial institutions by enhancing their banking habits. It allows the poor people to have a bank account, to save money in their name, which they can use to manage their adverse economic conditions. Moreover, while saving in the bank/post office, the poor people will receive a certain amount of money as a rate of interest, which ultimately help them to accumulate more wealth.

Secondly, financial inclusion provides the opportunity to access easy credit from formal financial institutions. Provision of credit from the financial institutions save the poor and marginalized section of people from the exploitation of local money lenders. With the unavailability of credit from the formal banking sector, a private money lender is the only option left for the poor to access the loan. And the private money lender gets an opportunity to exploit the poor by levying a heavy rate of interest. From this perspective, the basic argument can put forward that the extension of credit to the poor can save from the exploitation of local money lender and simultaneously can reduce their financial risks.

Thirdly, in India, both the central government and various state governments are providing different government subsidies to the poorer section of people in-order to meet their economic hardship. However, through DBT scheme government is regularly transferring the subsidy money to the beneficiaries' bank or post office account. Hence, simply by opening a bank account, the poor people can able to receive these subsidy money in their account.

Lastly, looking at the nature of the Indian economy, where still the majority of people are engaged in the agricultural sector to earn their basic income, the extension of credit to the poor and marginalized farmers will encourage them to improve their farming and correspondingly will inspire them to invest in their small agri-business (Beck and Demirgüç-Kunt, 2008).



Figure 7. Relation between Financial Inclusion, Poverty and Human Development

Source: Laha, 2016

1.5. The Rationale of the Study

The liberalization of the Indian financial market in 1991 has witnessed a paradigm shift in the basic structure and functioning of the financial system. The Indian financial institutions, in general, and the banking sector in particular, show a significant change in their day-to-day functioning. There was major economic and financial policy reform occurred during that time. Because of the sluggish functioning of the Indian financial markets in the earlier time, the implementation of financial reform pushed the government

to immediately form a high-level committee (Narasimham Committee-I) for preparing a road map for the smooth and efficient functioning of the future financial markets. Similarly, with the opening of the Indian financial markets, many foreign financial institutions were welcomed to operate in India. With the reform in the banking sector and the operation of foreign banks, it was expected that these policy initiatives would help to enhance India's financial inclusion process. Moreover, the post-liberalization India has also perceived several major pro-financial inclusion policies to provide basic banking services to the earlier unbanked people. Such policies are: the launching of Self-Help Groups (SHGs) in 1992 and linking it with individual's bank account, provision of Kisan Credit Card (KCC), opening of no-frill account, introduction of Know Your Customer (KYC) scheme, Direct Benefit Transfer (DBT) facility, Pradhan Mantri Jan-DhanYojana (Prime Minister's People Money Scheme), Mudra Yojana and the recent introduction of digital India programme (see Barik and Sharma, 2019). The prime motto of all these financial inclusion policies was to provide an easy and affordable financial services to the poor and marginalized communities, so that they could overcome their economic hardship. Furthermore, the new financial reform also led to the withdrawal of social banking policy in India, which was having a very significant impact on poverty reduction. Earlier researchers (like Burgess et al., 2005a; Burgess and Pande, 2005b) have claimed that the implementation of social banking policy in India between 1977 to 1990 has reduced rural poverty by extending credit to the rural people through the establishment of bank branches in rural areas. However, the financial reform in 1991, the withdrawal of social banking policy during the same time, and the huge pro-financial inclusion policy initiatives in the post-reform period, has erupted a special interest among the economists to understand the progress and future prospect of India's financial inclusion in the post-reform period. And how has the process of financial inclusion have helped to reduce poverty and improve human development in India. Correspondingly, some of the researchers (such as Ninan, 2000;

Raghbendra, 2004; Sridharan, 2004; Ghosh, 2006; Topalova, 2007; Jha, 2008; Mukherji, 2009; Kalirajan and Singh, 2010; Gupta and Sivaramakrishnan, 2010; Agrawal, 2015; Saksena and Deb, 2017;) have endeavoured to examine the impact of economic growth on poverty and human development in the post liberalized India, however, there is a shortage of studies investigating the status of poverty and human development with context to financial inclusion in both aggregate sense and state level.

Financial liberalization Additionally, and banking sector development has contributed a lot to India's high growth trajectory. The post 1990s period has been exhibited high economic growth, leaving far behind that "Hindu Growth Rate". But the advantage of this high growth has failed to reach the rural mass and other marginalised categories of people. Still today larger sections of people lack access to basic financial product and services. India being the second largest populous country in the world, comprises a large number of unbanked people. In a study, conducted by the Center for Financial Inclusion (CFI) Sharma and Chatterjee (2017) argue that globally 2 billion people and in India 37 per cent people are excluded from the formal financial system. The lack of financial inclusion among the poor and marginalised section people has blocked their expenditure on education, health, sanitation and raises their financial risk. As a result of this still India is having a low human development indicator. Realising the importance of an easy and adequate financial accessibility on human well-being and development, a discussion has erupted about the performance of financial inclusion on poverty reduction and improvement in human development in the post-reform period. Hence, this study is an attempt to find out the answer that how has financial inclusion helped to reduce poverty and improve human development among the Indian states in the post-reform period.

1.6. Objectives of the Study

The study has three main objectives. The objectives are:

1. To examine the demand-side and supply-side determinants of financial inclusion separately among the Indian states.

2. To investigate the effect of financial inclusion on the overall state poverty and rural-urban poverty reduction as well.

3. To examine the effect of financial inclusion on human development among the Indian states.

1.7. Database and Methodology

In-order to provide the overall status of financial inclusion in the world and India as well, this study has used data from Global Findex Database (World Bank) and Financial Access Survey of IMF. However, for empirical analysis purpose, the study relies upon various state-level database of India. The study collected data from the time period 1993 to 2015 for its empirical analysis. The present study uses different state level data sources [such as Basic Statistical Return of RBI, The National Institution for Transforming India (NITI Ayog), Census of India, Centre for Monitoring Indian Economy (CMIE), Handbook of statistics on India states, Sample Registration System (SRS) Census of India, The National Family Health Survey (NFHS) and National Sample Survey Office (NSSO)] for collecting and analyzing the data.

Furthermore, the study has considered data period from 1993 to 2015 for its empirical analysis. There are specific reasons for choosing this data period. Firstly, as the country show the financial reform in 1991, hence it is assumed that the impact of financial reform can be realized after two to three years of reform. Because it is generally known that any economic reform yields its result after a certain time period. At the instant moment, it is difficult to measure the impact of any economic reform. Hence, the study has chosen 1993 as its starting period for analysis. Secondly, one of the prime objective of this study is to analyze the impact of financial inclusion on human development among the 28 Indian states. For constructing the

state-wise human development index, the study relies upon National Family Health Survey (NFHS) for collecting health related data. The first round of NFHS survey was started in India in 1992-93 and the last round of data is available up to 2015. Though recently in 2020, the NFHS has released its fifth round data but that data is not available for all states. Hence, the last round of data available for all states is fourth round data in 2015. Thus, looking the theoretical arguments for financial reform period and the availability of data, the study has edeavoured to keep its analysis from the time period of 1993 to 2015.

Additionally, for measuring the stationarity in the panel data, the study has employed Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test. For our empirical analysis, this study deals with various appropriate panel data regression modelling that includes Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Errors (PCSEs), Feasible General Least Square Method (FGLS) and Hausman-Taylor Regression (RE_HTR) model.

Additionally, for the construction of multidimensional indexes for both financial inclusion and human development, this study has relied upon Principal Component Analysis (PCA) method. Unlike most of the earlier researchers who have used Distanced Based Approach or Analytical and Hierarchy Process (AHP) for constructing the index, here this study uses PCA method to mitigate the problem of the weight factor, selection of maximum and minimum problem which are present in the earlier methodology. In PCA, weight can be calculated by eigen value and factor score, whereas in AHP, weight depends on the component which is more influential, depending on the subject expert or the mere assumption of the researchers. Hence, calculating the index through AHP may add subjectivity to the experts regarding the significance of the various components. In-order to avoid this subjectivity problem, this study relies upon PCA for constructing both the Financial Inclusion Index (FII) and Human Development Index (HDI).

1.8. Limitations of this Study

Though this study has provided sufficient empirical evidence to support its primary objectives, but this study also has certain limitations. Firstly, inorder to know the demand side and supply-side determinants of financial inclusion, limited indicators (for both supply and demand-side) are considered. With the availability of data, a future study could be developed encompassing more supply side and demand side variables. Secondly, as per the availability and suitability, this study has considered limited indicators (i.e., six indicators) of financial inclusion for constructing the financial inclusion index; a future study could be conducted by capturing more financial access indicators such as microfinance, insurance, post office saving banks etc, which are having significant impact on inclusive finance. Thirdly, here the study has measured poverty through headcount ratio; a further study could be developed by constructing a multidimensional poverty index and also empirically can test the effect of financial inclusion index on multidimensional poverty index. Fourthly, for constructing a statewise human development index, nine indicators are selected from three dimensions of human development. Because of limited data availability, some important indicators of human development (environmental indicators, civil liberties indicators) are not included in the human development index. Hence, with the availability of more human development data, a comprehensive index can be constructed in the future.

1.9. Organization of the Thesis

The present thesis is organized in the following manner. Chapter two of this thesis provides a prolonged literature review on the theoretical and empirical background of financial inclusion, its measurement, determinants and the impact of financial inclusion on both poverty and human development. The first subsection of the literature review describes the conceptual background of financial inclusion. The prevailing literature is further extending its classification into the various methods used to measure the concept of financial inclusion and its determinants. Then the literature review section proceeds to explain the interlinkages between financial inclusion and poverty reduction. Simultaneously, the section also endeavours to show how financial inclusion have impacted to reduce poverty. The next sub-section presents the literature related to the causality between financial inclusion and poverty. Similarly, the second subsection of literature review chapter explains the various methods of measuring human development and how the process of financial inclusion have impacted to improve human development. Then the next subsection tries to provide literature showing the inter-causality between financial inclusion and human development.

Chapter 3 of this thesis establishes the research hypothesis based on the literature review. Following the hypothesis, chapter three tries to show the empirical methodologies used for analyzing the data. The methodology section firstly defined the PCA method to construct the financial inclusion index. The next subsection described the models and the variables used for the demand side and supply side determinants of financial inclusion across the Indian states. The next subsection further discusses the models and variables used for analyzing the impact of financial inclusion on the overall state poverty and the rural and urban poverty as well. The next subsection of chapter 3 describes the used indicators for constructing state-wise human development index, and then discusses the empirical model and variables used for measuring the impact of financial inclusion on human development.

Likewise, chapter 4 of this thesis attempts to describe the results of the constructed financial inclusion index. Then the next subsection discusses the results of both demand side and supply side determinates of financial inclusion among the 28 Indian states. The next sub-section discusses the results of how has financial inclusion has helped to reduce the state-wise overall poverty and rural-urban poverty as well. The next subsection presents the causality results of financial inclusion and poverty. The next section of this chapter attempts to show the result of the impact of financial inclusion on human development. The next sub-section of this chapter discusses the empirical results of the inter-causality between financial inclusion and human development across the Indian states.

Lastly, chapter 5 of this thesis is intended to summarize the entire thesis based on its empirical finding. Correspondingly, here the thesis also takes an opportunity to suggest some valuable policy recommendations to the government as well as policymakers to implement appropriate profinancial inclusion policies in India. Then at the end, the thesis discusses the limitations of the present study and tries to explain the future direction of this research.

Chapter 2

Review of Literature

2.1. Introduction

Though the term 'Financial Inclusion' has gained much popularity in the post-2000 years but within the last few years, a significant amount of research has been conducted in the areas of financial inclusion, financial depth, financial deepening, financial literacy, financial capability etc. Both the theoretical and empirical studies have been developed over the time to have a deeper understanding of the concept of financial inclusion and to know how financial inclusion can work as a key policy measure to impact other socio-economic factors in life. So, periodically different economists have explained how financial inclusion is affecting different micro and macroeconomic variables in the country. Here, this chapter endeavours to provide literature evidence showing the interlinkages between financial inclusion, poverty reduction and human development.

It is known that for establishing an inclusive financial system in the country, all the policymakers and financial institutions need to have pro-inclusive customer policies. And the other hands the customer needs to be well informed about the financial products and services which are provided to them. The exclusion of the poor and marginalized people from the formal financial system happens because of both demand side and supply side problems (Arindam, and Kumar, 2011; Martínez., Hidalgo., and Tuesta, 2013; Ghatak, 2013; Sharma., Jain., and Gupta, 2014; Ramakrishna and Trivedi, 2018; Lenka, and Barik, 2018; Barik, and Sharma, 2020; Adil, and Jalil, 2020). Such demand side problems include low income, inadequate financial literacy, lack of interest, less collateral value, less identity proof etc. Similarly, supply side hurdles are unavailability of bank branches, lack of bank staffs, bad attitude of the bank staffs, irregularity of electricity/internet supply in the bank, lack of pro-inclusive bank policy etc. Considering both the demand and supply side hurdles of an inclusive financial system and taking necessary pro-active policy measures to rectify these problems can increase the degree of financial inclusion in the country. Furthermore, the high degree of financial inclusion can improve the overall availability, accessibility and usability of financial products and services among the people, which further enables the people to mobilize their saving, increase cash flow, reduce financial risk and increase their everyday banking habits. Thus, it is surely undeniable that financial inclusion plays a significant role on the process of poverty reduction and human development.

The present chapter enlightens about the exiting literature, which covers both the theoretical backgrounds and empirical evidence of various aspects of financial inclusion, poverty reduction and human development. The present chapter is organized in the following manner. Section 2.2 try to comprehend the process of financial inclusion through various components of financial service and institutions. Section 2.3 of this chapter discusses the significance of financial inclusion. Section 2.4 describes the various methods to measure financial inclusion. Section 2.5 try to explain both the supply side and demand side determinants of financial inclusion. Section 2.6 discusses the theoretical and empirical studies conducted to know the impact of financial inclusion on poverty. The sub-section 2.6.1 describes the causality between financial inclusion and poverty reduction. Section 2.7 provides a brief note on the concept of human development. Section 2.7.1 explains the linkages between financial inclusion and human development. Section 2.7.2. discusses the inter-causality between financial inclusion and human development. Finally, section 2.8. of this chapter provides a concluding remark of the overall chapter.

2.2. Understanding the Financial Inclusion through Different Lens

Financial inclusion refers to the safe and adequate provision of basic financial services to the poor and marginalized people in a transparent and reliable way. The mere opening of an account does not fulfil the true essence of financial inclusion. Along with account opening, regular deposit, saving and obtaining credit is also required to fulfil the true objective of financial inclusion. The ambit of financial inclusion involves a number of financial services and financial institutions as well. Though historically, banks or post offices have played key role in providing basic banking services but the rise of other financial services and institutions have also equally played a vital role to extend the basic financial services to the people.



Figure 8. Bouquet of Financial Inclusion

Source: Prepared by the author

2.2.1. Role of MFIs in Financial Inclusion

The interference of microfinance institutions (MFIs) has drastically altered the mode of banking operation in the entire world in general and in India in particular. The phenomenal growth of microfinance institutions in India since the mid-70s has helped a lot to speed up the process of financial inclusion. The intervention of microfinance institutions has always been considered an integral part of the process of financial inclusion through the provision of micro-credits to the earlier unbanked people. Hence, financial inclusion through the channel of microfinance is another aspect of providing basic banking to the unbanked. The main aim of this MFIs is to provide micro loans to the low-income households, specifically to women and small business holders. Research evidence from India show that microfinance institutions have played a pioneering role to enhance financial inclusion in Indian (Mukhopadhyay and Rath 2011; Shankar 2013). Similarly, research findings have also depicted that the provision of microcredit to the low-income households and women have helped to reduce poverty and have increased women empowerment in Indian subcontinents (Leach and Sitaram 2002; Imai, and Arun, 2008; Gupta 2011; Sengupta 2013; Lavoori and Paramanik, 2014; Krenz., Gilbert., and Mandayam 2014; Swamy 2019).

The study conducted by Ghosh (2013) provide a full review of recent literature on microfinance in developing countries including India to have a critical assessment of the effectiveness of MFIs. She articulated that microfinance have gone extensive outreach all over the world in general and in India in particular. Over the years, India has witnessed a large extension of microfinance. The article concluded that microfinance could be worked as a silver bullet for development, and the rise of pro-profit MFIs is problematic in India.

2.2.2. Insurance Sector and Financial Inclusion

Similarly, the provision of insurance services is considered as one of the four pillars in financial inclusion. Over the years, people have realized that a well-designed insurance policy can protect their family from future adverse economic shocks. Insurance policies from both the live and non-life categories have played a significant role to protect the poor and middle-class individuals from their financial risks (Guilherme, 2016). An inclusive insurance system can have the number of social and economic advantages such as:

- (a) It can help to shape resilience and sustainable livelihood for the poor households and MSMEs as well though providing constant financial support.
- (b) The risk prevention or mitigation nature of insurance service can encourage people to invest in other economic welfare activities like better education, health, sanitation, food security etc.
- (c) From the investment side, it helps to mobilize people's saving to productive investment in agriculture, industry and other financial service sector.

Correspondingly, except for bank insurance and insurance from other financial institutions/companies, the role of the Indian post office in providing basic insurance services to the rural poor, specifically to the rural women, is truly a noteworthy contribution. Rural women who are earlier excluded from obtaining the basic formal financial services has been able to own an insurance account in their nearby post office through rural postal life insurance service.

2.2.3. Remittance Service and Financial Inclusion

Over the last year, we have observed a large number of out migrations in our country. This rising trend of migration has helped immensely to increase the degree of financial inclusion in India. In-order to receive the remittance money the recipient need to have an active bank account in his/her name. Hence, remittance firstly increases the chances of opening bank accounts. Secondly, the remittance also increased the demand for saving and demand for purchasing financial products from the formal financial systems. Correspondingly, research finding from both the household survey (like Anzoategui., Demirgüç-Kunt., and Martínez Pería, 2011; Aga and Peria, 2014) and cross-cross country analysis (such as Inoue and Hamori 2016; Naceur., Chami., and Trabelsi., 2020) have depicted that remittance has played a significant role to enhance the degree of financial inclusion among the individuals and household as well.

2.3. The Significance of Financial Inclusion

Despite financial inclusion having a significant impact on the household and individual level, it also has an important role to play in the improvement of the macroeconomic situation in the country. Many researchers have tried to link the concept of financial inclusion with other macroeconomic variables like growth, inflation, unemployment etc. Researchers have argued that financial inclusion positively affects the saving and investment behaviour of the people, which ultimately spur the economic growth of the country (for example see Anand, and Chhikara, 2013; Sharma, 2016; Lenka, and Sharma, 2017; Kim., Yu., and Hassan, 2018; Sethi, and Acharya, 2018 and 2019; Dahiya, and Kumar,2020). Similarly, researchers have found that financial inclusion has very significant role in reduction of inflation rate which leads to price stability in the country (see Mbutor and Uba, 2013; Lenka and Bairwa, 2016; Neaime and Gaysset, 2018; Ouyang, and Rajan, 2019).

Realizing the significance of financial inclusion for the overall growth and development of the country, both the Indian government and Reserve Bank of India have implemented various pro-financial inclusion policies from the very early stage of India's development process. Though the concept 'financial inclusion' has gained much popularity in India in recent years but it has long his history since India's independence time. Like any other developing countries, India has also shown serious concerns for building an inclusive financial system. Since the early time of Independence, policymakers in India have tirelessly given their efforts to bring the basic banking system to the door of the poor and marginalized people. The main objective of building an inclusive financial system involves:

 (a) Providing Banking Services to the Poor: In India, a large number of rural masses are excluded from the formal financial system.
 Factors like low level income, illiteracy, lack of financial knowledge, unavailability of banking services in the near distance and high documentations have always created constraints for the rural people to access banking services. So, establishing more bank branches in the rural areas will provide an opportunity for the rural people to open a bank account in their name. Correspondingly, the opening of a bank account will also encourage to them to save some amount of money in their account. On one side, the increase in saving will help the poor to mitigate their future financial risk and smoothen their live style. On the other hand, the increasing savings will boost the capital investment in the country, which will ultimately spur economic growth.

(b) Providing Save Credit to the poor: Earlier banks were often hesitated to provide loans to the poor rural masses. Because of asymmetric information and lack of collateral value to deposit, poor people are deprived of obtaining any loans form the banks.

Firstly, as the home of the lender are situated far away from the bank, hence it won't be possible for the banks to have full information about the lender (see Moro., Fink and Maresch, 2015; Liao., Chen and Lu, 2009; Rajan, 2017; Asongu, 2017). The bankers think that it would be difficult for them to collect their money from the lender. Therefore, the bankers sometimes hesitate to extend a loan to the poor.

Secondly, many rural people generally do not own any collateral value to deposit in the bank against their loan. Hence, the bank fears to get the return of its given loans, which further restrict the bank to give loan to the poor (see Fabbri and Padula, 2004; Field and Torero, 2006; Fafchamps, 2013; Rajan, 2017).

Thirdly, the impediment of fixed transaction cost also restricts the banks not to provide any small loans to poor people. For example, the poor generally need small loans, and the transaction cost for the poor is nearly the same as the bank helps the rich. Because it takes much time to fill-up the form and to provide other necessary documentation as it requires for the rich clients, hence, a conscious banker will always opt for providing loan to rich clients at the same time cost. Consequently, rural poor become deprived of obtaining their loans (see Rosenberg., Gonzalez and Narain, 2009; Rajan, 2017).

Because of all these institutional constraints, rural unbanked people depended on the local money lenders for centuries during their emergency need of money. And on the other hand, with the absence of any formal sector to lend the poor, local moneylender gets an opportunity to exploit the poor by imposing a heavy rate of interest on their lending.

Hence, understating the importance of small credits on the economic empowerment of poor people, recently both the government and RBI have taken so many policy measures to relax the credit norms for the poor and rural people. Some of the polices like Differential Rate of Interest (DRI), Pradhan Mantri Mudra Yojana (PMMY), Make in India programme, Emergency Credit Line Guarantee Scheme (ECLGS), Atmanirbhar Bharat etc. have been implemented to provide save and adequate credit to the poor people to initiate their own business or entrepreneurship.

(c) Reduces Corruption in the Public System: The recent initiatives to link the bank account with technology has immensely benefited to the poor people. The intervention of digital payment system in the financial sector in general and in the banking sector, in particular, has drastically altered the mode of operation and function. The implementation of digital payment method has certainly reduced the middleman transaction cost and has able to provide more efficient services to the customers. The implementation of DBT scheme by the government of Indian has enabled people to receive their government subsidies and their MGNRECA (Mahatma Gandhi National Rural Employment Guarantee Act.) wage paid directly to their bank account without middlemen interference. any Similarly, the recent implementation of JAM trinity has able to identify many ghost beneficiaries of government benefits and has able to provide government subsidies to the actual beneficiaries (see Barnwal, 2018; Joy, 2018; Barik and Sharma, 2019).

2.4. Measurement of Financial Inclusion (FI)

Measurement of complete financial inclusion is always a difficult task for almost every researcher. For measuring financial inclusion, it needs financial indicators from multiple dimensions of various financial institutions. The measurement of complete financial inclusion will not be possible while neglecting any of the indicators from any of the financial institutions. Hence, it is hard to find a universally accepted definition, despite much progress witnessed in the areas of financial inclusion in recent times. The reasons behind this are financial inclusion takes different meaning with different socio-economic context. The measurement of financial inclusion widely varies from country and place-specific. Depending open the availability and suitability of data, the measurement can give different results. Therefore, while going through the long journey of our literature review on financial inclusion, we observed that most definition of financial inclusion is country or place specific.

Earlier studies on financial inclusion were focusing only the availability part of financial inclusion. Hence, studies were looking the availability indicators like the opening of bank account among the household/adult individuals and availability of bank branches in the nearby areas (for example, see Seaver., and Fraser,1979; Beck., Demirguc-Kunt., and Peria., 2006; Honohan, 2008) for measuring financial inclusion. Later on, it was realized that the mere opening bank account would not fulfil the true essence of financial inclusion until and unless it is used by the customer for their benefits. Therefore, along with availability indicators, other aspects like usability, accessibility, affordability, security and reliability are also given importance over time. Because with the passage of time, it was understood that together these factors could build an inclusive financial system in the country. Inorder to overcome this problem, a researcher like Sarma (2008, 2010,

2011, 2012 and 2015) has provided a multidimensional index of financial inclusion including all dimensions (i.e., availability, accessibility and usability) of banking services. Sarma (2008) used distance-based approach (adopted by UNDP to compute the HDI, the HPI and the GDI) and considered three major dimensions to construct financial inclusion index (FII) among the cross-country level. These three dimensions were *banking penetration* which involves the number of bank accounts per 1000 adult population; availability dimension, which involves the number of physical bank branches and ATM per 1000 adult population and *usage dimension*, which includes the volume of credit and deposit as proportion country's GDP. In that paper, she gave equal weightage to the three dimensions and calculated the FII. Based on the index score, she ranked all the 55 countries into three groups (i.e., high, medium and low). The countries which were having an index score equal to or more than 0.6 are categorized as high financial inclusion country. Similarly, those countries index varying between 0.4 to 0.6 are categorized as moderately inclusive countries. And countries having an index score of less than 0.4 are categorized as least inclusive or less financial inclusive countries. Another study by Rashmi Arora (2010) tries to examine the degree of access in both developed and developing countries. Unlike Sarma (2008), Arora (2010) used introduced two more dimensions along with outreach or physical access dimension. In-order to construct a comprehensive financial inclusion index, she considered three dimensions like physical access, ease of transactions dimension and cost of transactions dimension. Furthermore, the paper constructed two separate financial inclusion indexes for both banking and non-banking institutions. Similarly, Kumar and Mishra (2011) tried to measure financial inclusion by observing both the supply side indicators (like the number of deposit and credit accounts, number of bank branches, average deposit and credit amount per account and credit utilized) and demand side factors (such as indicators of household-level access such as the proportion of households having saving, credit and insurance facilities). Using both the dataset, two separate indexes were constructed for the year 2002-03 for all the Indian
states and union territories. Their findings depicted that there is a high variation in financial inclusion between rural and urban India. Likewise, within the various Indian states, a huge gap was observed between them. Some states are performing good in terms of providing basic financial services, whereas other states are performing worse. During the same time, Bihari (2011) constructed financial inclusion index using a multidimensional approach such as banking penetration, availability of banking services and usage of banking services. He asserted that the proposed index could be used to make comparison of the degree of financial inclusion between various countries at a particular point in time. Further, he assured that the constructed index could equally be used to supervise the progress in financial inclusion policy initiatives that any government has undertaken overtime. The proposed index was able to capture the various dimensions of financial inclusion in a single between 0 and 1. Here the digit '0' refers to complete financial exclusion whereas '1' refers to complete financial inclusion in the country.

Similarly, Gupte et al., (2012) constructed financial inclusion index by using a different methodology. They tried to construct a financial inclusion index by accompanying multi-dimensional variables for financial inclusion. They used the geometric mean of the four major dimensions such as outreach (penetration and accessibility, usage, ease of transaction and cost of transaction for constructing a complete index. Bagli and Dutta (2012), applying a Rotated Principal Component Analysis, tried to construct a comprehensive financial inclusion index in each Indian state. Taking data of ten financial inclusion indicators from RBI and the Government of India Economic Survey, this study computed financial inclusion index and ranked each state in accordance with their composite score.

Kunt and Klapper (2012) measured financial inclusion for 148 considering the data on formal accounts (a. the mechanics of the use, b. purpose, c. barriers d. alternatives to formal accounts, e. penetration, and f. receipt of payments), savings behaviour (a. use of accounts, b. use of community-based savings methods, and c. the prevalence of savings goals), source of borrowings, and use of insurance. Their findings depicted that nearly 50 percent of the world adult population are out of the formal financial system. Furthermore, the finding showed that financial inclusion varies widely across the regions. The most common reasons of financial exclusion are high transaction cost, physical distance, and lack of convenient legal documentation etc.

Credit Rating and Information System of Indian Ltd (CRISIL, 2013) measured financial inclusion, taking three dimensions (i.e., Branch penetration, Credit penetration and Deposit penetration). The finding of the report says that smaller states and Union Territories like Goa, Puducherry, and Chandigarh, having a population less than 30 million are performing good in comparison to the larger states in India.

Another study by Chakravarty and Pal (2013) used a different methodology for measuring financial inclusion. Using the axiomatic method, they tried to construct a financial inclusion index across the Indian states covering the time period 1972 to 2009. The study here demonstrated that supply side banking data has a significant role to play in constructing the financial inclusion index. Moreover, while analyzing the data for such a long period of time, the study found that social banking policy or otherwise known as bank licensing (which started in 1977 and ended in 1990s) policy had a significant role in boosting the overall financial inclusion among the Indian states.

Recently some researchers have calculated financial inclusion in Indian and in Indian state as well. Authors like Ambarkhane, Singh., and Venkataramani (2016) measured the financial inclusion index for major 21 states. Taking indicators from three dimensions such as demand, supply and infrastructure dimension, the financial inclusion index was calculated for 21 major Indian states. The finding of the paper depicts that states like Goa, Kerala and Tamil Nadu are having high financial inclusion, whereas states like Chhattisgarh, Jammu and Kashmir and Madhya Pradesh are having very low financial inclusion. Similarly, Goel and Sharma (2017) calculated the financial inclusion index for India taking six indicators from three dimensions (i.e., banking penetration, availability and access to insurance).

While questioning the assigned weight factor in distance-based approach, some researchers recently have constructed financial inclusion index using Principal Component Analysis (PCA). Using a two-step principal component analysis method United Nation Development Programme (UNDP, 2012) measured the financial inclusion index based on data from the 2012 wave of the Mexican National Financial Inclusion Survey. The survey results indicate that the access dimension is the main determinant of inclusion and that there are important inclusion gaps between rural and urban dwellers. Similarly, Cámara and Tuesta (2014) constructed financial inclusion index for 137 countries using PCA method. Taking indicators from three dimensions like usage, barrier and access dimensions, they constructed a financial inclusion index for 137 countries across the world. Thereafter, many researchers have used PCA method to calculate the financial inclusion index in India (see Lenka and Bairwa 2016; Lenka and Barik 2018; Lenka and Sharma 2017) and in other countries (see Yorulmaz 2018; Ahamed and Mallick 2019; Barik and Pradhan 2020) as well.

2.5. Determinants of Financial Inclusion in India

The process of financial inclusion is constrained by both demand side and supply side factors. The demand side determinants of financial inclusion include economic status, social identity, educational training, and cultural/religious characteristics of the individuals. Similarly, the supply side determinants of financial inclusion comprise infrastructural facilities, well-trained bank employees, and pro-financial inclusion policies by the government. Kumar (2013) conducted a study with annual data of 29 states of India from 1995 to 2008. The findings of the study depicted that supply side determinants like bank branch expansion, employment generating scheme have a significant impact on the expansion of financial inclusion. Oppositely, the demand side factors like employee base and level of industrialization have an influential impact on financial inclusion. Nandru et al., (2016) conducted a primary survey in Pondicherry region (India) to know the socio-economic determinants of financial inclusion. The author used various social and economic variables (such as income level, age, gender dimension, employment status and education level) to know the determining factors of financial inclusion. The result of the study shows that level of income and education have a significant impact on financial inclusion, which is measured by ownership of bank account. A different kind of study was conducted by Sahoo et al., (2017) among the Tribal in Odisha (India) to know the determining factors of financial inclusion among the Tribal people. A primary survey was conducted with 300 households in two districts of Odisha (i.e., Bolangir and Mayurbhanj). From the result, it was found that almost 72 percent of the household did not own any saving account in their names. Similarly, almost 98 percent of people did not have even a post office saving account in their names. The result showed that the level of education of the household head, size of land ownership, household income and participation in MGNREGS is the major factor which determines the degree of financial inclusion among the tribal people in Odisha. Recently, Raichoudhury (2020) conducted a study on 28 Indian states to know the various socio-economic factors determining financial inclusion across the Indian states. Using the Wroclaw Taxonomic Approach, the study measures financial inclusion in a composite manner. The study finds that the state of Goa tops in the rank while a state like Nagaland occupies the last rank in the financial inclusion rank list. The further economic analysis of the paper finds that income, infrastructure and employment opportunities are the significant predictors of financial inclusion among the Indian states. Another recent study was Kaur and Kapuria in 2020, which tries to find out the determining factors of financial inclusion in rural India. Furthermore, the study also tries to look after the role of gender in determining financial inclusion in rural India. The findings of the study depicted four interesting facts that are -:

- a. Female-Headed Households (FHHs) have a lower chance to obtain financial service from formal financial institutions and a higher chance to access from the non-financial institution. Similarly, vis-à-vis happens for Male Headed Households (MHHs).
- b. Level of education, monthly household consumption expenditure (mpce), land holding size, irrigated area and penetration of scheduled commercial banks influence FHHs to obtain financial services.
- c. Female from socially disadvantaged castes have fewer chances to obtain financial services form formal financial institutions.
- A substantial proportion of FHHs accesses neither a formal financial institution nor from non-financial institution relative to MHHs.

2.6. Linkages Between Financial Inclusion and Poverty Reduction

In many developing and emerging economy, it is argued that the mere development of the financial system is not enough for the country to reduce poverty because the financial system does not reach all sections of people equally due to the problem of adverse selection or asymmetry information in the financial market and high fixed cost/risk associated in lending to small borrowers. Sometimes the financial system is more favoured towards the better-off person, elite people or urban middleclass section leaving the poor and marginalized people out of the reach of the formal financial system. In this situation, the concept of financial inclusion plays a very crucial role to bring the unbanked/underbanked people under the banking purview at an easy and affordable cost. Hence, in this context, it can be said that financial development is an input variable that works as a means to achieve the goal of financial inclusion through the establishment of financial institutions.

On the other hand, poverty is defined as the deprivation of consumption and other basic economic resources among the people. Provision of microcredit through the formal financial institution will help the poor to smoot their consumption expenditure and enhance their capability by investing in their non-income generating activities such as health, education, sanitation and other basic entitlements. Sen, (2001) argues that the availability and easy access to finance has a very significant effect on economic entitlement.

At first, financial inclusion will enhance the saving habits among poor people. Through financial inclusion, the poor unbanked people will have an opportunity to save a small amount of money in their bank/post office account, which they can use during their adverse economic shocks. Simultaneously, through saving in bank/post office, the poor people will get a rate of interest in return and can accumulate more wealth. Secondly, financial inclusion extends credit to poor people at an affordable cost. Accessing easy and adequate credit from formal financial institutions can save poor people from the exploitation of local money lenders because with the absence of a formal financial system to provide credit, local money lenders provide loans with a high rate of interest. In this context, it can be argued that the provision of easy and adequate finance curtails financial risks of the poor and marginalised people, which may increase their production capacity. Thirdly, from an individual family perspective, financial inclusion not only increases poor people's cash flow and but also encourages them to invest their obtained credit on other dimensions of poverty such as children's education, health, building house, smoothening consumption etc (Li 2018). As a consequence, families involved in the formal financial system raise their family income and secure their family from the adverse financial shocks, which create instant financial risks for the family. Fourthly, in India, it is known that poor agriculture farmers and small entrepreneurs often face difficulties to access adequate finance from formal financial institutions because of less collateral values to deposit in the bank. Hence, extending micro loans to the poor and marginalised farmers/entrepreneurs can help them to improve their agricultural activities and small business. Lastly, in India, many government resources are unable to reach the poorest of the poor due to the leakages in the government distribution system. As a remedy, the Government of India (GOI) has implemented the Direct Benefit Transfer (DBT) scheme for transferring money to the beneficiaries bank/post office accounts. So opening a bank account is the first step to acquire the benefits of DBT scheme (see Barik and Sharma 2019). Hence, through financial inclusion, the poor and marginalized people can obtain government subsidies which ultimately helps them to improve their standard of living.

Therefore, recently there have been substantial studies from both theoretical and empirical analysis perspective that have addressed the effect of financial inclusion (or the accessibility of banking products and services) on poverty reduction by taking different indicators of financial inclusion. Such studies (Chibba, 2009; Kablana and Chhikara, 2013; Inoue, 2011, 2018; Park and Mercado 2015; 2017; Zhang and Posso, 2017) have used few indicators of financial inclusion as per their data availability and suitability and analyzed that financial inclusion has a significant effect on poverty reduction (Williams et al., 2017; Anwar et al., 2016; Hussaini et al., 2018, Erlando et al., 2020). Oppositely, researchers like Bhandari 2009; Meager, 2019 and Neaime and Gaysset, 2017 have also found that financial inclusion has no impact on poverty reduction.

Except for these secondary data analyses of financial inclusion and poverty reduction, some Indian researchers have shown the same linkage by working with primary data. In the early stage of financial inclusion, Sinha et al., (2012) conducted a study in six states of India from five different regions in India, namely the south, west, east, north and north-east, to examine the linkages between Self-Help Group-Bank Linkage Programme (SBLP) of the National Bank of Agriculture and Rural Development (NABARD) on poverty eradication in rural India. The finding of the study depicted that such a programme has done tremendous work to generate income among rural people and has equally helped to reduce rural poverty. Khaki and Sangmi (2017) conducted a survey in the Kashmir valley and found that access to finance through National Rural Livelihood Mission (NRLM) (formerly known as Swarnajayanti Gram Swarozgar Yojana) scheme has a positive and significant effect on lowering multi-dimensional poverty in the valley. Similarly, Lal (2018) conducted a study in three states of India (i.e., Jammu and Kashmir, Himachal Pradesh and Punjab) with 540 beneficiaries Cooperatives banks to measure the impact of financial inclusion on poverty reduction via Cooperatives banks participation. Using statistical techniques like ANOVA, t-test and SEM (Structural Equation Modelling), the findings of the study described that financial inclusion via Cooperatives banks has a direct and significant impact on the poverty reduction process. The study has further thrown light on the fact that accessibility of basic financial services like savings, insurance, loans etc., are having much positive impact on the lives of the poor to come out from the poverty trap. Recently, Das (2019) conducted a study with both primary and secondary data in the state of Assam (India) to evaluate the impact of credit accessibility on multidimensional poverty reduction. The findings of this study argued that a formal source of credit is an effective means to reduce poverty by lifting those who are near to the poverty line.



Figure. 9 Relationship between the Different Dimensions of Financial Inclusion and Poverty Reduction

Source: Author's Preparation

Author (s)	Study Area	Data	Major Findings
	(Countries/States)	Sources	
Bukari, et al, (2020)	Ghana	Cross- sectional secondary data	Financial products and services have strong effect on poverty reduction.
Koomson et al, (2020)	Ghana	Cross- sectional secondary data	Financial inclusion has negative effect on household poverty.
Omar and Inaba (2020)	Cross-country Analysis	Cross- sectional secondary data	Financial inclusion significantly reduces poverty in developing countries.
Bello and Oladunjoye (2020)	Cross-country Analysis	Cross- sectional secondary data	Overall access to finance positively impacted the level of poverty in Sub-Saharan Africa.
Ouechtati (2020)	Cross-country Analysis	Cross- sectional secondary data	Financial inclusion has negative relationship with poverty reduction in developing countries.
Ahmeda, et al., (2016)	Bangladesh	Cross- sectional secondary data	Financial inclusion reducing rural poverty in Bangladesh.
Park and Mercado, (2017)	Cross-country Analysis	Secondary data	Financial inclusion has a significant correlation with lower poverty and income inequality.
Zhang and Posso, (2017)	China	Primary data	Financial inclusion helps to reduce poverty and improve income inequality by raising household income.

Table.4 Important International Studies on Financial Inclusionand Poverty Reduction

Source: Author's Preparation

Author (s)	Study Area	Data	Major Findings
	(Countries/States)	Sources	
Churchill and Marisetty, (2020)	India	Cross- sectional secondary data	Financial inclusion has strong poverty alleviation effect.
Cavoli et al., (2020)	India	Secondary data	Financial inclusion has significant effect on poverty reduction.
Das (2019)	Assam (India)	Both secondary and primary data	Formal source of credit is an effective means for the reduction of poverty.
Inoue, (2018)	Indian States and union territories	Secondary data	Financial inclusion and financial deepening through public sector banks have a significant effect on poverty reduction in India.
Lal, (2018)	Three Indian states (J &K, Himachal Pradesh and Punjab)	Primary data	Financial inclusion through cooperative banks has a direct and significant effect on poverty reduction.
Khaki and Sangmi, (2017)	Kashmir Valley (India)	Primary data	Access to finance through the participation of SGSY has a significant effect on multidimensional poverty reduction, except the education of children.
Inoue (2011)	Indian States and union territories	Secondary data	Both access to and usages of financial services have helped to reduce poverty in both rural and urban India.
Burgess <i>et al.,</i> (2005a;2005b)	Indian states	Secondary data	Rural bank branch expansion through social banking programme has significant effect on rural poverty, especially among the lower caste and tribal households.

Table.5 An Empirical Study on Financial Inclusion and PovertyReduction in India

Source: Author's Preparation

2.6.1. Causality Between Financial Inclusion and Poverty Reduction

Financial inclusion has a significant role to play to reduce poverty and to improve the standard of living. The process of financial inclusion delivers an occasion for generating an environment for providing a better economic opportunity for the poor and vulnerable section of people. The accessibility of financial services allows poor people to spend money on their both consumption and non-consumption expenditure. The constant cash flow through financial inclusion reduces the poverty level among the poor. However, the reverse causality can also be possible here i.e., the reduction of poverty can equally lead to enhance the process of financial inclusion in a country. These intercausalities are a very complex process. There might have various direct and indirect channels through which the reduction in poverty lead to a high degree of financial inclusion. One possible channel could be that with the reduction in poverty and the corresponding rise in the standard of living, the individual can able to deposit the surplus money in the bank, can withdraw the deposited money as per his/her requirement and can invest the money to earn more future profit.

In this context, to know the causality between financial inclusion and poverty, there are a few studies conducted in various country context. Uddin et al. (2014) well described the nexus between finance and poverty reduction. They conducted their research using data from 1976-2010 in Bangladesh with the Autoregressive Distribution Lag (ARDL) approach. The finding of their study indicated that in the long run, the development of the banking sector was associated with poverty reduction. While in the short run, there was a two-way causality between the development of the banking sector and poverty reduction. Similarly, Erlando et al., (2020) conducted a study in the recent past to show the nexus between financial inclusion and poverty alleviation in Eastern Indonesia. The paper used the Toda-Yamamoto VAR bivariate causality model and the dynamic Panel Vector Autoregression (PVAR) to accomplish the study. The result of this study shows that the bivariate causality model specifies a high relationship between financial inclusion, economic growth, poverty reduction, and income distribution in Eastern Indonesia. However, through-out our literature journey, we did not observe any study on this issue with context to India. The here realized that there is shortage of studies conducted in Indian context to measure the causality between financial inclusion and poverty reduction.

2.7. Understanding the Concept of Human Development

In the year of 1990s, the first Human Development Report paid considerable attention to a human-centric development process, deviating from the earlier method of measuring human development through national income and accumulation of wealth. As per the 1990s UNDP report, the Human Development Index includes three dimensions like Health, Knowledge, and Standard of living. Each dimension possesses different indicators. For dimension one (Health), it takes into account one indicator like average life expectancy at birth, for the second dimension (Knowledge), it takes into account two indicators like gross combined enrolment ratio (which includes primary, secondary and tertiary school education) and adult literacy rate and similarly, for the third dimension (Income) it takes into account only one indicator like GDP per capita (Anand and Sen 2000). For the first time, other than individual income, much attention was paid to other wellbeing factors of human life such as long and healthy life, access to education or knowledge, and economic condition. The term human development was defined as the process of enhancing people's choice in life and also expanding their capabilities (UNDP_HDI, 1990, pp-10; Sen, 1990). It was also felt that human freedom is also an important aspect of human development. In developing countries (like South Asia, South Africa, Latin America and Caribbean countries), everyday people are struggling and sacrificing their lives to protect basic human freedom and rights (Gasper 2002; Nussbaum 2003; Alkire 2002; 2005). Hence without considering the freedom in a life of a human being, the complete definition of human development is quite impossible. Human development is not only bounded with economic wellbeing but also included freedom in all aspects of life such as political and civil liberties, social opportunities etc. (Anand and Sen 1998; Sen, 2001). As it is known that human development is a multidimensional concept, and some of the qualitative aspects of life such as freedom of speech, free election, and social and cultural restrictions are not properly quantified with relevant data information. In the first human development report, three basic factors like health, education and standard of living were given importance. It has been assumed that these three factors are very basic requirement for human development. But over time, with the availability of other development aspect information, the human development index can be extended to capture the available relevant development information. Measurement of human development and capabilities with few indicators is absolutely inadequate and periodical revision can be done systematically with adequate information (Sen, 1988; Anand and Sen 1994).

2.7.1 Connections Between Financial Inclusion and Human Development

One of the major objectives of life is to have a healthy and peaceful life. Hence, every human being chooses to have a long and healthy life, to be educated and to enjoy a decent standard of living. Since it is expected that the extension of basic financial services through financial inclusion will directly help to attain good health, education and decent standard of living for the individual, which will ultimately improve the human capability or human development. Professor Amartya Sen has defined his human development as the process of expanding human capability. Sen's concept of 'Capability' and 'Functioning' refers to the overall wellbeing of an individual through the availability of a broad range of opportunities. The word 'functioning' indicates the actual realization of a set of capabilities by the individuals. Functions are the active realization of one or more capabilities, i.e., beings and doings that are the outgrowths or realization of capabilities. On the other words, the capability is a combination of multiple functioning that is feasible to attain by the individuals. Therefore, providing a safe and affordable formal financial service is always considered as an effective policy instrument to ensure a multiple functioning to the individuals which ultimately produces a better degree of human capability.

Likewise, in a similar kind of argument, it can be said that poor people use their financial services to attain two main outcomes for improving their wellbeing i.e., building resilience and capturing opportunities. Building resilience refers to individual's ability to prepare against future adverse economic shocks. The availability of a formal financial system to the poor at an easy and affordable manner provides them with a chance to save money in order to save their family from any economic hardships. Similarly, 'capturing opportunities' refers to people's ability to seize investment opportunities that improve their livelihoods. With the easy accessibility of credit from the formal financial system, the people can invest that obtained credit to improve their skill, to obtain a better education and to have decent job in- order to gain more wellbeing in life.

Here, we have identified some of the dynamic role of financial accessibility to improve the overall wellbeing of the people.

- (a) Smoothen Household Management: People mostly use financial access to either acquire more wealth through various investment in consumption and non-consumption factors or manage their liabilities. In either way, it will help the household to smoothen their household management.
- (b) Building Human Capability: When people access finance, they get an opportunity to invest that money in their health, education, sanitation and other household wellbeing. Similarly, more often, poor people also invest their obtained credit to acquire more productive skills to make fit for the job market or to gain more employment opportunities. All these expenditures on their future progress helps to secure their life from the adverse situation and provides them with more welfare.



Figure 10. Relationship between Financial Inclusion and Human Development

Source: Author's preparation

Image of financial inclusion is retrieved from: https://bfsi.eletsonline.com/the-truth-about-indias-financial-inclusion/

Literature evidence from both cross-country level and India shows that financial inclusion has played a pioneering role in enhancing human development. Using the same (Sarma 2008) methodology, Sarma and Pais (2011) conducted a cross-country study to know the relationship between financial inclusion and human development. The results of the study found that financial inclusion and human development are strongly positively correlated to each other except a few exceptions. A recent study by some of the researchers (such as Ofosu-Mensah et al., 2019; Peria and Shin 2020; Matekenya etal., 2020) conducted in various cross-country context and their results have found that financial inclusion has played a positive role in improving human development. Nanda and Kaur (2016) conducted a cross country research among 68 countries from the time period 2004 to 2012 to know the impact of financial inclusion on human development. The findings of the paper suggested that financial inclusion have a strong and significant impact on human development. Another study conducted by Qureshi and Xiong (2018) to know the impact if financial inclusion through the use of bitcoin, on human development. The study finds a strong positive correlation between bitcoin transactions and human development.

Similarly, in the Indian sub-continent, some researchers have also tried to look after the inter-relationship between financial inclusion and human development. Researchers like Kuri and Laha (2011) conducted a study among the Indian states and union territories, taking the time period from 1993 to 2004, to know the impact of financial inclusion on human development. The findings of the study show that an inclusive financial system enables the progression of human development by addressing the basic distortions in the level of financial inclusion. Similarly, recently Nanda and Kaur (2017) conducted a study with 25 states, 4 Union Territories (UTs) of India to measure the relationship between financial inclusion and human development among the Indian states. The result of the study indicates that financial inclusion is high among the states like Delhi, Goa and Chandigarh throughout the period of the study. The study further reflects that the Southern region of the country has made extensive progress in financial inclusion. And states from North-east are performing poorly in terms of financial inclusion. With relation to financial inclusion and human development, the study shows that financial inclusion is an imperative policy measure to ensure human development.

2.7.2. Causality between Financial Inclusion and Human Development

Like the causality between financial inclusion and poverty, the study here also tried to examine the causality between financial inclusion and human development. The study assumes that there might have bidirectional causality between these two variables. Because the constant cash flow through the process of financial inclusion would surely encourage the individuals to spend money on their health, education and other income generating activities which will improve the human development condition. Oppositely, the reverse causality can also possible here. Because the expenditure on human health and education would help to enhance the productivity and efficiency of the individuals, which would further help to increase the income level of the individuals. One possible way through which the individual can use their efficiency is that they can utilize their better efficiency for obtaining better employment and market opportunity. An obtaining a better employment opportunity would increase the income level of the individuals and they would prefer for formal saving of their surplus money earned. In this way both financial inclusion and human development can help each other to improve both the condition of a human being.

In this regard, one study was conducted by Ofosu-Mensah et al., (2019) to know the causality between human development and financial inclusion. The study endeavour to empirically examine whether the degree of human development leads to greater financial inclusion and vice versa in the frontier markets circumstances. The study used the dynamic panel generalized methods of moments (System-GMM) for analyzing its data from 2005 to 2014 for twenty (20) frontier markets by Standard and Poor's Indices. The study finds that human development plays a major role in augmenting financial inclusion, which further increases the degree of human development. The study confirms that income, healthiness and financial literacy are the important factors for enhancing financial inclusion. Hence, the study concluded that low financial inclusion leads to low human development and low human development leads to low financial inclusion among the frontier market countries. However, while going through our literature journey, we did not observe any study conducted in Indian context. Realizing the shortage of studies in Indian context, here the study has endeavoured to examine the causality between financial inclusion and human development among the Indian states.

2.8. Concluding Remarks

Financial inclusion has a pioneering role to play in-order to reduce poverty and improve human development. Both the theoretical and empirical literature reviewed in this chapter examines the effect of financial inclusion on poverty and human development.

Firstly, this chapter endeavors to investigate the determining factors of financial inclusion among the Indian states. The process of financial inclusion involves both demand side and supply side factors. Hence, firstly this chapter conducted a literature review on the world level to know the determining factors of financial inclusion in the global context. Then the literature reviews focused particularly to the Indian context to examine the various determining factors of financial inclusion in India. From both the global level and Indian context, the literature journey realized that numerous factors from economic, social, political and cultural/religious sides are responsible for enhancing the process of financial inclusion. Therefore, researchers have used various factors of financial inclusion as per their availability and appropriateness of data for any particular region or country. Similarly, with context to the construction of the financial inclusion index also, researchers have used various financial indicators as per their data convenience and suitability. The construction of a comprehensive financial inclusion index is always a challenging task for researchers. Because the process of financial inclusion is a multidimensional concept in itself. Hence, comprising all indicators of financial inclusion in the index construction is truly a challenging task. So, from the literature review, it was realized that both the construction of the financial inclusion index and its determinates can be altered over time as per the data availability and suitability.

Secondly, the literature review discusses the relationship between financial and poverty alleviation. Many studies have explained the negative relationship between financial inclusion and poverty alleviation (see Kablana and Chhikara, 2013; Inoue, 2011, 2018; Park and Mercado 2015; 2017; Anwar et al., 2016; Zhang and Posso, 2017; Williams et al., 2017; Hussaini et al., 2018, Erlando et al., 2020) Like earlier section, here also our literature review firstly focused the theoretical and empirical study explaining the impact of financial inclusion on poverty reduction in the global context. Then our literature review again focused on the same impact on the Indian context. Our finding from the literature journey on financial inclusion and poverty alleviation depicts that most of the study have shown financial inclusion have a negative impact on poverty alleviation. That means the rise of financial inclusion can help to reduce poverty in a particular region or household. Conversely and surprisingly, few other studies have also found no impact of financial inclusion on poverty alleviation (see Bhandari 2009; Meager, 2019 and Neaime and Gaysset, 2017).

Thirdly, our literature review discusses the impact of financial inclusion on human development. In this section, we discuss the casual linkages between financial inclusion and human development. Similarly, this section also provided many empirical evidence showing the negative impact of financial inclusion on human development (see Ofosu-Mensah et al., 2019; Peria and Shin 2020; Matekenya etal., 2020).

Lastly, our literature review journey explains the inter-causality between these three concepts i.e., financial inclusion, poverty and human development. In this section, we discuss the obvious relationship between financial inclusion, poverty reduction and human development.

Chapter 3

Conceptual Framework, Variables Specification and Econometric Techniques Used

After conducting an extensive literature review, this chapter endeavours to critically examine all the existing literature and find out the solid gap in the previous literature. Based on the literature gap, this chapter establishes its research hypothesis and describes the methodological framework and econometrics techniques required to empirically carry out the hypothesis.

The chapter is organized in the following manner. Section 3.1 describes the research gaps in the existing literature. Section 3.2 explains the variables and data sources for financial inclusion. Most specifically, its sub-sections 3.2.1 and 3.2.2 describe the proxy variables used for financial inclusion and the index constructing procedures. The subsections, such as 3.2.3, 3.2.4, 3.2.5, describes the demand side determinants of financial inclusion and the empirical model to examine the impact of various demand side factors on financial inclusion. Finally, this sub-section provides a proper justification for each demand side factors. Similarly, sub-sections like 3.2.6, and 3.2.7, explains the empirical model and supply side factors that are impacting financial inclusion. The sub-sections of 3.3, describe the empirical model to examine the impact of financial inclusion on overall poverty and ruralurban poverty as well. The sub-section 3.3.1 provides a detailed explanation of the main variable and control variables used for poverty reduction. The sub-section of 3.3.2. describes the causality between financial inclusion and poverty among the Indian states. Likewise, subsections 3.4, and 3.4.1, provides the details of variables used, their data sources and the procedure for constructing the human development index. The sub-section 3.4.2 gives the model specification for the

empirical examination of the impact of financial inclusion on human development. The sub-section 3.4.3 shows the causality between financial inclusion and human development. Lastly, the section 3.5 provides a concluding remark of this chapter.

3.1. Gaps in Previous Literature

From the literature related to determinants of financial inclusion among the Indian states, we observed that researchers have used different financial inclusion proxies as per their availability and accessibility of data. Additionally, it has also been observed that, while constructing the financial inclusion index, the studies mostly have used a distance-based approach for constructing the index. Correspondingly, most of the studies have analysed the determinants of financial inclusion either from demand side factors or from supply side factors. There is a shortage of studies that takes into consideration both demand side and supply side determinants of financial inclusion.

Literature with context to financial inclusion and poverty reduction in Indian states depict that Inoue, (2011) had conducted a study to know the effect of financial inclusion on poverty reduction among the Indian states. In that study, the author empirically analysed the effect of financial inclusion on rural and urban poverty reduction among the 28 Indian states without measuring the same effect on the overall states' poverty. Secondly, the author used five indicators (such as no. of bank branches in proportion to 10000 population, no. of deposit bank account in proportion to 10000 population, no. of credit bank accounts in proportion to 10000 population, amount of deposit as a per percent of state GDP, amount of credit as a per percent of state GDP) of financial inclusion and empirically tested the effect of each particular financial inclusion indicator on state-wise rural and urban poverty. Similarly, in a recent study Inoue, (2018) conducted another research to know the effect of financial inclusion on poverty reduction in India. In this study the author used only two indicators (like number of bank branches and bank accounts) to measure financial inclusion, and along with financial deepening interaction term, the author empirically

analyses whether and to what extent the breadth and depth of the banking sector interact with each other to reduce aggregate poverty in India. From the above literature journey, we did not find any study conducted to measure the effect of financial inclusion on both overall state poverty reduction and rural-urban poverty reduction in India. Similarly, previous literature on financial inclusion and poverty in India shows that most of the studies have measured the impact of financial inclusion on poverty reduction. There is a shortage of studies showing the causal relationship between these two variables (i.e., financial inclusion and poverty).

Correspondingly, from the literature related to financial inclusion and human development in Indian states, it has been observed that all of the studies have measured both financial inclusion index and human development index using the distance-based approach, which was adopted by UNDP (United Nations Development Programme) to calculate Human Development Index (HDI). As it is argued that the method adopted for measuring human development has its own limitation and criticism. Many times, it has bees argued that the HDI constructed by UNDP has poor quality of data in many socio-economic Indicators, and it has excluded many non-income indicators from the Index due to unavailability of reliable data. Additionally, there is no prior information regarding the assign of weight to a particular variable. Assigning weight to a variable purely depends on the assumption of the researcher that which variable s/he gives more importance. Likewise, the fixing of minimum and maximum value in the distance-based approach has also encountered many criticisms. The assumption of fixing the minimum and maximum value in the distance-based approach is not constant over time. The value of minimum and maximum varies with the time variant. Hence, with variation with minimum and maximum values, the result of the constructed index also changes. Furthermore, the existing literature on financial inclusion and human development in Indian states depict that earlier studies have mostly measured the effect of financial inclusion on human development.

However, thre are inadequate studies found which have been conducted to measure the inter causality between these two variables (i.e., financial inclusion and human development).

Hence, in order to fill the gaps in the previous literature, this study is an extension of previous studies. This present study differs from previous studies in five major ways. Firstly, this study constructs state-level financial inclusion index and human development index through Principal Component Analysis (PCA) method. Secondly, this study considers a greater number of indicators for constructing both financial inclusion (six indicators) and human development (nine indicators). Thirdly, while measuring the determinants of financial inclusion among the Indian states, this study takes into consideration both demand side as well as supply side indicators separately. Fourthly, with context to financial inclusion in state-wise overall poverty and rural-urban poverty as well. Fifthly, the study tries to find out what is the causal relationship between the three major concepts used in this study (i.e., financial inclusion, poverty and human development).

3.2. Financial Inclusion Index (FII)

3.2.1. Indicators, Data Sources and Index Construction Procedures

Measuring a holistic and unbiased composite financial inclusion index is a challenging assignment for the researchers. Meanwhile, previous studies (Sarma, 2008¹; Arora, 2010²; Gupte *et al*, 2012; Chakravarty and

Index of Financial Inclusion (IFI) = 1- $\sqrt{(1-d1)^2 + (1-d2)^2} + \cdots (1-dn)^n / \sqrt{n}$

² For each dimension we have n number of variables: $D_i = X_1, X_2, X_3...X_n$ For each variable we compute D_i using the following formula: $d_i = A_i - m_i/M_i - m_i$

 $^{^{1}}D_{i} = A_{i} - m_{i}/M_{i} - m_{i}$

Here, A_i = Actual Value of dimension of i, m_i = Minimum Value of dimension i, M_i = Maximum Value of dimension i. The value of D_i is $0 \le D_i \le 1$.

A country *i* will be represented by a point $D_i = (d_1, d_2, d_3..., d_n)$ on the 'n' dimensional Cartesian space.

Pal, 2013³) have used different methods (like distance-based approach adopted by UNDP to computed HDI, Analytical and Hierarchical Process-AHP and axiomatic approach) to compute the index of financial inclusion. Each method has its own merits and demerits for computation of the index. Most of the studies have used AHP for weights of the variables in the composite index construction. However, the problem with AHP is that there is no prior information available about the weight of a particular variable (Lenka and Barik, 2018). So AHP may not be a good method to find out the weight of factor included in the multidimensional index. Also, looking at the volatile nature of financial access variables, AHP, and distance-based approach may not solve unbiased index construction.

To overcome these deficiencies, the present study relies on the statistical procedure for the construction of weights of the factors i.e.,

Where, A_i = Actual value of X_1 , m_i = Minimum value of X_1 , and M_i = Maximum value of X_1 $D_i = (d_{i1} + d_{i2} + d_{i3} ... d_n)/n$ FAI= $D_i I^* W_i / D_i II^* W_{ii} + D_i III^* W_{iii}$ Here, FAI= Financial Access Index, W_i , W_{ii} , W_{iii} are the weight to three dimensions. ³ A_r $(x_i, m_i, M_i) = (x_i - m_i / M_i - m_i)^r$

Where 0 < r < 1 is a constant. The parameter r can be interpreted as an inclusion sensitivity parameter in the sense that given x_i , m_i , and M_i , as the value of r decreases A_r (x_i , m_i , M_i) increases. We now state the following four basic axioms for an arbitrary indicator A of an individual functioning and analyse the index in terms of these axioms.

Normalization: A(x_i , m_i , M_i) = {1 if and only if $x_i = M_i$, 0 if and only if $x_i = m_i$.

Monotonicity: Given m_i and M_i , for any $\delta > 0$ such that $x_i + \delta \in [m_i, M_i]$, A $(x_i + \delta, m_i, M_i) - A(x_i, m_i, M_i) > 0$.

Homogeneity: For any c > 0, A $(x_i, m_i, M_i) = A (cx_i, cm_i, cM_i)$.

Lower difference in gain at higher levels of attainment difference: Let $x_i \in [m_i, M_i]$ be any attainment level for functioning *i*. Then for any $\delta > 0$ such that $x_i + \delta \in [m_i, M_i]$ the magnitude of gain in the indicator of functioning *i*, A ($x_i + \delta, m_i, M_i$) – A (x_i, m_i, M_i) is a decreasing function of x_i .

By averaging the individual indicators across functionings, we get Financial Inclusion Index (FII):

$$I_r(A_r(x_1, m_1, M_1), \dots, A_r(x_k, m_k, M_k)) = \frac{1}{k} \sum_{i=1}^k (x_i - m_i / M_i - m_i)^r$$

the Principal Component Analysis (PCA)⁴ method. Though 'N' number of financial inclusion indicators can be used as a proxy of financial inclusion but here, as per the availability of state-level data for the period of 1993 to 2015, the study has used six financial access indicators to construct a single holistic financial inclusion index. All the six indicators have been collected from the Scheduled Commercial Banks of RBI. The six indicators included in the FII are (i) number of bank branches in proportion to 1000 population (BB), (ii) number of bank employees as the ratio of bank branches (BE) (iii) deposit bank accounts in proportion to 1000 population (DBA), (iv) credit bank account in proportion to 1000 population (CBA), (v) amount of deposit as the percentage of state GDP (DEP), (vi) amount of credit as the percentage of state GDP (CRE).

In the PCA method, first, we calculate the factor scores (weights) through their eigenvalues. Then we calculated the factor score (weights) of each variable and multiplied it with the respective original variable. Unlike other methodologies, PCA assigns equal weight to every variable (Kendall 1939; Lenka, and Barik, 2018). Finally, we add them together to get the single value of the composite index for i^{th} state for a particular time period t. Hence, for constructing a single index of financial inclusion, the formula is expressed as: -

$$FII_i = \sum_{i=1}^p Wji \, Xpi \tag{1}$$

By expanding this equation, it can be expressed as: -

$$FII_i = W_{i1}X_1 + W_{i2}X_2 + W_{i3}X_3 + \dots + W_{ip}X_p \quad (2)$$

⁴ $Y_k = W_k X_p$

The first step in PCA to create a maximum variance linear function of the n variables in the matrix x, on the form: $Y_1 = W_{11}X_1 + W_{12}X_2 + \dots + W_{1n}X_n$ The second maximum variance linear function: $Y_2 = W_{21}X_1 + W_{22}X_2 + \dots + W_{2n}X_n$ This procedure is then repeated to create a system of maximum variance uncorrelated linear functions up to $Y_n = W_{n1}X_1 + W_{n2}X_2 + \dots + W_{nn}X_n$ Here, FII_i is the financial inclusion index; W_i is the weight of the factor coefficient, X is the respective original value of the component, and p is the number of variables used.

Finally, FII for all Indian states is calculated using these below cited variables: -

$$FII_{i} = W_{1i}BB_{t} + W_{2i}BE_{t} + W_{3i}DBA_{t} + W_{4i}CBA_{t} + W_{5i}DEP_{t} + W_{6i}CRE_{t}$$
(3)

Here, the financial inclusion index for all the Indian states are calculated by adding together the entire factor scores (weights) and their respective original values. FII_i is the financial inclusion index of i^{th} state and W_1, W_2, \ldots, W_6 are the weights of different factor scores.

3.2.2. Description of Financial Inclusion Indicators

Number of Bank Branches in Proportion to 1000 Population (BB): The presence of bank branches per 1000 adult population reflects the banking outreach by the formal sector banks. The greater presence of bank branches helps the rural and remote areas people to access an easy and affordable financial service in their nearby areas. With the presence of the high number of bank branches, it will be easy for people to visit their nearby bank branches and to obtain their banking services in less time. Otherwise, the absence of bank branches compels the individuals to visit a long-distance journey to obtain their banking services. For the poor and working-class people, visiting long-distance road is always cost-effective in both time and money sense which further discourage the individual to connect with the formal banking sector. It has been observed that mainly in hilly and village areas, less presence of bank branches has excluded many people from formal banking activities. Moreover, along with bank branches penetration, other banking services such as the number of ATM, number of PoS (point of sale), number of Banking Correspondents (BC) can also be considered for measuring the financial service outreach of the formal banks. But because of the absence of large-scale data for all the Indian states, here only bank

branches are considered as a prominent indicator to measure the availability dimension of financial inclusion.

Number of Bank Employees as the Ratio of Bank Branches (BE): BE is the ratio of a number of bank employees to the number of bank branches. This is an important indicator of financial inclusion indicating the kind of banking facility and accessibility provided by the bank employees to their customers. The greater number of bank employees are assumed to provide more speedy services to the customers. The lesser presence of bank employees unnecessary creates more hurdles in the banking activities by forming a long queue in front of every counter, creates much noise inside the bank, gives overloaded work to every staff and creates more irritation or mental anxiety among the staffs. Specifically, in the in the rural and remote areas of India, we often face this kind of problems which sometimes discourage the customer to participate in banking activities.

Deposit Bank Accounts in Proportion to 1000 Population (DBA): The number of deposit bank account in all schedule commercial banks per 1000 adult population shows the accessibility of bank account by the adult individuals. This indicator has been widely used among researchers as a prominent indicator to measure the degree of financial inclusion (for example, see Sarma, 2008, Lenka and Sharma, 2017). The higher number of bank account depicts that a greater number of people are opening their bank account to deposit their money. Ideally, in-order to have a greater inclusive financial system, a greater number of people should have their bank account. Having a bank account is always considered as the primary requirement of the financial inclusion process. Now-a-days both the state and central government are spending huge amount of money on social welfare schemes. Hence, in-order to obtain any government subsidies, pension and other benefits, the beneficiaries should have a bank account in her/his name through which they can receive their benefits. Similarly, in-order to receive any credit from the bank, the borrower should possess a bank account through which credited money can be transferred. Therefore, opening a bank account is the primary objective of financial inclusion.

Credit Bank Account in Proportion to 1000 Population (CBA): Like deposit account, credit account per 1000 adult population also plays a significant role to indicate the banking accessibility of people. Both deposit and credit are the most vital elements of the financial inclusion process. Because the mere opening of bank account will not fulfil the true essence of financial inclusion. In-order to have a successful financial inclusion programme, along with deposit, credit account is also essential. The greater number of credit account indicates that a greater number of adult individuals are accessing bank credits for their business, agricultural activities and for other financial needs.

Amount of Deposit as the Percentage of State GDP (DEP): Apart from availability and accessibility dimensions of financial inclusion, this study has also considered the usability aspect of financial inclusion. The usability of finance is also an essential part of financial inclusion. The mere availability and accessibility of finance will not fulfil the true objective of financial inclusion until and unless it is properly used by the customers (Sarma, 2010). Hence, the amount of deposit as the percentage of state GDP is an essential indicator of financial inclusion, which shows the number of working account and the average amount of money deposited in the customer's bank account.

Amount of Credit as the Percentage of State GDP (CRE): Like deposit, the amount of credit in proportion to state GDP is also an essential element of financial inclusion. This indicator shows the average amount of credited money to the customer's bank account. The rising amount of credit is assumed that more amount of money is credited to the customer's bank account for their different usage purpose.

3.2.3. Determinants of Financial Inclusion

As financial exclusion is termed as 'social exclusion', hence various social, economic, cultural and institutional factors are accountable for creating an inclusive financial system. Some of the social factors such as individual's gender identity (like women, transgender), social identity (like caste and religion), family size, dependency ratio, location of habitant (like rural or urban), age group, and literacy level paly significant role for the individual to be included within the formal banking system. Furthermore, while describing the influence of various social factors, it can be observed that the gender identity of a person significantly influences the process of financial inclusion. Historically, excluded gender groups such as women and transgender people are more likely to be excluded from the formal financial system than their male counterparts (see Ghosh and Vinod 2017; Barik and Sharma, 2019; Arnold and Gammage 2019). Similarly, the caste identity of a person in India also plays a significant role in the financial inclusion process. People from historically excluded community like Scheduled Caste, Scheduled Tribes, and Other Backward (OBC) are more likely to be excluded from the formal banking system. Sometimes, their low socioeconomic profile restricts them to participate in the banking system, and sometimes the discriminatory behaviour of the bank staffs restricts them to go the bank. Likewise, Individual's family factors also highly influence the process of financial inclusion. Persons from larger family size having high dependency ration are less likely to participate in the banking system. Similarly, the place of residence also determines your demand for financial access services. People from remote rural areas and hilly zones are less likely to be included in the formal banking system. Because of the low literacy level, low income, less presence of bank branches and low financial awareness, people from rural and hilly areas are generally excluded from the formal financial system. Similarly, from an economic point of view, factors like employment status and income plays a prominent role in financial inclusion. Cultural factors like religious belief system, religious practice and cultural freedom have meaningfully impacted the process of financial inclusion. Lastly, institutional factors such as pro-financial inclusion policies, provision of the financial awareness programme, infrastructural facilities, welltrained bank employees, and more political interest also matter for boosting financial inclusion in a country.

All the social, economic, cultural and institutional factors of financial inclusion can be simply divided into two main categories (i.e., Demand and Supply factors). Hence, we can alternatively argue that both demand side and supply side factors are responsible for enhancing the process of financial inclusion in a country. In India, though some studies have been conducted to identify the various determining factors of financial inclusion (for example, see Kumar 2013; Nandru et al., 2016; Sahoo et al., 2017; Raichoudhury 2020; Kaur and Kapuria in 2020) but all these studies are undertaken either form demand side or from supply side measure. There is a shortage of studies showing the separate effect of both demand and supply side factors on financial inclusion. Hence, realizing this fact here, this study considers both demand side and supply sides factors separately to know the impact of these two sides differently on financial inclusion.

3.2.4. Demand Side Determinants of Financial Inclusion

Though there is a wide range of demand side factors that can be used as the determinants of financial inclusion but as per the availability of secondary data for the time period 1993-2015 for the 28 Indian states, this study has considered four demand side factors. Such factors are Literacy Rate, Rate of Unemployment, Per Capita GDP, and Percentage of Rural population. The data for this analysis is collected from various secondary data sources such as Census of India, Centre for Monitoring Indian Economy (CMIE), Reserve Bank of India (RBI) etc. All the used demand side indicators are well supported by the existing literature. Here, the study uses the composite index of financial inclusion as the dependent variable, and the four demand side factors are used in the independent variable side of the equation. Using unbalanced panel data regression equation, the study attempts to isolate the key predictors of financial inclusion. The regression equation for this estimation can be expressed in the following manner.

 $FII_{it} = \alpha + \beta_1 LIT_{it} + \beta_2 \text{ UNEMP}_{it} + \beta_3 \text{ PCSGDP}_{it} + \beta_4 R_POP_{it} + \beta_5 Reg_Dum_{it} + \varepsilon_{it}$ (4)

In the above regression equation, FII is the composite index of financial inclusion, which is used in the dependent variable side. Similarly, in the independent variable side, the sign α is the constant term, whereas β_1 , β_2 , β_3 , β_4 are the coefficient value of the four independent variables. Similarly, β_5 indicates the coefficient value of the regional dummies and ε_{it} is the error term. Here, *i* indicated the individual states like 1, 2, 3...28, and t refers to the time period such as 1993, 1994, 1995....2015. As the analysis is intended for the state-level data of India, hence, to capture the different zonal impact on financial inclusion, the study has considered dummy variables in the regression model. The study has collected data for 28 Indian states for the time period 1993 to 2015 for its analysis. Here, all the 28 Indian states are classified into six zones (i.e., Central India, East India, Northern India, North-East India, Southern India, Western India). Therefore, in-order to capture the six zonal effects on financial inclusion, the study uses five dummies based on the n-1 econometric rule. The main intention of including the zonal effect in the regression is to check whether there are regional factors which are having impact on financial inclusion. As India is a vast country covering its territory for vast areas of land, hence there is a wide range of socio-economic variation among the people's living standard and government policy as well. Hence, in-order to capture the varieties of socio-economic inequalities within the different regions of India, region dummies have been used in this study.

In-order to empirically investigate the impact of various demand side factors on financial inclusion, here the study has used four different econometric models (i.e., Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Error (PCSE), and Feasible Generalized Least Square (FGLS). Firstly, on the basis of Hausman test, the best-fitted model was determined then, in-order to remove the problem of autocorrelation and heteroscedasticity in the dataset, the study used PCSEs. Finally, the study uses FGLS to check the robustness of the results.

3.2.5. Description of Explanatory Variables for Demand Side Determinants

Literacy (LIT): The rate of literacy is an essential ingredient for determining the progress of financial inclusion. In-order to gain a basic understanding on banking activities and to have a fuller participation in banking system, a person need to have basic level of education. A literate person will able to understand about the various financial products and services available by the formal financial system. Similarly, for opening a saving bank account, applying for credit and using various modes of modern digital payment technologies, the basic level of education is required (see Clamara, et al., 2014; Siddik, *et al.*,2015; Bhuvana and Vasantha, 2016; Park and Mercado, 2017; Lenka and Barik 2018; Datta and Singh 2019). Hence, it is assumed that the rate of literacy is positively associated with the enhancement of financial inclusion.

Unemployment (UNEMP): The employment status of the people also plays a very significant role in determining the expansion of financial inclusion. Firstly, when an individual is employed (either in the formal or informal sector), then s/he receives income which ultimately pushed her/him to open a bank account for saving. Secondly, employment in the formal sector automatically links the employees with the formal banking system because the formal employees receive their monthly salary through their bank accounts. Hence, a rise in formal employment is more likely to increase the level of financial inclusion (Lenka and Barik, 2018). Oppositely, people with unemployed status or have irregular income pattern are less likely to participate in the formal banking sector. Their unemployment status and no regular pattern income discourage the people to participate in the formal banking system (Sarma and Pais 2011; Lenka and Barik, 2018).

Per Capita State GDP (PCSGDP): Per capita state GDP has a significant role to play in enhancing financial inclusion. The rise in per capita income of the individual improves the economic status of the person and equally persuades the individual to open a bank account in her/his name (Sarma and Pais 2011; Kumar 2013; Lenka and Barik 2018; Datta and Singh 2019). Similarly, the rise in income encourages the person to do various kind of investment and financial transactions. Correspondingly, the rise in per capita income enforces the individuals to use the cashless payment system by relying on modern digital technology, which ultimately enhances the banking habits of the Individuals. Hence, per capita income is the most essential element of financial inclusion. It is expected that per capita income is always positively associated with financial inclusion.

Rural Population (R_POP): Geographical location of the population is also a significant indicator of financial inclusion. It is quite often observed in India that people from rural areas mostly rely on their friend, relatives or the local money lender for their financial needs. The primary objective of financial inclusion is to extend the financial product and services to the last mile of the globe. But people from rural and remote areas are mostly excluded from the formal financial system. The lack of banking knowledge, low income, less presence of banking, less literacy, low investment profile of the village people restricts them to participate in the formal banking system (Clamara, et al., 2014; Siddik, et al., 2015; RBI 2015; Lenka and Barik 2018). Furthermore, it is assumed that the demand for banking products is less in rural areas. Hence, because of less demand and less participation of village people in the banking system, the presence of higher rural people can hinder the process of financial inclusion. Therefore, rural people are expected to have a negative relationship with financial inclusion.

3.2.6. Supply Side Determinants of Financial Inclusion

Similar to demand side variables, there are diverse supply side factors that can be used as supply side predictors of financial inclusion but as per the availability of secondary data for all Indian states from 1993 to 2015, this study has considered only four factors. Such supply side factors are Road Length, Electricity, Social Sector Expenditure (SSE) and Capital Receipt (CR). The data for road and electricity has been

collected from CMIE, data regarding state-wise Social Sector Expenditure has been gathered from NITI Aayog and data for Capita Receipt has been gathered from RBI. Like the demand side determinants, here the study uses similar kind of panel data regression model to identify the key predictors of financial inclusion. In the regression model, the composite index of financial inclusion is used in the dependent variable side and all four predictors along with the error term are used in the independent variable side. Hence, the regression equation for this estimation can be expressed in the following manner.

 $FII_{it} = \alpha + \beta_1 \operatorname{LOG_ROAD}_{it} + \beta_2 \operatorname{LOG_ELCTY}_{it} + \beta_3 \operatorname{SSE}_{it} + \beta_4 \operatorname{CR}_{it} + \beta_5 \operatorname{Reg_Dum}_{it} + \varepsilon_{it}$ (5)

In the above regression equation, *FII* is the composite index of financial inclusion, which is used in the dependent variable side. Similarly, in the independent variable side, the sign α is the constant term, whereas β_1 , β_2 , β_3 , β_4 are the coefficient value of the four independent variables. Similarly, β_5 indicates the coefficient value of the regional dummies and ε_{it} is the error term. Here, *i* indicated the Individual states like 1, 2, 3...28, and *t* refers to the time period such as 1993, 1994, 1995....2015. Similar like demand side determinates, the study here has also used dummy variables to capture the effect of regional characteristics on financial inclusion. The use of number of dummy variable and the reasons for this follow the same explanations like demand side determinates.

Like demand side determinates, the study has also endeavoured to find out the supply side determinants of financial inclusion. Using four different econometric models (i.e., Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Error (PCSE), and Feasible Generalized Least Square (FGLS), the study examined the impact of each individual factor on financial inclusion. Like the demand side determinants, here also the study relied upon the Hausman test to know whether the FE is best-fitted model over RE or vice versa. Looking the nature of panel data (i.e., both time and cross-sectional dimensions), the study assumed the presence of autocorrelation and heteroscedasticity. In-order to take care of this problem, the study used PCSEs. Finally, at the end, the study uses FGLS for checking the robustness of the results.

3.2.7. Description of Explanatory Variables for Supply Side Determinants

Road Length: Geographical proximity plays a significant role in the matter of financial services availability and accessibility (Brevoort and Wolken, 2009). India being a vast country, covering a wide range of geographical territories, includes many hilly and remote areas, where it is quite difficult to provide safe and affordable banking services. Visiting long-distance road for accessing banking services always involves high monetary and time cost. The monetary cost due to longdistance is directly associated with the number of transactions the customer wishes to do with the bank (Ghosh, 2020). For example, people like small business holder, street vendors and small shopkeepers are often more likely to visit the bank for their financial transaction but when they face hurdles because of long-distance road, they obviously tend to reduce their number of visits to the bank. Consequently, these things will create barriers in the process of financial inclusion. Similarly, long-distance road can also create asymmetric information biasness among the customers and the bankers. Because of both time and money consumption, the customers will feel hesitate to visit the bank to obtain any required information, which will ultimately restrict the customers to associate with the bank. Hence, long distanced road length is expected to have a negative impact on the financial inclusion process.

Electricity (ELCTY): In recent years, the Indian economy has witnessed high-speed growth of digital payment technologies (Barik and Sharma 2019). Financial institutions in India in general and banking sectors in particular have perceived a paradigm shift in the usage of digital technology in their financial transactions. This has undoubtedly altered the style of operation, organizational structure, and the strategy of building inter/intra banking relationship among the banks in India (Campanella et al. 2017). Moreover, India's recent digital technological
up-gradation is driven by innovations in mobile/internet banking, the use of various UPI (Unified Payments Interface) and the use of high-speed internet/Wi-Fi services. Over a few years, the Indian market has observed a decline in cash-based transactions with a corresponding rise of digital transactions. Correspondingly, the rise of internet banking has enabled people to access their banking services with a single finger click without visiting physical bank branches (Lenka and Barik, 2018). Hence, in-order to run the various digital technologies in the banking sector in a smooth and uninterrupted way, a constant supply of electricity is required. Without the constant supply of electricity, it would be quite difficult for the bankers to run a computer, ATM machine, biometric machine etc., which will surely hamper the process of financial inclusion. On the other hand, the frequent cut of electricity would lead to slow processing in banking activities, which alternatively force the customers to have a long queue in front of the bank. This kind of problems are most often seen in remote areas of India. So, the uninterrupted supply of electricity is expected to have a positive impact on the process of financial inclusion.

Social Sector Expenditure (SSE): In recent years, India has witnessed a speedy rise in social sector expenditures. In every development sector like health, education, sanitation, food security, LPG gas cylinder and in mid-day meal, the government is spending heavy amount of money every year. Correspondingly, with the rise in government spending on social expenditure, corruption through middle man has also increased drastically. Whether it comes to the case of wage distribution through Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNRES) or it may be the case of school mid-day meal, everywhere the middle man is doing an enormous amount of corruption. Consequently, these developmental schemes are not able to reach the real beneficiaries. Realizing this problem, in-order to mitigate the middleman corruption, recently, the government of India and many state governments as well have started sending money directly to the beneficiaries' bank/post office account thorough direct benefit transfer

(DBT) schemes. Hence, in-order to receive any government help or subsidies (like old age/widow pension, gas subsidy, money for mid-day meal etc.), the beneficiaries need to have a bank or post office account in her/his name. Hence, it is expected that the rise in social sector expenditure is intended to have a positive impact on the enhancement of the financial inclusion process.

Capital Receipt (CR): Similarly, the amount of capital receipt can also indirectly impact the process of financial inclusion. The rise in capital receipt would enhance the government resource, and that would encourage the government to spend more money on social sector expenditure. As discussed in the earlier section that the increment of social sector expenditure will automatically enforce the individuals to connect with the formal sector banks to reap the government benefits. Hence, the capital receipt is expected to have a positive effect on the process of financial inclusion.

3.3. Financial Inclusion and Poverty Reduction

Here, the aims are to estimate the effect of financial inclusion on statelevel poverty reduction in India. Additionally, the study also finds out the impact of financial inclusion on state-wise rural and urban poverty reduction. The state-wise overall poverty and rural-urban poverty head count ratios are taken from NITI Aayog for four points of time: 1993-94, 2004-05, 2009-10 and 2011-12. Therefore, to empirically examine the above-cited objectives, this study uses three different models. We ran three different regression models for (a) full sample states (which includes both rural and urban poverty), (b) for rural poverty only, and (c) again separately for urban poverty only. The main purpose of doing separate regression for rural-urban context is to examine the regional characteristics that affect the outcomes. As there are huge variation in the socio-economic characteristics between rural and urban India, financial inclusion has non-monotonic nature in these two areas. These rural-urban differences can lead to unequal accessibility of financial services among the peoples in these two areas. Generally, it is expected that because of high financial literacy, high income, good infrastructural facilities, better transportation facilities, and easy accessibility of financial institutions in urban areas, people from urban localities are more likely to be financially included than their rural groups. Hence, to examine the regional differences that are impacting the main consequences, here we have used separate regressions for both rural and urban poverty. Similarly, to capture the different zonal state effects on the process of poverty reduction, this study has taken regional dummies (Reg-Dum) across the three regression models (i.e., full sample, rural only and urban only). As India is a vast country, having different socioeconomic lives pattern of people in different states. Hence, all the 28 Indian states are divided into six zones (i.e., Central India, East India, Northern India, North-East India, Southern India, Western India). Hence, to capture six zonal effects, the study has considered five dummies (based on the 'n-1' rule). Furthermore, various state governments in Southern zonal (i.e., Tamil Nadu, Kerala and Andhra Pradesh) have undertaken numerous pro-financial inclusion policies to eradicate the presence of poverty in their respective states/zones. Therefore, regional dummies are used in this study to capture the particular zonal effect on poverty. The following three econometric models are specified in-order to materialize our above-cited objectives.

Model 1

$$Pov_{it} = \alpha + \beta_1 FII_{it} + \delta_i Z_{it} + \beta_2 Reg_Dum_{it} + \varepsilon_{it}$$
(6)
Model 2

$$RPov_{it} = \alpha + \beta_1 FII_{it} + \delta_i Z_{it} + \beta_2 Reg_Dum_{it} + \varepsilon_{it}$$
(7)

Model 3

$$UPov_{it} = \alpha + \beta_1 FII_{it} + \delta_i Z_{it} + \beta_2 Reg_Dum_{it} + \varepsilon_{it}$$
(8)

These three models are established to analyse the effect of financial inclusion on poverty reduction in all 28 Indian states and in rural-urban India as well. Moreover, in these three models, we used Pov_{it} (model 1), $RPov_{it}$ (model 2) and $UPov_{it}$ (model 3) in the dependent variable

sides and financial inclusion and other control variables are used in the independent variable sides. In model 1, Pov_{it} is the poverty headcount ratio for i^{th} states at time period t; in model 2, $RPov_{it}$ is the % of people living below the poverty line in rural areas for i^{th} states at time period t and in model 3, $UPov_{it}$ is the % of people living below the poverty line in urban areas for i^{th} states at time period t. Similarly, FII_{it} is the financial inclusion index for i^{th} states at time period t; Z_{it} refers to the vector of four control variables, namely log of social sector expenditure (SSE), per capita SGDP (PCSGDP), rural population (R_POP); log of capital receipt (CR) for each state at time period t. The term Reg_Dum_{it} refers to the zonal dummies that have been considered to capture the zonal effect on poverty reduction. And finally, the term ε_{it} indicates the error term.

During the analysis of a large set database, it is quite obvious to face some major econometric problems whose presence in the data may make the estimation biased and inconsistent. These econometric issues arise because of various reasons such as due to the nature of data used in the study, the omission of variables, presence of serial corelation, issue of autocorrelation and heteroscedasticity etc. The presence of these econometric problems in the analysis may bring serious doubts about the accuracy and consistency of the estimated results. Hence, in-order to avoid these econometric problems, we need to take some remedial measures. This study has undertaken these below given remedial measures to take care of the econometric problems.

As we are well aware from the econometric literature that, the presence of unit root in the regression data may produce spurious results (Granger, et la., 1974). Hence, before going for regression estimation, this study conducted a unit root test to check the stationarity of the data. As the used financial data are non-stationary in nature, hence the study has applied Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test for stationarity check for the sample period from 1993 to 2015. After checking unit root in the panel dataset, we moved towards selecting the appropriate econometric models that can be used in the study.

Furthermore, in the empirical models, the study uses both fixed effect and random effect models to measure the impact of financial inclusion on poverty reduction. Moreover, the fixed effect model is chosen for the final interpretation of the result based on the Hausman test. Through panel data are mainly based on the two dimensions i.e., time and crosssectional dimensions; so there might be the issue of autocorrelation and heteroscedasticity in the dataset. To take care of these issues, the study employs Panel Corrected Standard Errors (PCSEs) and Feasible General Least Square Method (FGLS) for robustness of the results. At the end, both PCSEs and FGLS are not sufficient to solve the issue of endogeneity or any potential problem of variables omission. To overcome these problems, the study applies Hausman-Taylor Regression (RE_HTR) model and re-estimates the results.

3.3.1. Variable Specification and Data Sources

This section briefly describes the definition and sources of data used for this study. To measure the inter-relationship between financial inclusion and poverty reduction in Indian states, this study employs unbalanced panel data of 28 Indian states (except Telangana), covering the period from 1993 to 2015. For poverty measurement, this study uses headcount ratio as the dependent variable, while on the independent variable side, financial inclusion index and other suitable control variables are used.

Poverty: State-wise reduction of poverty (*pov*) is accessed through statewise headcount ratio i.e., the percentage of people living below the poverty line, determined by the Government of India. Data for headcount ratio is collected from NITI Aayog (GOI). Headcount ratio is also used in other literature (Inoue and Hamori, 2012; Zahonogo, 2016; Ayyagari *et al.*, 2013) of financial development and poverty reduction. In the financial inclusion literature, the percentage of people below the poverty line or headcount ratio is also used in Inoue (2011); Park and Mercado, (2017).

Financial Inclusion: In the financial inclusion literature, different indicators have been used by different researchers as per the data

availability and suitability. In the present study, we use six indicators taken from three dimensions of financial inclusion. Such indicators are (i) number of bank branches in proportion to 1000 population, (ii) number of bank employees as the ratio of bank branches, (iii) deposit bank accounts in proportion to 1000 population, (iv) credit bank account in proportion to 1000 population, (v) amount of deposit as the percentage of state GDP, (vi) amount of credit as the percentage of state GDP, (vi) amount of credit as the percentage of state GDP. All these indicators are used in Lenka ad Sharma (2017) in their financial inclusion and economic growth paper. In that paper they tried to analyse the effect of financial inclusion on the economic growth of India. And also, the same indicators (except bank employees as the ratio of bank branches) have been used by Inoue (2011) in his state-wise analysis of financial inclusion and poverty reduction paper with different magnitude of variables. All the indicators of financial inclusion are collected from basic statistical returns of schedule commercial of RBI.

Control Variables: For control variables, we use per capita state GDP, social sector expenditure, rural population and capital receipt. The control variable for per capita GDP has been used by Beck and Levine, (2007), Jalilian and Kirkpatrick, (2002), and Donou-Adonsou and Sylwester, (2016). The control for social sector expenditure or government expenditure has been used by Ayyagari et al., (2013), Jalilian and Kirkpatrick, (2002, 2005). Similarly, the control for the rural population has also been used by (Ayyagari et al., 2013). The first control variable, like Per capita state GDP has a significant role to play in reducing poverty. Generally, the rise in per capita income of the individual improves the economic status of the person and equally persuades the individual to spend more money on their consumption. Similarly, with the rise in social sector expenditure, the citizens of the county will have the opportunity to obtain more government benefits in the field of food security, health, education, sanitation employment, etc., which will further help the citizens to move out from the poverty trap. The government spending on social upliftment through providing various welfare measures has a significant impact on the reduction of poverty in the country. Likewise, the increase in the percentage of rural population is expected to hamper the process of poverty reduction in the country. Because of less literacy, low employment skills, and lack of employment opportunity in the rural areas, it is expected that the presence of more rural people can hinder the process of poverty reduction. With regard the last control variable (i.e., capital receipt), it can be argued that the inflow of more capital in the country is expected to reduce the poverty rate. With the inflow of more capital, the government will have more resources to spend on the different welfare measures, that may have negative impact on the poverty condition of the country.

3.3.2. Causality between Financial Inclusion and Overall State Poverty

Access to easy and affordable finance helps to increase the standard of living of the poor and reduce their poverty level by enhancing their income. On the other hand, with the rise in income and standard of living, people tend to participate in banking activities by opening a deposit/saving bank account or having an account in the post office, or by taking different insurance services. Hence, it is assumed that there might be a bidirectional relationship between these two concepts (i.e., financial inclusion and poverty). Thus, to check the causality between these two variables, the study here used Dumitrescu-Hurlin Panel Granger Causality Test. Furthermore, while going through our literature survey, we observe that there is shortage of studies conducted to measure the causality between financial inclusion and poverty in Indian context. Though there have been some studies (like Schmied, and Ana, 2016; Erlando, et al., 2020; Omar and Inaba, 2020) conducted on this issue but these are available with other coutry context. Looking the dearth of studies on Indian context, the study here tried to examine the inter-causality between these two variables among the Indian states from the time period 1993 to 2015.

3.4. Human Development Index (HDI)

3.4.1. Indicators, Data Sources and Index Construction Procedures

Like the financial inclusion index, the construction of the human development index also requires wide range of indicators from diverse aspect of human life such as health, education, economic condition, environmental status, civil liberty, human rights, social and political freedom. As professor Amartya Sen (2001) has defined that human development is not only bounded with economic wellbeing but also it includes freedom in all aspects of life such as political and civil liberties, social opportunities etc. Hence, collecting variables from each dimension and constructing a complete human development index is really a challenging task for every researcher. However, over the years various researchers have constructed the human development index for their studied countries with the availability and suitability of their data sources. As it is known that human development is a multidimensional concept and some of the qualitative aspects of life such as freedom of speech, free election, social liberty, and cultural and religious freedom, etc. are not properly quantified with relevant data information. Though, the first human development report started with considering only three aspects (i.e., health, education, and standard of living) of human life. But over the years with the availability of diverse field of information, the calculation of human development has involved a wide range of development related data.

Similarly, with context to the methodology, different human development reports have been modified over time with new methodologies. The earlier human development researchers have calculated HDI through various methods like distance-based approach, Analytical and Hierarchical Process. In 2010, the world human development report made some changes in selecting a variable to construct the human development Index. In that year, the world human development report used geometric means⁵ to construct HDI, instead of

 $^{^{5}} D_{i} = A_{i} - m_{i}/M_{i} - m_{i}$

arithmetic mean like an earlier method of HDI Index (UNDP _2010). Over the years, it is argued that the methods adopted for measuring human development have its own limitation and criticism. It is argued that the HDI constructed by UNDP has a poor quality of data in many socio-economic indicators and it has excluded many non-income indicators from the index due to the unavailability of reliable data. Similarly, researchers have raised the question regarding the procedure for the selection of maximum and minimum value to calculate the HDI. As there is no hard-and-fast rule for selecting maximum/minimum value, so it often changes periodically (Santos and Alkire, 2011). Likewise, the assignment of weight to a particular factor has also raised much doubt in HDI calculation. As there is no prior information available regarding the assignment of weight for a particular factor, hence the researcher assign weight as per their suitability.

Therefore, in-order to avoid these above cited problems, here, this study relied upon PCA method to calculate HDI. The procedure to calculate state-level HDI is the same as the calculation of FII⁶. The study uses nine indicators of human development covering three dimensions. The three dimensions are heath, education and standard of living. For the first dimension (i.e., health) the study considers five indicators such as Infant Mortality Rate (IMR), Death Rate (DR), Birth Rate (BR), Early Health Good (EHG) and Ailment to Total Population (ATP). Similarly, for the education dimension, the study has considered literacy rate (LIT), Mean Year of Schooling (MYS) and Expected Year of Schooling (EYS). For the third dimension (i.e., the standard of living), the study has considered Monthly Per Capita Consumption Expenditure (MPCE).

Here, A_i = Actual Value of dimension of i, m_i = Minimum Value of dimension i, M_i = Maximum Value of dimension i. The value of D_i is $0 \le D_i \le 1$.

 $HDI = \sqrt[3]{Ilife} *Iedu * Iincome$

⁶ $HDI_i = \sum_{i=1}^p Wji Xpi$

After expanding the equation, it can be written in the following way. $HDI_i = W_{i1}X_1 + W_{i2}X_2 + W_{i3}X_3 + \dots + W_{ip}X_p$

Finally, for calculating HDI for a particular state, the study follows the below given equation.

 $HDI_{i} = W_{1i}IMR_{it} + W_{2i}DR_{it} + W_{3i}BR_{it} + W_{4i}EHG_{it} + W_{5i}ATP_{it} + W_{6i}LIT_{it} + W_{7i}MYS_{it} + W_{8i}EYS_{it} + W_{9i}MPCE_{it}$ (9)

Here, after adding together all the factor scores (weight) with their original value, we get the final HDI score for each state. The term HDI_i is the human development index of i^{th} state, t is the time period and W_1, W_2, \ldots, W_6 are the weights of different factor scores.

3.4.2. Financial Inclusion and Human Development

In the previous section, the study tried to measure the impact of financial inclusion on overall state-wise poverty and rural-urban poverty as well. Likewise, here the study is intended to empirically examine how does the level of financial inclusion impacts human development among the Indian states. Hence, in-order to empirically investigate the above cited objective, the study uses unbalanced panel data for 28 Indian states. The study here run one panel regression estimation with five different econometric models (i.e., Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Error (PCSE), and Feasible Generalized Least Square (FGLS) and Hausman-Taylor Panel Regression (HTR) approach). Similar to poverty estimation, here, the study also uses regional dummy (Reg-Dum) variables to capture the impact of various regional characteristics on human development. The description of the number of regional dummies used and the reasons for using such regional dummies are the same as poverty estimation. Hence, the following econometric model is specifying to empirically examine this objective.

Model Specification

$$HDI_{it} = \alpha + \beta_1 FII_{it} + \delta_i Z_{it} + \beta_2 Reg_D um_{it} + \varepsilon_{it}$$
(10)

In the above model, the term HDI_{it} is the composite index of all human development indicators for i^{th} states at time period t and here it is used in the dependent variable side. Similarly, in the independent variable side, the term FII_{it} refers to the composite index of financial inclusion indicators for i^{th} states at time period t.

The term Z_{it} refers to the vector of four control variables, namely log of social sector expenditure (SSE), per capita SGDP (PCSGDP), rural population (R_POP); log of capital receipt (CR) for each state at time period t. The term Reg_Dum_{it} refers to the zonal dummies that have been considered to capture the zonal effect on poverty reduction. And finally, the term ε_{it} indicates the error term.

Similar to financial inclusion and poverty reduction, here also, the study used the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test for checking the stationarity of the sample data. Based on the result of the Hausman test appropriate estimated (between FE and RE) result is interpreted. Furthermore, in- order to remove the problem of autocorrelation and heteroscedasticity in the used data, the study has used PCSEs and FGLS for checking robustness of the results. As both PCSEs and FGLS are not sufficient to solve the issue of endogeneity or any potential problem of variables omission. To overcome these problems, the study applies the Hausman-Taylor Regression (RE_HTR) model and re-estimates the results.

3.4.3. Causality between Financial Inclusion, and Human Development

Like the causality of financial inclusion and poverty, here the study also verifies the inter-causality between financial inclusion and human development. In the course of our literature journey, we did not observe any empirical study conducted in the Indian context, measuring the causality between financial inclusion and human development or viceversa. Though there are some literatures exist on this subject with context to other countries (Laha, 2015; Matekenya, et al., 2020), but there is a dearth of literature in the Indian context. Looking at the shortage of literature, the study here has endeavoured to find out the causal relationship between these two concepts (i.e., financial inclusion and human development). Hence, to examine the causality between the said variables, the study uses Dumitrescu-Hurlin Panel Granger Causality Test.

3.5. Concluding Remarks

This chapter demonstrated the methodological framework to describe the three main objectives of this thesis. The chapter begins with a methodological explanation of the construction of the financial inclusion index. This next section of the chapter describes about the financial proxy variables selected for constructing the financial inclusion index and provided a detailed explanation about the reasons to include these indicators in the index. Then this section extends its explanation to describe how the demand side and supply side factors are impacting the financial inclusion process. Then the chapter moves to describes the empirical techniques used to measure the impact of financial inclusion on poverty and human development. Using the constructed single index of financial inclusion, the study here established an empirical model to measure the impact of financial inclusion on poverty (overall state poverty and rural-urban poverty) and human development among the 28 Indian states from the time period 1993 to 2015. While measuring the impact of financial inclusion on poverty and human development, the study also tries to check the inter-causality between these three concepts.

Table 6.1: Components of Financial Inclusion Index				
Variables	Definition	Data		
		Sources		
BB	Number of Bank Branches in Proportion to	RBI		
	1000 Population			
BE	Number of Bank Employees as the Ratio of	RBI		
	Bank Branches			
DBA	Deposit Bank Accounts in Proportion to	RBI		
	1000 Population			
CBA	Credit Bank Accounts in Proportion to	RBI		
	1000 Population			
DEP	Amount of Deposit as the Percentage of	RBI		
	State GDP			
CRE	Amount of Credit as the Percentage of	RBI		
	State GDP			

Variables Used for Empirical Analysis of various Hypothesis, their Definition, and Data Sources

Source: Authors Preparation

Table 6.2: Demand side Determinants of Financial Inclusion

Variables	les Definition Data Sources	
LIT	Literacy Rate	Census of India
UNEMP	Rate of Unemployment	CMIE
PCSGDP	Per Capita State Domestic	CMIE
	Product	
R_POP	Rural Population	Handbook of statistics on
		India states

Source: Authors Preparation

Variables Definition		Data Sources
ROAD Length of Roadways CMI		CMIE
ELCTY	Electricity	CMIE
SSE	Social Sector	NITI Ayog
	Expenditure	
CR	Capital Receipt	Handbook of statistics on India
		states

Table 6.3: Supply Side Determinants of Financial Inclusion

Source: Authors Preparation

Table 6.4: Description of Variables for Financial Inclusion and
Poverty Reduction

Variables	Explanation	Sources
Dependent variables		
Pov		
Rpov	Poverty headcount ratio	NITI
Upov	% of people below the poverty line in rural areas	Aayog, Government
	% of people below the poverty line in urban areas	of India
Independent variables (FI)	Composite Financial inclusion Index	Constructed Index through using PCA method
Control Variables	(a) Log of state-wise social sector expenditure	a. NITI Aayog
	(b) State-wise per capita state domestic product (SDP)	b. CMIE
	(c) State-wise rural population	data (c,d)
	(d) Log of capital receipt	Handbook of statistics on India states

6.5: Components of Human Development Index				
Variables		Description	Data Sources	
(i)	IMR	Infant Mortality Rate	SRS, Census of	
			India	
(ii)	DR	Death Rate	RBI State level	
			data	
(iii)	BR	Birth Rate	RBI State level	
			data	
(iv)	EHG	Elderly Health Good	NFHS	
(v)	ATP	Ailment Total Population	NSS unit level	
			health and	
			morbidity specific	
			data	
(vi)	LIT	Literacy Rate	Census of India	
(vii)	MYS	Mean Year of Schooling	(vii, viii)	
			Estimated from the	
			unit level data	
			collected by the	
			National Sample	
			Survey	
			Organization	
			(NSSO)	
(viii)	EYS	Expected Year of Schooling		
(ix)	Mean	Mean of Monthly Per Capita Consumption	Estimated from	
	MPCE	Expenditure (Rs.)	NSSO	

Variables	Explanation	Sources
Dependent variables HDI	Composite Index Human Development	Constructed Index through using PCA method
Independent variables (FI)	Composite Financial Inclusion Index	Constructed Index through using PCA method
Control Variables	(a) Log of state-wise social sector expenditure	a. NITI Aayog
	(b) State-wise per capita state domestic product (SDP)	b. CMIE
	(c) State-wise rural population	data (c d)
	(d) Log of capital receipt	Handbook of statistics on India states

6.6: Description of Variables for Financial Inclusion and Human Development

Chapter 4 Empirical Results and Discussions

After explaining the methodologies and econometrics techniques in the preceding chapter, this current chapter tries to presents and discusses the results of the four main objectives of this thesis. Based on the empirical findings from all three objectives, the chapter provides a full length of discussion on the finding. The discussions are presented in the following manner.

Section 4 of this chapter provides the results of the constructed composite index of financial inclusion among the Indian states. Firstly, this section presents the three dimension-wise indexes of financial inclusion. Then the section provides the overall index of financial inclusion. The dimension-wise indexes are presented to show the interdimension variations among the different states of India. Similarly, the overall financial inclusion index is presented to discuss the overall interstate disparities in the process of financial inclusion. The next subsection (i.e., 4.1) discusses the determinants of financial inclusion. The section 4.1 is divided into two parts i.e., 4.1.1 and 4.1.2. The Subsubsection 4.1.1 discusses the demand side determinants of financial inclusion and the sub-subsection 4.1.2 discusses the supply side determinants of financial inclusion. The next section of this chapter i.e., section 5, explains the results financial inclusion and poverty reduction among the 28 Indian states. The section discusses the findings of the impact of financial inclusion on the overall state poverty and rural-urban poverty as well. The sub-section of 5.1 provides the causality results between financial inclusion and overall state poverty. The next section of this chapter (i.e., section 6), demonstrates results of the constructed human development index. Like the financial inclusion index, this section also first presents the three-dimension indexes of human development, then the overall composite index of human development is demonstrated. Then the sub-section 6.1 demonstrates the results of financial inclusion and human development among the Indian states. The next section of this chapter i.e., section 6.2, shows the results of inter-causality between financial inclusion and human development. Finally, at the end, the section 7 of this chapter provides a concluding remark on this chapter.

4. Measuring Financial Inclusion Index among the Indian States

The present study has considered three dimensions of financial inclusion for constructing the financial inclusion index for 28 Indian states for the time period of 1993 to 2015. Such dimensions are Available, Accessible and Usable dimension. In each dimension, the study has taken two indicators. For dimension one (i.e., Available dimension), the number of bank branches in proportion to 1000 population (BB) and the number of bank employees as the ratio of bank branches (BE) is used as a proxy indicator. Similarly, for the accessible dimension, deposit bank accounts in proportion to 1000 population (DBA) and credit bank account in proportion to 1000 population (CBA) have been considered. For the third dimension (i.e., usability), the amount of deposit as the percentage of state GDP (DEP) and the amount of credit as the percentage of state GDP (DEP) have been used as a proxy variable. With the help of PCA method, we calculated the three-dimension indexes of financial inclusion for each Indian state for the time period 1993 to 2015 (see table no. 7.1,7.2 and 7.3). The dimension indexes are calculated to observe the inter-state variations in different dimensions of financial inclusion. It has been observed that some states which might have to perform well in one dimension may not have the same level of performance in another dimension. Hence, in-order to examine the dimension wise variation in different states of India, three-dimension indexes are calculated for each state. The dimension wise variation within the states happens because of some socio-economic, demographic and geographical characteristics of the states.

State	Available	Accessible	Usage
	Dimension	Dimension	Dimension
Haryana	15.49	6.32	5.14
Himachal	11.04	14.01	1.04
Pradesh			
Jammu &	13.91	5.109	2.95
Kashmir	4 0 0 -		• •
Punjab	18.87	14.90	3.79
Rajasthan	8.764	3.98	1.87
Arunachal	7.98	2.88	2.96
Pradesh	(• • /	
Assam	9.24	2.24	2.2
Manipur	2.816	2.42	1.63
Meghalaya	9.85	4.60	2.88
Mizoram	5.53	4.58	1.64
Nagaland	3.22	2.57	1.80
Tripura	12.24	3.24	2.65
Sikkim	4.020	5.10	2.05
Bihar	6.34	5.19	2.79
Odisha	8.17	2.86	1.45
West Bengal	17.73	4.24	2.68
Madhya	11.20	6.64	1.19
Pradesh			
Uttar Pradesh	4.49	2.60	2.43
Gujrat	11.59	3.57	1.46
Maharashtra	23.08	7.87	5.97
Andhra	6.117	4.888	2.22
Pradesh			
Karnataka	7.265	5.95	2.95
Kerala	20.35	11.10	7.63
Tamil Nadu	9.66	6.43	3.41
Goa	42.21	11.16	12.09

Table 7.1: Dimension Indices of Financial Inclusion for the Year1993

State	Available	Accessible	Usage
	Dimension	Dimension	Dimension
Haryana	11.52	6.88	4.80
Himachal Pradesh	13.63	7.76	3.73
Jammu & Kashmir	11.71	7.14	4.18
Punjab	16.72	9.94	7.86
Rajasthan	7.812	2.62	2.44
Arunachal Pradesh	5.13	3.02	2.65
Assam	7.81	2.81	1.97
Manipur	2.40	1.19	1.54
Meghalaya	7.71	2.91	2.50
Mizoram	5.77	1.28	1.185
Nagaland	2.10	2.40	1.15
Tripura	9.54	4.11	3.05
Sikkim	6.06	3.078	2.29
Bihar	4.01	2.29	1.78
Odisha	5.91	4.93	1.72
West Bengal	12.99	4.85	3.88
Madhya Pradesh	7.17	3.80	2.40
Uttar Pradesh	3.13	1.54	2.24
Gujrat	6.96	4.86	2.914
Maharashtra	15.33	10.50	8.55
Andhra Pradesh	7.78	2.60	2.74
Karnataka	7.08	4.08	3.19
Kerala	14.02	12.32	8.00
Tamil Nadu	10.21	5.202	3.65
Chhattisgarh	3.06	2.289	2.22
Jharkhand	8.98	4.28	2.89
Uttarakhand	3.95	1.37	1.62
Goa	32.35	14.69	8.59

 Table 7.2: Dimension Indices of Financial Inclusion for the Year

 2001

State	Available	Accessible	Usage
	Dimension	Dimension	Dimension
Haryana	33.19	11.68	9.56
Himachal	28.74	11.13	10.85
Pradesh			
Jammu &	23.86	15.02	10.86
Kashmir	22.12	1.6	10.05
Punjab	32.13	16	13.35
Rajasthan	12.67	9.35	8.72
Arunachal	11.63	5.88	2.98
Pradesh		0.07	
Assam	17.25	8.05	7.14
Manipur	9.45	5.78	4.917
Meghalaya	13.83	8.98	4.94
Mizoram	18.79	11.801	4.66
Nagaland	8.48	7.20	4.45
Tripura	33.01	11.59	8.98
Sikkim	22.18	11.27	8.23
Bihar	9.744	4.98	3.23
Odisha	21.14	10.46	9.33
West Bengal	20.84	14.84	9.94
Madhya	13.001	10.05	6.81
Pradesh			
Uttar Pradesh	5.317	4.42	2.63
Gujrat	18.24	10.13	8.13
Maharashtra	44.95	31	15.19
Andhra	12.68	7.32	5.77
Pradesh			
Karnataka	17.84	10.01	9.38
Kerala	38.21	18.24	15.28
Tamil Nadu	32.76	13.08	13.78
Chhattisgarh	12.86	8.83	4.84
Jharkhand	19.79	9.42	8.53
Uttarakhand	6.410	4.42	3.92
Goa	43.97	25.52	17.97

Table 7.3: Dimension Indices of Financial Inclusion for the Year2015

Similarly, using the same methodology (i.e., PCA), the study has calculated the overall composite index of financial inclusion for every 28 states of India from 1993 to 2015. The overall composite index of financial inclusion is calculated to observe overall variation in financial inclusion in these 28 Indian states. With context to the overall financial inclusion index, it can be observed from the below table (Table no.7.4) that there is a high variation in financial inclusion among Indian states. Some states are having high financial inclusion whereas other states are having low financial inclusion. The variation in financial inclusion among the Indian states can be understood from the demographic structure of the states, socio-economic profiles, geographic inhabitants, state policies towards establishing an inclusive financial system, etc. From the state-level financial inclusion index, it can be witnessed that the states like Maharashtra, Kerala, Goa are performing well in financial inclusion. Hence these states are placed on the top of the ranking of financial inclusion. As per the 2015 index, Maharashtra has occupied 1st rank securing the index score of 91.05. Next to Maharashtra, the state of Goa has occupied 2nd position securing the index score of 87.30. Similarly, the state of Kerala has occupied the 3rd rank securing the index score of 71.16 (see Table 7.4). Next to these three top-ranked states, other states such as Punjab, Tamil Nadu, Haryana, Himachal Pradesh are performing well in financial inclusion. Whereas on the other side, states like Utter Pradesh, Uttarakhand, Bihar are placed at the bottom of the ranking. As per the 2015 calculated Index, the state Utter Pradesh has occupied 28th rank securing the index score of 12.65. Next to Utter Pradesh, the state Uttarakhand has occupied 27th rank securing the index score of 14.53. In the third bottom line (i.e., rank 26th), the state Bihar is positioning securing the index score of 17.84 (see Table 7.4). Here, it can be understood that the state of Utter Pradesh and Bihar has been positioned the bottom line because of the low socio-economic profile of the two states. Whereas the state of Uttarakhand has been positioned in the bottom line because of its hilly areas. Next to these three bottom line states, other states from the North-East regions like Manipur, Nagaland, Arunachala Pradesh have performed worse in financial inclusion.

Hence, it can be observed that in the aggregate sense states from southern, western, northern (except Uttar Pradesh and Uttarakhand), and central regions of India are relatively better placed in financial inclusion whereas eastern and north-eastern regions are less financially included. Here, our results are relatively similar to the results of Rajeev (2015), Poonam and Chaudhry (2016).

Furthermore, here all the 28 states of Indian have been classified in three ranks (i.e., High, Medium and Low) as per their index values (see table 7.5). It can be observed from the classification that during the 1993, only Goa was having high performance in financial inclusion. However, in 2015, along with Goa, seven more countries (i.e., Maharashtra, Kerala, Punjab, Tamil Nadu, Haryana, Tripura, Himachal Pradesh) are placed high performing state category. Similarly, in between 1993 to 2015, many poor-performing states have seen tremendous speed up in their financial inclusion process, and as a result of that these states have been able to shift to medium ranked state from the low-ranking states (see table 7.5). That means financial inclusion in the post-20001 period has seen much progress in these states. Correspondingly, our literature journey in financial inclusion also corroborates the same arguments. Researchers like Chakrabarty, (2013), Bhaskar, (2013), Singh, et. al., (2014), Lenka and Sharma (2017), Ravi, (2019) have argued that the term financial inclusion has gained much popularity in India since early 2000. The formation of financial inclusion committee to review the progress of financial inclusion, the introduction of no-frill account, the implication of KYC, the implementation of PMJDY, opening of Mudra banks, promotion of digital banking is some of the noteworthy policy initiatives that have been commenced in the post-2000 period. Therefore, as a cumulative effect of these policy initiatives, most the Indian states have encountered high progress in financial inclusion.

State	1993	Rank	2001	Rank	2015	Rank
Haryana	26.97683	5	23.26115	6	54.41994	6
Himachal Pradesh	26.0737	6	25.15859	5	50.87011	8
Jammu & Kashmir	21.9785	8	23.07755	7	49.88385	9
Punjab	37.60291	4	34.56425	2	61.54774	4
Rajasthan	14.6027	15	12.89559	16	30.83058	18
Uttar Pradesh	9.539031	23	6.977314	26	12.65495	28
Arunachal Pradesh	13.97031	18	10.84255	21	20.59341	23
Assam	13.74318	19	12.60687	18	32.66097	17
Manipur	6.918663	25	5.16338	28	20.15459	25
Meghalaya	17.3532	12	13.18883	14	27.86725	20
Mizoram	11.797	21	8.261193	22	35.61518	16
Nagaland	7.604094	24	5.718008	27	20.16395	24
Tripura	18.13729	11	16.74882	10	53.52673	7
Sikkim	11.19629	22	11.45765	19	41.69923	11
Bihar	14.36706	16	8.108157	23	17.84848	26
Odisha	12.49038	20	12.6237	17	40.7244	12
West Bengal	24.72923	7	21.89586	8	45.92991	10
Madhya Pradesh	19.25023	10	11.21049	20	29.68482	19
Andhra Pradesh	14.2189	17	13.15901	15	25.80539	22
Karnataka	16.15218	14	14.37178	13	37.3863	14
Kerala	39.00592	3	34.34499	4	71.1657	3
Tamil Nadu	19.55773	9	19.08693	9	59.73001	5
Gujrat	16.70837	13	14.80828	12	36.94587	15
Maharashtra	39.98575	2	34.43052	3	91.05867	1
Goa	65.41975	1	55.69504	1	87.30442	2
Uttarakhand	N/A		6.997807	25	14.53171	27
Jharkhand	N/A		16.15691	11	37.54776	13
Chhattisgarh	N/A		7.553125	24	26.8673	21

 Table 7.4. Status of Financial Inclusion across the States over the Years

N/A: Refers to the new states which formed in 2001. Hence, Financial Inclusion ranks are not calculated for the year 1993.

Category	Financial Inclusion Index Values			
	1993	2001	2015	
High	Goa	Goa	Maharashtra, Goa, Kerala,	
Ranked			Punjab, Tamil Nadu,	
			Haryana, Tripura, Himachal	
			Pradesh	
Medium	Maharashtra, Kerala,	Haryana, Himachal	Jammu & Kashmir,	
Ranked	Haryana, Himachal	Pradesh, Jammu &	Rajasthan, Arunachal	
	Pradesh, Jammu &	Kashmir, Punjab,	Pradesh, Assam, Manipur,	
	Kashmir, Punjab, West	West Bengal, Kerala,	Meghalaya, Nagaland,	
	Bengal	Maharashtra	Sikkim, Odisha, West	
			Bengal, Madhya Pradesh,	
			Andhra Pradesh, Karnataka,	
			Gujrat, Jharkhand,	
			Chhattisgarh	
Low	Rajasthan, Uttar Pradesh	Rajasthan, Uttar	Uttar Pradesh, Bihar,	
Ranked	Arunachal Pradesh, Assam	Pradesh	Uttarakhand	
	Manipur, Meghalaya,	Arunachal Pradesh,		
	Mizoram, Nagaland,	Assam, Manipur,		
	Tripura	Meghalaya, Mizoram,		
	Sikkim, Bihar, Odisha,	Nagaland, Tripura		
	Madhya Pradesh, Andhra	Sikkim, Bihar, Odisha,		
	Pradesh, Karnataka, Tamil	Madhya Pradesh,		
	Nadu, Gujrat	Andhra Pradesh,		
		Karnataka, Tamil		
		Nadu, Gujrat,		
		Uttarakhand,		
		Jharkhand,		
		Chhattisgarh.		

Table 7.5. Classification of States as per the Financial Inclusion Index Values

Source: Author's Preparation

Note: High (50<100), Medium (20<50), Low (0<20)

4.1. Results of the Determinants of Financial Inclusion

Here, the study presents the results of both demand side and supply side determinants of financial inclusion among the 28 Indian states. Additionally, the study also tries to combine both the demand side and supply side determinants together and endeavour to examine how the combined determinants affect the financial inclusion process. All the state-level variables for both the demand side and supply side have been collected from various data sources for 28 Indian states from 1993 to 2015. Using the unbalanced panel regression model, this study tries to

estimate how do various macro-level social, economic and infrastructural variables are impacting the process of financial inclusion across the 28 Indian states. Firstly, we present the results of demand side determinants. Secondly, we present the supply side determinants of financial inclusion. In the end, we present the combined determinants (i. e., both demand and supply side) of financial inclusion. Moreover, along with the results of demand side and supply side variables, the study presents the results of reginal dummies which are used in the study to capture the impact of regional characteristics on financial inclusion.

4.1.1. Results and Discussions of the Demand Side Determinants of Financial Inclusion

Here, the results of the demand side determinants of financial inclusion are presented in table no 8.1. The study has used four demand side determinants. The four determining variables are Literacy Rate (LIT), Rate of Unemployment (UNEMP), Per Capita State GDP (PCSGDP) and Percentage of Rural Population (R_POP). The constructed composite index of financial inclusion is used here in the dependent variable side and the four demand side factors are used in the independent variable side along with the error term.

Variable	FE	RE	PCSE	FGLS
	Model 1	Model 2	Model 3	Model 4
LIT	-84.6151	-210.5056	210.5056***	210.5056
	(132.2885)	(134.287)	(42.7362)	(133.2002)
UNEMP	1.2293***	1.2284***	-1.2284***	-1.2284***
	(0.1195)	(0.1216)	(0.1360)	(0.1206)
PCSGDP	1657.622***	1690.286***	1690.286***	1690.286***
	(158.8182)	(93.5273)	(109.1149)	(92.77)
R_POP	-0.7806***	-0.7670***	-0.7670***	-0.7671***
	(0.1349)	(0.1289)	(0.0811)	(0.1279)
North	5.3690***	5.5499***	5.5499***	5.5499***
	(1.4968)	(1.5156)	(0.4149)	(1.5033)
Northeast	-6.3846***	-5.9197***	-5.9197***	-5.9197***
	(1.5062)	(1.5471)	(0.7592)	(1.5345)
East	3.6764*	3.9105*	3.9105***	3.9105*
	(1.6119)	(1.6551)	(0.5211)	(1.6417)
South	8.0253***	8.4474***	8.4474***	8.4474***
	(1.5965)	(1.6264)	(0.8429)	(1.6133)
West	16.4683***	16.7719***	16.7719***	16.7719***
	(1.8358)	(1.7446)	(1.1648)	(1.7305)
С	163.7409	390.6465	390.6464***	390.6464
	(238.9259)	(242.5238)	(76.8496)	(240.56)
Obs.	620	620	620	620
R-squared	0.6823	0.6829	0.6829	
F -statistics	120.83			
Prob. (F-	0.0000			
statistics)				
Wald chi2		1313.52	8922.90	1335.05
Prob >		0.0000	0.0000	0.0000
chi2				
Log				-2186.338
likelihood				
Hausman		-35.31		
test				
No. of	28	28	28	28
States				

 Table 8.1: Regression Results of the Demand Side Determinants

The overall results from the above table (table no 8.1) depicts that literacy rate and the per capita state GDP have positive impact on financial inclusion whereas the other two variables such as rate of unemployment and the percentage of rural population have negative impact on financial inclusion across the 28 Indian states from the time period 1993 to 2015 (see Table no 8.1). If we observe the result from the individual variable perspective, then it can be noticed that the first variable (i.e., LIT) is having negative impact on financial inclusion in the Fixed Effect (FE) and Random Effect (RE) models. However, after controlling the standard error and the issue of autocorrelation and heteroscedasticity, we found a positive effect in the Panel Corrected Standard Error (PCSE), and Feasible Generalized Least Square (FGLS) models with no significant level. As this study has used basic literacy rate, hence the result is showing only positive impact without any significant level. This may be possible that the secondary or higher secondary level of education may give a positive result with better significance level. The study has obtained its results as per the expectation. Because as the people receive their basic education, they would prefer to use the formal sector banking instead of relying on the informal money market. In the past decades, both the central government and many state governments have undertaken pro-active policy measures to boost the overall literacy rate in India. The postliberalization period has seen a number of policy reform in the education sector. The implementation of Sarva Shiksha Abhiyan (Education for all), Right to education policy, provision of mid-day meals, free books, dress codes, cycles and scholarships are some of the eye-catching recent initiatives which have helped the students from rural and marginalized section of society to participate in school education (Bazaz, 2016; Venkatanarayanan, 2015). Similarly, the post-liberalized Indian has also witnessed the rise of private schools across the states. These privates' schools have also helped to raise the literacy level in India. The combination of these policy reforms has helped to enhance the basic literacy rate in Indian states, which have ultimately assisted in enhancing the process of financial inclusion across the states. Other researchers have also used literacy rate as determining factor for financial inclusion. The result from their study suggests that literacy level plays a significant role to enhance the process of financial inclusion (see Zins and Weill, 2016; Soumaré, et al., 2016); Bhuvana, and Vasantha, 2016; Akileng et al., 2018; Sahoo et al., 2017; Wokabi, 2018; Kaur and Kapuria, 2020; Raichoudhury, 2020).

Similarly, the second variable (i.e., unemployment rate) has negative impact on financial inclusion. Like literacy, in the FE and RE model, we found a positive impact of unemployment on financial inclusion. However, after controlling the issues of standard error, autocorrelation and heteroscedasticity, we found a negative result in the superior models. As it is expected that the higher level of unemployment would reduce the income level of the individuals, which will discourage them to open a bank account or saving money in their account. In this course unemployment rate is having a negative and significant impact on the process of financial inclusion (Wokabi, 2018; Akileng et al., 2018; Raichoudhury, 2020). Likewise, Per Capita state GDP has a positive and significant impact on financial inclusion. As the rise in income raise the demand for banking services and encourage the people to participate in banking activities by opening a bank account or saving money in their account. Hence, rising individual income can be considered a primary factor for demanding more financial products and services from the banking institutions (Kumar, 2013; Bhuvana, and Vasantha, 2016; Soumaré, et al., 2016; Uddin, A., Chowdhury, et al., 2017; Raichoudhury, 2020). Similarly, the last variable (i.e., rural population) shows that the presence of higher percentage of rural population negatively impact the financial inclusion across the 28 Indian states. As it is known that rural people have a high number of illiteracy (both in terms of basic literacy and financial literacy) and low income, hence these factors discourage them to demand more banking services.

Similarly, the results from the regional dummies depict that the overall impact of Northern, Southern, Western, and Eastern zones are having a positive impact on financial inclusion. At the same time, the overall impact of only North-East region has a negative impact on the demand for financial inclusion. There are certain social, economical, geographical, political and institutional factors responsible for the lower demand of financial products by the North-East people. The North-East region of India poses a more complex challenge for financial inclusion because of difficult terrain, lower population densities, poor infrastructure, inadequate communication facilities and law and order disruptions, which restrict its higher demand of financial services. As the whole North-East region is hilly area, possessing lower number of populations, banking institutions are not convinced enough to open their banking services in these areas. Moreover, the region has very sparse settlement of population, engaging mainly in the traditional economic activities, which might have induced them to less rely on the modern banking services. Additionally, because of diverse ethnic population, they use different languages to communicate, which also create hurdles for the people to communicate with the banking staffs. And on the other hand, it creates difficulties for the banking institutions to spread banking awareness or financial literacy among the people. Similarly, the political instability and ethnic conflict also creates problems for showing their identity proof, that also sometimes restrict them to access banking services.

4.1.2. Results and Discussions of the Supply Side Determinants of Financial Inclusion

Same like demand side determinants, here the study has discussed the impact of supply side factors on financial inclusion across the 28 Indian states from the time period of 1993 to 2015. The study has used four supply side factors. Such factors are Road Length (LOG_ROAD), Electricity Supply (LOG_ELCTY), Social Sector Expenditure (SSE) and Capital Receipt (CR). The financial inclusion index is used on the dependent variable side, and the four supply side factors are used on the independent variable side along with the error term. The results of the supply side determinants are presents in the below-given table (i.e., table no. 8.2).

The results from the below table (i.e., table no. 8.2) demonstrate that all the four independent variables (i.e., LOG_ROAD, LOG_ELCTY, SSE, CR) are having a positive and significant impact on financial inclusion across the 28 Indian states. Here, the variables like road length and electricity are used to indicate the infrastructural development across the states. The regression results suggest that road length and electricity supply will have a positive and significant impact on the process of financial inclusion across the Indian states. As these results are quite obvious because the rise in road length would raise the connectivity possibility, and that would encourage the customers for frequent participation in banking activities. It has been often observed that the unavailability of good connectivity discourages the customers from frequent visit to the banks. Corresponding, the unavailability of road connectivity is more cost-effective in both money and time sense. The customer has to spend more amount of money and time in-order to reach the bank branch office. Therefore, better road connectivity can eradicate this problem and the customer could ably save both their money and time. Hence, the provision of good road connectivity would raise the customer's frequency to visit the bank branches. Similarly, another infrastructural facility such as electricity supply can equally help to raise financial inclusion. The constant and uninterrupted electricity supply to the bank branches helps to speed-up the banking activities and enhances banking productivity. Many times, it has been observed that due to frequent electricity cut in the rural areas, the customers have to wait for long hours in the queue in front of the bank office or in ATM machine to obtain their banking services. So, the provision of a better electricity supply can help to increase banking productivity and enhance the financial inclusion process.

Variable	FE	RE PCSE		FGLS	
	Model 1	Model 2	Model 3	Model 4	
LOG_ROAD	0.3176	9.0150***	10.7231***	10.7231***	
	(1.7209)	(1.5524)	(1.7481)	(1.5169)	
LOG_ELCTY	0.4588	3.5157***	4.5448***	4.5448***	
	(0.9749)	(0.9858)	(0.7925)	(1.0083)	
SSE	8.3045***	2.9616***	6.5127***	6.5127***	
	(1.3883)	(1.0271)	(1.5064)	(0.8716)	
CR	2.0441*	0.5555	0.7209	0.7209	
	(0.8185)	(0.8506)	(1.0617)	(0.8312)	
North	6.4083***	7.0645***	7.9264***	7.9264***	
	(1.7895)	(7.0644)	(0.7095)	(2.0517)	
Northeast	-10.914***	-5.4857*	-3.9133***	-3.9133*	
	(2.0480)	(2.1872)	(1.3405)	(2.2756)	
East	4.5704*	2.6185*	2.5430***	2.5431*	
	(1.9047)	(2.0809)	(0.5849)	(2.1759)	
South	14.423**	13.4423	13.7071***	13.7071***	
	(1.8647)	(2.0449)	(1.1794)	(2.1389)	
West	26.6798***	26.0547***	26.5294***	26.52936***	
	(1.9784)	(2.17060)	(1.4552)	(2.269323)	
С	69.0224***	41.0011***	31.6336***	31.6336***	
	(5.6839)	(5.6395)	(5.8891)	(5.6918)	
Obs.	620	620	620	620	
R-squared	0.6488	0.5025	0.4390		
F-statistics	69.88				
Prob. (F-	0.0000				
statistics)					
Wald chi2		479.22	2192.65	485.10	
Prob > chi2		0.0000	0.0000	0.0000	
Log				-2363.186	
likelihood					
Hausman test		97.03***			
		(0.0000)			
No. of States	28	28	28	28	

 Table 8.2: Regression Results of Supply Side Determinants

Similarly, among the economic factors, the results show that social sector expenditure is having a positive and significant impact on financial inclusion. Likewise, the capital receipt also has a positive impact but it is insignificant in nature (see table no. 8.2). That means the higher the government expenditure on the various social head that encourage the people to participate in banking activities. When government spend more money for providing various subsidies and pensions (like old age pension, widow pension, physical disability pension etc.) that encourage many under-privileged individuals to open a bank account in-order to reap the government benefits. The recent opening of "jan dhan yojana' account would be the best example in this context. The government of India has enabled poor and marginalised people to open a bank account with zero balance. On the other hand, in order to reduce the corruption occurred by the middle-men, the government is directly transferring money to the beneficiaries' bank/post office accounts. Correspondingly, both the central government and many state governments in India are extending housing and sanitation facility by providing Pradhan Mantri Gramin Awaas Yojana (for rural poor), Pradhan Mantri Awas Yojana (for urban poor), Biju Pucca Ghar *Yojana* (under Odisha state government) and building household toilet under Swachh Bharat Mission Scheme. In-order to receive money under these schemes, the people need to have their bank account in their nearby bank or post office. Similarly, many state governments and central government as well are providing various kinds of scholarships to the school-going children, transferring money to girl's child's account for buying bi-cycle, dress and books for promoting girl's participation in education. Hence, opening a bank account is the primary precondition for the people for obtaining various government assistances. Therefore, spending on social sector expenditure would surely enhance the process of financial inclusion among the Indian states.

Like demand side results, here, our regional dummies for supply side determents also follow the same results. That is the overall impact of Northern, Southern, Western, and Eastern regions are having positive impact on financial inclusion. In contrast, only North-East region has a negative impact on financial inclusion. As it is argued in the previous section that the whole North-East regions are considered as hilly areas, hence there is lack of communication facility in the region. In the supply side, the low conectivity of road, electicity, internet, ATM machine, bank branches have severly affected their degree of financial inclusion.

After regressing two isolated regressions for both the demand and supply side determents of financial inclusion, now the study tries to combine these two sides and endeavour to see any divergent outcome is coming because of combining two sides of factors. The result of the combined factors is presented in table number 8.3 below. However, the study did not observe any divergence from the main results after taking the combined factors together (See table no.8.3). The study found that for all the combined factors the signs are remained same like earlier demand and supply side determinants. However, in the combined results, some changes have been observed in case of co-efficient values, their standard errors and the level of significance then the earlier two regression results (I.e, demand and supply side determinants results).

Variable	FF	RE	PCSE	FGLS
v allable	Model 1	NL Model 2	Model 3	Model 4
I IT	-53 9082	-100 1565	100 1565***	100 1565
LII	$(132 \ 1941)$	(135, 1486)	(A9 92A72)	$(133\ 6141)$
UNEMP	1 3330***	1 2570***	-1 2570***	-1 250***
UIVLIVII	(0.1370)	(0.1390)	(0.2016)	(0.1374)
PCSGDP	1634 059***	1758 028***	1758 028***	1758 028***
I COODI	(165,7312)	$(133 \ 1972)$	(97 2594)	$(131\ 6848)$
R POP	-0 8799***	-0 5716***	-0 5716***	-0 5716***
K_1 01 .	(0.1917)	(0.1809)	(0.0986)	(0.1789)
LOG ROAD	(0.1717) 4 7253***	1 0038	1 0038	1 0038**
LOO_ROAD	(1 5496)	(1.39)	$(1 \ 1157)$	$(1 \ 3742)$
LOG Electri	(1.3+70) 0.7150	(1.37) 0.3208	0 3208	(1.3742)
city	(0.9660)	(0.8863)	(1.0803)	(0.8762)
SSE	(0.900)	0.0003)	(1.0003)	(0.0702)
55E	(1.7433)	(0.8180)	(0.7384)	(0.3009)
CP	(1.4439) 1 $1017*$	(0.0109)	(0.7364) 0.1884	(0.8090)
CK	(0.7014)	(0.63/3)	(0.6580)	(0.6271)
North	<u>(0.7014)</u> <u>/ 27/5***</u>	5.0380***	5.0380***	5.0380***
Norui	(1.5441)	(1.5027)	(0.4641)	(1.5746)
Northeast	(1.3441)	(1.3927) 6 0200***	6 0200***	6 0200***
Northeast	(1.7040)	(1.7424)	(0.7020)	(1.7226)
Fact	(1.7949) 2 5042	(1.7424) 2.6160*	(0.7929)	(1.7220)
East	2.5043	(1.6888)	(0.5527)	(1.6606)
South	(1.0403) 7 0022***	(1.0000)	(0.3327)	(1.0090)
South	(1.6541)	(1,6550)	0.0203°	(1, 6262)
West	(1.0341) 15 1927***	(1.0330) 16.0740***	(0.6413) 16 0740***	(1.0302) 16.0740***
west	15.1827	$10.2/49^{****}$	$10.2/49^{****}$	$10.2/49^{****}$
C	(15.1827)	(1.8278)	(1.1390)	(1.8070)
C	107.7966	377.4932	377.4932^{***}	377.4932
	(238.5905)	(243.8445)	(88.9440)	(241.0757)
UDS.	020	020	020	620
R-squared	0.0030	0.6842	0.6842	
F-statistics	85.75			
Prob. (F-	0.0000			
statistics)		1212.04	15071 10	1040 17
Wald chi2		1312.84	159/1.19	1343.17
Prob > cn12		0.0000	0.0000	0.0000
Log				-2185.052
IIKelinood		0.50		
Hausman test		0.56		
	20	(1.0000)	20	20
No. of States	28	28	28	28

 Table 8.3: Measuring the Determinants of Financial Inclusion with

 Combined Sample

5. Impact of Financial Inclusion on Poverty: Empirical Results and Discussions

Here, the main objective is to empirically examine the impact of financial inclusion on the overall poverty reduction among the 28 Indian states and state's rural-urban poverty reduction as well from the time period of 1993 to 2015. Table 9.1 provides a detailed descriptive statistic of this study. There is a total of 620 observation used in this analysis. The correlation results (see table 9.2) show the overall correlation between all the variables. The correlation results depicts that the financial inclusion index is negatively associated with the overall state poverty, rural poverty and urban poverty, respectively. The social sector expenditure (SSE) is negatively associated with the overall state poverty and rural poverty, whereas with context to urban poverty, SSE is positively associated. Similarly, the per capita SGDP (PCSGDP) is having a negative relationship with all three poverty categories (i.e., overall state poverty, rural and urban poverty). However, as expected, the rural population is positively associated with the three poverty groups. Lastly, the capital receipt is negatively related to the overall poverty and rural poverty, whereas it is positively associated with urban poverty.

Variable	Obs.	Mean	Std. Dev.	Min	Max
HCR	620	3.054518	.6882883	.1823216	4.304335
RP	620	2.965579	.7567135	.1823216	4.064057
UP	620	2.557312	.8560137	.0198026	3.944297
FII	620	22.35735	14.62081	4.224208	91.05867
SSE	620	8.372756	1.484166	4.49981	11.66281
PCSGDP	620	.0042268	.0039587	.0000105	.0231094
R-POP	620	2.828026	3.169561	.039328	15.53513
CR	620	7.795066	1.662489	2.833213	11.29127
North	620	.2467742	.4314823	0	1
North-East	620	.2967742	.457205	0	1
East	620	.1354839	.342516	0	1
Central	620	.0612903	.2400558	0	1
South	620	.1483871	.3557703	0	1
West	620	.1112903	.3147452	0	1

Table 9.1: Summary Statistics
	HCR	RP	UP	FII	SSE	PCSGD P	R_POP	CR
HCR	1.0000							
RP	0.4923	1.0000						
UP	0.4086	0.4148	1.0000					
FII	-0.3912	-0.5885	-0.3475	1.0000				
SSE	-0.1717	-0.0713	0.1866	0.2441	1.000			
PCSGDP	-0.3615	-0.5117	-0.4668	0.6497	0.305	1.0000		
R_POP	0.1004	0.2285	0.4306	-0.1375	0.645	-0.1918	1.0000	
CR	-0.1284	-0.0959	0.2156	0.2351	0.728	0.2141	0.6543	1.0000
	1 4	1 1 E	· ·					

 Table 9.2: Correlation Table

Before conducting regression analysis, the study used a unit root test (ADF and PP) for checking the stationarity in the data. The ADF and PP test results indicate that variables used in this study are stationary at their level forms (see table 9.3). After the stationarity check, the study moved for the regression analysis.

	AD	F test	PP test		
Variables	Intercept	Trend and	Intercept	Trend and	
		Intercept		Intercept	
POV	-8.6829***	-8.6638***	-6.6483***	-6.6232***	
POV_R	-7.7688***	-7.7737***	-6.2165***	-6.2115***	
POV_U	-8.5910***	-8.7574***	-6.2708***	-6.8711***	
FII	-3.2050**	-3.6622**	-4.0646***	-4.4402***	
SSE	-5.9517***	-6.1350***	-6.7542***	-6.8711***	
PCSGDP	-6.5815***	-6.6962***	-6.7542***	-6.8711***	
R_POP	-3.3674**	-3.3481*	-3.6448***	-3.6330**	
CR	-5.3240***	-5.4615***	-6.0238***	-6.1960***	

 Table 9.3: Unit Root Test

Source: Author's Estimation

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

Here, table 9.4, 9.5 and 9.6 discuss the regression results of the impact of financial inclusion on poverty reduction for the full sample states and rural-urban areas respectively. Here, in addition to the financial inclusion index, the study has also used other control variables that may have a significant impact on poverty. The study has used the

overall state-wise financial inclusion index for full sample poverty and rural-urban poverty as well. The estimated results depict that for all the three sample poverty data (i.e., full sample state poverty and ruralurban), financial inclusion have a negative and significant impact on poverty reduction; that is states with higher financial inclusion are tend to have lower poverty rates. Correspondingly, it can also be argued that the rise in financial inclusion will have a significant impact on reducing the state's overall poverty and rural-urban poverty as well. The empirical outcomes found that across the five models' specifications, our negative results for financial inclusion on poverty remain the same (See table 9.4,9.5 and 9.6). The negative impact of financial inclusion on poverty could be understood from the pioneering role that public sector banks in India have played historically. One of the probable reasons for this result is that this study has used public sector banks data for its analysis. The primary objectives of public sector banks are to promote banking services to the unserved areas and to include the poor and weaker sections of people into the banking system. While looking at the history of financial inclusion in India, it can be seen that to enhance financial accessibility, both GoI and RBI has undertaken so many initiatives. In the pre-liberalization period, the government has undertaken numerous policy measures (like nationalization of banks, the establishment of RRBs, opening of NABARD, social banking policy, priority sector lending) to enhance financial accessibility in the country. Similarly, the post-liberalization period has also witnessed major profinancial inclusion policy reforms (such as implementing SHGs and connecting it with the banking system, no-frills account, the introduction of Pradhan Mantri Jan-Dhan Yojana and DBT schemes). Additionally, the post-liberalized Indian economy has observed a reduction of absolute poverty and rise in income among the people (Samal, 1998; Raghbendra, 2004; Kalirajan, and Singh, 2010; Cain, et al., 2012). With the reduction in poverty and rise in income, a greater number of people have participated in formal banking activities. Correspondingly, the participation of formal banking would have enhanced the chances to obtain formal credit from the bank, which have further increased their

income by providing them employment and enhancing their productivity capacity. The corresponding rise in credit to the Micro, Small and Medium Enterprises (MSME) sectors in rural and urban areas has helped the poor to increase their income through their various investment channels. This would have further helped to reduce poverty. On the other side, the affordable accessibility of formal credit has protected the rural poor from the exploitation of local moneylenders. The poor and marginalised people have able to obtain credit at an affordable interest rate, which have protected themselves from the extra monetary exploitation of the local money lenders. Furthermore, in the postliberalized period, specifically after 2000, the Indian public sector banks have seen the expansion of bank branches to the remote areas of India. In this process, the government is continuously extending public sector banks for the easy accessibility of banking services to the poor and marginalized people of India. Because of all these aggregate policy initiatives, Indian poor people have able to access easy and affordable financial accessibility from the formal banking sectors. The easy accessibility of banking services nearby the localities has encouraged the Indian poor to enhance their savings and mitigating their future uncertain financial risks. Consequently, the cumulative effect of all these policy efforts has helped to produce a negative impact of financial inclusion on poverty in the overall full sample states and rural-urban poverty as well.

Variable	FE	RE	PCSE	FGLS	HTR RE
	Model 1	Model 2	Model 3	Model 4	Model 5
FII	-0.0074***	-0.0119***	-0.0119***	-0.0119***	-0.0215***
	(0.0026)	(0.0027)	(0.0030)	(0.0027)	(0.0044)
SSE	0.2149***	-0.2425***	-0.2425***	-0.2425***	-0.3670***
	(0.0676)	(0.0515)	(0.0565)	(0.0510)	(0.0622)
PCSGDP	-69.3727***	-2.7659	-2.7659	-2.7659	-39.2303***
	(11.7799)	(10.0785)	(8.6362)	(9.9887)	(12.9543)
R_POP	0.01523	0.0416***	0.0416***	0.0416***	0.0503
	(0.0122)	(0.0125)	(0.0094)	(0.0124)	(0.0463)
CR	-0.0227	0.1180***	-0.1180*	-0.1180***	-0.0821*
	(0.0469)	(0.0443)	(0.0545)	(0.0439)	(0.0406)
North	-0.5264***	-0.5472***	-0.5472***	-0.5472***	-4.0989***
	(0.1048)	(0.1141)	(0.1063)	(0.1131)	(0.4411)
North-	0.2509*	0.2419*	0.2419*	0.2419*	1.0488
East	(0.1226)	(0.1228)	(0.1354)	(0.1217)	(0.6498)
East	0.0690	0.0126	0.0126	0.0126	0.0532
	(0.1099)	(0.1199)	(0.0749)	(0.1189)	(0.7059)
South	-0.3285***	-0.1322	-0.1322	-0.1323	-4.4929***
	(0.1129)	(0.1209)	(0.1049)	(0.1199)	(0.5448)
West	-0.6596***	-0.3076*	-0.3076***	-0.3076*	-4.4693***
	(0.1330)	(0.1398)	(0.0683)	(0.1385)	(0.5771)
С	1.4291***	4.5841***	4.5841***	4.5841***	6.4884***
	(0.4104)	(0.2752)	(0.3597)	(0.2728)	(0.6799)
Obs.	620	620	620	620	620
R-	0.6896	0.7948	0.2589		
squared					
F-	19.07				
statistics					
Prob. (F-	0.0000				
statistics)					
Wald		212.76	214.23	216.61	224.30
chi2					
Prob >		0.0000	0.0000	0.0000	0.0000
chi2					
Log				-554.7552	
likelihood					
Hausman		102.55***			
test		(0.0000)			
No. of	28	28	28	28	28
States					

Table 9.4. Results of Overall Sample-Financial Inclusion and
Poverty Reduction
Dependent Variable: Poverty (HCR)

Source: Author's Estimation

Furthermore, our empirical results for the impacts control variables on poverty suggest that all the three-control variables like

PCSGDP, R-POP, and Capital Receipt (CR) have similar kinds of results across the three poverty categories (i.e., full sample states and rural-urban poverty). However, the findings for SSE differ for different poverty categories (See table 9.4, 9.5 and 9.6). The estimated results for SSE depict that social sector expenditure by the government has a negative impact on the overall state poverty and rural poverty (see table 9.4 and 9.5) whereas, for urban poverty, the social sector expenditure has a positive impact. In the case of rural poverty, we first observed a positive sign of SSE on poverty, whereas after controlling the autocorrelation and heteroscedasticity, we found a negative impact of SSE on rural poverty. The probable reasons for this result could be due to the inclination of the government to spend more government expenditure on rural poverty eradication programmes. In contrast to this result, while measuring the impact of SSE on urban poverty, it is observed that for the initial two models (i.e., FE and RE) we found a negative effect, whereas after controlling autocorrelation and heteroscedasticity, we found a positive impact of SSE on urban poverty. Similarly, as expected, the per capita state GDP has a negative and significant impact on poverty in all the poverty categories (see table 9.4, 9.5 and 9.6). The result of this is very obvious that the rise in people's income would lead to an increase in their standard of living and assist them to spend more on both consumption and non-consumption expenditure. However, the result of the control variable 'R POP' depicts that the rural population has a positive effect on poverty across the three poverty categories analysis (see table 9.4, 9.5 and 9.6). This result is quite expected because with lack of employment skills, less education and unavailability of employment opportunities in rural areas, the increment of the rural population would augment the poverty situation in rural India. Similarly, with the rising trend of urbanization, urban slums and urban poverty are also increasing rapidly. Because of the modernization of the agriculture sector, low employment skills and less employment opportunity in rural areas, a large number of rural people are migrating to urban areas in search of better livelihood. Consequently, this huge rural-urban migration would help to increase

urban poverty. Hence, the rise in rural population would ultimately lead to a rise in urban poverty also. Similarly, the empirical result of another control variable, 'CR' shows that capital receipt has a negative effect on the poverty condition in all three poverty categories (see table 9.4, 9.5 and 9.6). This result could be possible because, with the inflow of more capital, the government will able to spend more on public welfare activities which would help to have a negative impact poverty condition of the respective states.

	Dup	enacht (aria)	olei Ruiul I ov		
Variabl	FE	RE	PCSE	FGLS	HTR_RE
e	Model_1	Model_2	Model_3	Model_4	Model_5
FII	-0.0160***	-0.0171***	-0.0171***	-0.0171***	-0.0051
	(0.0023)	(0.0023)	(0.0020)	(0.0023)	(0.0038)
SSE	0.3036***	0.1069**	0.1028*	0.1028**	-0.1292**
	(0.0591)	(0.0469)	(0.0528)	(0.0440)	(0.0513)
PCSGD	-10.5751	-47.422***	-54.629***	-54.629***	-33.674***
Р	(10.3002)	(8.7862)	(10.8542)	(8.6175)	(10.8856)
R_POP	0.0005	0.0201*	0.0256*	0.0256**	0.0741**
	(0.0106)	(0.0106)	(0.0130)	(0.0107)	(0.0301)
CR	-0.0237	-0.0046	-0.0393	-0.0393	-0.0337
	(0.0411)	(0.0393)	(0.0448)	(0.0378)	(0.0345)
North	-0.8062***	-0.8019***	-0.7882***	-0.7882***	-1.1857***
	(0.0916)	(0.0952)	(0.0384)	(0.0976)	(0.3505)
North-	-0.1449	-0.1187	-0.1822***	-0.1821*	-0.7129*
East	(0.1072)	(0.1038)	(0.0537)	(0.1049)	(0.3522)
East	-0.0129	-0.0355	-0.0331	-0.0331	-0.3020
	(0.0961)	(0.0999)	(0.0395)	(0.1025)	(0.3787)
South	-0.8363***	-0.7152***	-0.6795***	-0.6795***	-0.9407***
	(0.0987)	(0.1011)	(0.0351)	(0.1034)	(0.3759)
West	-0.5364***	-0.3627***	-0.3229***	-0.3223***	-0.97847**
	(0.1163)	(0.1175)	(0.0907)	(0.1194)	(0.4071)
С	1.3512***	3.0168***	3.3401***	3.3401***	5.1623***
	(0.3588)	(0.2569)	(0.2499)	(0.2354)	(0.4329)
Obs.	620	620	620	620	620
R-	0.5564	0.6071	0.5437		
squared					
F-	73.63				
statistic					
S					
Prob.	0.0000				
(F-					
statistic					
s)					
Wald		702.25	4336.69	738.61	277.48
chi2					
Prob >		0.0000	0.0000	0.0000	0.0000
chi2					
Log				-463.2094	
likeliho					
od					
Hausm			73.75***		
an test			(0.0000)		
No. of	28	28	28	28	28
States					

Table 9.5. Financial Inclusion and Rural Povert	y
Dependent Variable: Rural Poverty (R Pov)	

Variabl	FE	RE	PCSE	FGLS	HTR RE
e	Model 1	Model 2	Model 3	Model 4	Model 5
FII	-0.0175***	-0.0179***	-0.0184***	-0.0843***	-0.0198***
	(0.0027)	(0.0027)	(0.0026)	(0.0027)	(0.0048)
SSE	-0.0354	-0.0089	0.0272	0.0272	0.1600*
	(0.0712)	(0.0552)	(0.0656)	(0.0524)	(0.0649)
PCSGD	-47.6879***	-50.7474***	-53.8692***	-53.8693***	-82.3357***
P	(12.4150)	(10.3537)	(13.1481)	(10.2529)	(13.7542)
R POP	0.0538***	0.0526***	0.0503***	0.0503***	0.0207
	(0.0128)	(0.0125)	(0.0127)	(0.0127)	(0.0388)
CR	-0.0230	-00.0500	-0.0808	-0.0808*	-0.1157**
	(0.0495)	(0.0464)	(0.0632)	(0.0450)	(0.0435)
North	-0.8015***	-0.7837***	-0.7619***	-0.7619***	-1.3778***
itoitii	(0.1104)	(0.1123)	(0.1184)	(0.1162)	(0.3389121)
North-	-1.2557***	-1.2653***	-1.2689***	-1.2689***	0.9747***
East	(0.1292)	(0.1223)	(0.1853)	(0.1249)	(0.3071)
East	-0 3421***	-0 3341***	-0 3237***	-0 3237**	1 6847***
Lust	(0.1159)	(0.1179)	(0.0871)	(0.1220)	(0.4043)
South	-0 3458***	-0 3319***	-0 3189***	-0 3189**	-1 5267***
boutin	(0.1189)	(0.1192)	(0.0798)	(0.1230)	(0.4105)
West	-0.2006	-0.1696	-0.1338	-0.1338	-2 1625***
W OBL	(0.1403)	(0.1385)	(0.1413)	(0.1330)	(0.4254)
C	4 1656***	4 1690***	4 1279***	4 1279***	3 5993***
C	(0.4325)	(0.3025)	(0.3806)	(0.2800)	(0.5555)
Obs	620	620	620	620	620
R-	0.6138	0.6210	0.4952	020	020
squared	0.0120	0.0210	0.1952		
F-	50.93				
statistic	50.75				
s					
Proh	0.0000				
(F-	0.0000				
statistic					
s)					
Wald		559 69	946 75	608 19	312.92
chi2		557.07	710.75	000.17	512.72
Proh >		0.0000	0.0000	0.0000	0.0000
chi?		0.0000	0.0000	0.0000	0.0000
				-570 9424	
likeliho				J 1 0. J 7 47	
od					
Hausm		6 85			
an teet		(0.6525)			
No of	28	28	28	28	
States	20	20	20	20	
States					

Table 9.6. Financial Inclusion and Urban PovertyDependent Variable: Urban Poverty (U Pov)

Our analysis with context to the zonal effect on poverty shows that the results of all the five zonal dummies are varying for different zones. The empirical result depicts that the overall effect of Northern, Southern and Western are having a negative impact on overall state poverty. However, the other two zones, such as North-East and Eastern zones are having a positive impact on the overall poverty (see table 4a). The negative impact of financial inclusion in Northern, Southern and Western zones could be possible because of their high financial inclusion and higher economic status. Whereas in the case of North-East and Eastern zones, because of low financial inclusion status, hilly regions and lower economic status, the overall zonal dummies are having no impact on poverty reduction. Likewise, in the case of rural poverty, the average impact of all the five zonal dummies (such as North, South, West, North-East and East) are having a negative impact on rural poverty (see table 9.5). This result could be possible because of extensive pro-financial inclusion policies implemented in North, South, West zones. However, for North-East and East zones though the overall formal financial sector has low financial inclusion but the extensive outreach of microfinance to the rural areas may have helped to reduce rural poverty in these two zones (Roy, 2010; Das and Patnaik, 2015; KPMG, 2018). Similarly, in the case of urban poverty, our results found that the overall impact of North, South and West regions are having a negative impact on urban poverty, whereas other two zones like North-East and East regions are having a positive impact on urban poverty. In urban poverty, our first four models found a negative impact for North-East and East zones, whereas after controlling the problem of endogeneity, we observed a positive sign for the same zones.

5.1. Causality between Financial Inclusion and Poverty

The constant credit cash flow through financial inclusion can assist in raising income and reducing poverty. On the other hand, the rise in income can equally inspire people to participate in formal banking activities like saving, deposit, withdrawal etc. Hence, both the sides can cause each other by nature. Therefore, in-order to check the nature of causality, this study attempts to check the inter-causality between financial inclusion and poverty. In order to martialize the above-cited objective, the study used the Granger causality test. Before moving towards the Granger causality test, the study checked the stationarity of the data by applying the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test for the period of 1993 to 2015 (see table 9.7).

Variable	AD	F test	P	P test
	Intercept	Trend and	Intercept	Trend and
		Intercept		Intercept
FII	-3.2050**	-3.6622**	-4.0646***	-4.4402***
POV	-8.6829***	-8.6638***	-6.6483***	-6.6232***

Table 9.7: Unit Root Test

Sources: Author's Estimation

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

The result of the panel Granger Causality test for financial inclusion and poverty, indicate that financial inclusion causes poverty at the '1st' lag but not vice-versa. However, in 2nd and 3rd lag, both financial inclusion and poverty are causing each other. That means at the initial stage, financial inclusion and poverty have unidirectional causality, while in the latter stage, both the variables have bi-directional causality between them. This kind of results is quite obviously expected because when at the initial stage, people obtain their formal banking services (like credit) that helps to reduce the poverty level of the people by investing that money on various income-generating activities. However, when the income of the people increases continuously over time, they plan to further participate in banking activities by depositing or saving more money in their account, which further boosts the process of financial inclusion. Therefore, at the initial stage, only financial inclusion helps to reduce poverty and not vice-versa, while in the later stage, both the variables cause each other (see table 9.8).

Null Hypothesis		Directio	n of causality	y
	Obs.	Lags	F-stat	Prob.
FI does not Granger Cause POV	619	1	5.2778	0.0116
POV does not Granger Cause FI	619	1	1.7382	0.1879
FI does not Granger Cause POV	618	2	6.6848	0.0013
POV does not Granger Cause FI	618	2	1.7096	0.1818
FI does not Granger Cause POV	617	3	4.1650	0.0062
POV does not Granger Cause FI	617	3	4.6338	0.0033

Table 9.8: Pairwise Granger Causality Test between FinancialInclusion and Poverty

6. Construction and Discussion of Human Development Index (HDI)

One of the major concerns for the policy makers in India is the wide range of regional disparities that exist in reaping the fruits of development. Over the years, India has witnessed high economic growth, but the economic growth has failed to reach equally to every section of the society. As a result of this, there has been a huge gap in human development among the various social groups and among the various states as well (Kumar and Rani, 2019; Majumder, 2004; Roy, S. 2012; Kumar, et al., 2020).

The present section here depicts the results of each dimension of the composite human development index in three different time period (i.e., 1993, 2001 and 2015). The three dimensions are education, the standard of living and health dimension. Here the dimension-wise results are demonstrated to understand the regional disparities present in each dimension of human development. In the next section, the study has presented the overall composite index of human development and discusses the overall state-wise gaps in the overall human development conditions. Using the PCA method, the study has calculated threedimension indexes of human development (see table no. 10.1, 10.2 and 10.3). It can be observed that over the years, each dimension of human development has witnessed improvement. However, the improvement in each dimension is not identical for all states. Some states have performed well in one dimension, whereas other states have performed well in other dimensions. A dissimilar growth has been observed among the three dimensions in different Indian states. Thus, it can be commented that the period 1993-2015 has experienced a steady improvement of human development levels in Indian states, but the improvements are not identical for all states. Correspondingly, it should be accepted that the Indian states have come a long way compared to where we started. However, the absolute levels are still not satisfactory, especially if compared to international standards. The variation in the growth of each dimension occurs because of some historical factors, social behaviour of the people, geographical reasons, and may be a major lacuna in the state economic policy implication.

States	Education	Standard of	Health
	Dimension	Living	Dimension
Andhra Pradesh	9.26	55.9	25.6
Arunachal Pradesh	7.46	48.0	16.9
Assam	7.75	31.8	20.1
Bihar	4.83	35.2	17.6
Goa	15.03	53.0	17.5
Gujarat	9.48	42.0	16.6
Haryana	8.32	42.6	19.5
Himachal Pradesh	12.27	61.1	28.7
Jammu and Kashmir	6.83	54.2	22.4
Karnataka	5.51	47.2	26.4
Kerala	10.45	55.4	23.4
Madhya Pradesh	6.96	32.6	21.3
Maharashtra	10.82	68.1	24.3
Manipur	10.03	46.8	12.3
Meghalaya	7.34	59.2	28.2
Mizoram	14.66	72.0	11.81
Nagaland	9.00	60.3	21.4
Odisha	7.93	40.5	24.0
Punjab	8.66	52.1	15.8
Rajasthan	6.49	64.0	20.7
Sikkim	7.68	34.4	22.6
Tamil Nadu	9.00	36.9	13.9
Tripura	8.72	58.4	24.5
Uttar Pradesh	6.33	32.7	21.1
West Bengal	7.09	47.6	18.2

Table 10.1: Dimension-Wise Index of Human Development for the year 1993

States	Education	Standard of	Health
	Dimension	Living	Dimension
Andhra Pradesh	11.94	78.3	33.9
Arunachal Pradesh	9.66	65.7	17.1
Assam	8.75	44.2	19.2
Bihar	5.46	48.3	21.8
Chhattisgarh	14.36	59.1	24.4
Goa	15.98	74.6	21.4
Gujarat	10.45	62.8	17.9
Haryana	9.80	65.2	18.5
Himachal Pradesh	14.80	90.7	24.3
Jammu and Kashmir	8.08	82.3	24.1
Jharkhand	7.48	42.2	16.2
Karnataka	5.90	70.9	21.5
Kerala	10.59	85.4	25.8
Madhya Pradesh	9.12	40.3	21.6
Maharashtra	12.32	96.6	22.2
Manipur	10.89	69.8	13.8
Meghalaya	9.00	93.9	31.2
Mizoram	15.69	187.7	14.79
Nagaland	9.41	107.9	27.9
Odisha	9.67	54.5	29.8
Punjab	10.00	67.6	16.8
Rajasthan	9.12	88.7	21.5
Sikkim	8.79	49.8	24.3
Tamil Nadu	10.27	54.9	15.1
Tripura	9.97	71.6	29.2
Uttar Pradesh	8.13	44.0	21.3
Uttarakhand	10.63	44.9	20.6
West Bengal	8.03	61.9	23.3

Table 10.2: Dimension-Wise Index of Human Development for theYear 2001

States	Education	Standard of	Health
	Dimension	Living	Dimension
Andhra Pradesh	14.46	497.1	23.2
Arunachal Pradesh	15.60	303.9	14.8
Assam	11.05	167.9	14.0
Bihar	9.20	236.3	18.4
Chhattisgarh	16.73	261.5	33.8
Goa	17.80	343.9	22.2
Gujarat	13.18	326.2	15.5
Haryana	12.19	411.5	15.3
Himachal Pradesh	18.12	400.3	29.1
Jammu and Kashmir	11.07	340.2	19.5
Jharkhand	11.36	193.1	18.5
Karnataka	8.25	464.0	22.9
Kerala	11.70	519.1	21.6
Madhya Pradesh	11.26	203.4	17.2
Maharashtra	14.10	573.2	23.9
Manipur	13.34	323.7	11.2
Meghalaya	12.60	455.9	26.7
Mizoram	16.78	476.7	15.34
Nagaland	12.21	417.9	26.3
Odisha	12.28	228.9	24.5
Punjab	11.92	397.5	16.6
Rajasthan	11.27	433.4	16.9
Sikkim	11.40	240.5	16.8
Tamil Nadu	12.09	352.2	19.9
Tripura	12.98	301.6	18.3
Uttar Pradesh	11.05	177.1	15.9
Uttarakhand	13.32	254.4	28.3
West Bengal	9.93	347.01	15.53

Table 10.3: Dimension-Wise Index of Human Development for the
Year 2015

Here, in the below table (table no.10.4) the constructed Human Development Index (HDI) is showing a glimpse of the regional disparities in human development. The constructed HDI is a composite index of the three dimensions of human wellbeing, namely, health, education and standard of living. Using the same PCA method, the study here constructed the HDI for each state from 1993 to 2015 (see table 10.4). Moreover, from the table it can be seen that like the dimensionwise indexes, the composite human development index is also not stable among the Indian states over the years. From the below-given table the inter-state disparities in human development can be observed. There is high variation among the Indian states with context to the condition of human development. Historically, there had been a wide gap between the various regions in terms of the availabilities and accessibilities of various social and economic wellbeing in the pre-liberalized India. The economic liberalization has abled to bring more growth to the Indian economy but the nature of development is unsatisfactory. It is true that the situation across the states has improved, but there are high regional inequalities that exist between the states. Here, it can be observed that some states in India are having good human development condition while other states have very worse human development condition. From the given table (table no 10.4), it can be observed that between 1993 to 2015, almost every state in India has seen improvement in their human development conditions. But despite their progress in human development condition, huge gaps exist between the states. That means some states in India have abled to progress in a more rapid ways whereas others have failed to catch-up that rapid progress. The reasons for this unequal progress could be due to some historical negligence, demographic profile of the state, social behaviour of people, economic policy failure, geographical hurdles and lack of political willingness (Franke and Chasin, 1999; Simister, 2011; Rathore and Das, 2019). The cumulative effect of all these have produced a high divergence in human development among the Indian states. The result of our constructed Index shows that as per the latest 2015 index, states like Kerala and Maharashtra have been ranked as 1st and 2nd by securing 55.24505 and

50.11554 value respectively. Whereas states like Assam, Utter Pradesh and Jharkhand have been placed in 28th, 27th, and 26th place by securing 19.2904, 20.40644 and 22.29654 index values (see table no.10.4).

State	1993	Rank	2001	Rank	2015	Rank
Haryana	8.041961	9	10.35476	12	43.90206	5
Himachal						
Pradesh	10.20495	3	12.97653	4	44.75508	3
Jammu &						
Kashmir	8.349013	7	11.44529	9	37.07198	12
Punjab	7.657076	14	9.943414	15	42.60252	6
Rajasthan	7.124815	19	11.93549	8	38.213	10
Arunachal						
Pradesh	7.237522	18	9.245929	21	33.4394	16
Assam	5.959225	24	7.215173	26	19.2904	28
Manipur	6.910577	20	9.441629	18	34.82647	15
Meghalaya	7.471961	15	12.41627	6	30.51902	20
Mizoram	9.845705	4	12.40125	7	32.356	18
Nagaland	9.071521	5	10.52448	11	36.642	13
Tripura	8.16318	8	11.07439	10	33.29659	17
Sikkim	6.467403	21	8.285782	22	26.87261	22
Bihar	5.764947	25	7.553052	24	26.38788	23
Odisha	7.2421	17	9.400042	19	24.52048	24
West Bengal	7.286362	16	9.32538	20	37.24972	11
Madhya						
Pradesh	6.086721	22	7.100161	27	23.18652	25
Uttar Pradesh	6.014596	23	7.344809	25	20.40644	27
Gujrat	7.804106	12	10.11597	13	35.48216	14
Maharashtra	10.32017	2	13.1152	3	50.11554	2
Andhra						
Pradesh	7.779378	13	12.41807	5	40.47341	7
Karnataka	7.911534	11	9.830242	16	38.51809	8
Kerala	10.92375	1	14.17535	1	55.24505	1
Tamil Nadu	7.985575	10	10.02486	14	38.41557	9
Goa	8.554436	6	13.20012	2	44.39108	4
Chhattisgarh	N/A		9.778395	17	31.20029	19
Jharkhand	N/A		6.589629	28	22.29654	26
Uttarakhand	N/A		7.613893	23	29.59964	21

Table 10.4: Status of Human Development Index across States

6.1. Impact of Financial Inclusion on Human Development: Empirical Findings and Discussions

The study here is mainly intended to empirically examine the impact of financial inclusion on human development across the 28 Indian states from the time period of 1993 to 2015. Table no 10.5 provides details of basic summary statistics of this empirical analysis. It can be seen from the table that there is a total of 620 observation used in this analysis. Similarly, the correlation results are provided in table no. 10.6. The correlation table shows the relationship between the used variables. The correlation results demonstrate that financial inclusion has a positive relationship with human development. Similarly, among the control variables, the result shows that variables like the Social Sector Expenditure (SSE), Per Capita State GDP (PCSGDP) and Capital Receipt (CR) have a positive relationship with human development, whereas Rural Population (R_POP) has a negative relationship with human development (see Table10.6).

Table 10.5. Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
HDI	620	15.94558	9.073782	5.764947	55.24505
FI	620	22.35735	14.62081	4.224208	91.05867
SSE	620	8.372756	1.484166	4.49981	11.66281
PCSGDP	620	.0042268	.0039587	.0000105	.0231094
R_POP.	620	2.828026	3.169561	.039328	15.53513
CR	620	7.795066	1.662489	2.833213	11.29127
Source: Author's Estimation					

Variable	HDI	FI	SSE	SGDP	RURAL POP.	CAPITAL
HDI	1.0000					
FI	0.5665	1.0000				
SSE	0.4413	0.2441	1.0000			
PCSGDP	0.7021	0.6497	0.3056	1.0000		
R_POP.	-0.1037	-0.1375	0.6458	0.1918	1.0000	
CR	0.3169	0.2351	0.7287	0.2141	0.6543	1.0000
Source: Author's Estimation						

Table 10.6. Correlation Metrix

Table 10.7 Unit-Root Test

Variable	ADF test		PP test		
	Intercept	Trend and	Intercept	Trend and	
		Intercept		Intercept	
HDI	-8.5071***	-8.5272***	-8.9004***	-8.9224***	
FII	-3.2050**	-3.6622**	-4.0646***	-4.4402***	
SSE	-5.9517***	-6.1350***	-6.7542***	-6.8711***	
PCSGDP	-6.5815***	-6.6962***	-6.7542***	-6.8711***	
R_POP	-3.3674**	-3.3481*	-3.6448***	-3.6330**	
CR	-5.3240***	-5.4615***	-6.0238***	-6.1960***	

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 is as per MacKinnon one-sided p values.

Before empirically examining the regression model, the study here first conducted the unit root test to know the stationarity of the data. The result of the unit root test is presented in table no. 10.7. The empirical results for the impact of financial inclusion on human development are presented in table no 10.8. For materializing this objective, this study has used the main variable (i.e., financial inclusion) along with the four control variables. The composite index of human development is used as the dependent variable side, and the composite index of financial inclusion is used in the independent variable side along with the four control variables. Here, the four control variables are Social Sector Expenditure (SSE), Per Capita State GDP (PCSGDP), percentage of Rural Population (R_POP), and Capital Receipt (CR). Furthermore, like the earlier two objectives, here the study also uses five regional dummies to capture the effect of various regional characteristics on human development.

With context to the finding of this particular objective, the empirical results from the below table (i.e., table no.10.8) depict that financial inclusion has a very positive and significant impact on human development. That means the higher degree of financial inclusion will assist in improving human development condition among the 28 Indian states. The empirical finding depicts that across the five model's specification, our positive results for financial inclusion on human development remain the same (see table no. 10.8). Our findings support the hypothesis that financial inclusion could work as prominent means to improve the human development condition among the Indian states. This finding could be understood through the development made by the public sectors banks by extending their financial products and services across the Indian states. There is no doubt that over the years, specifically, the post 2000 period has witnessed tremendous growth in banking outpost (Barik and Sharma, 2019), starting from the expansion of bank branches to the rural hamlets, providing credit the priority sectors and including a poorer section of people through easy banking process. It can be observed from the table no. 7.5 that majority of Indian states have improved in terms of financial inclusion. In between 1993 to 2015, the majority of states have moved from low ranked to the medium or high ranked financial inclusion categories (see table no. 7.5). Hence, the results demonstrate that financial inclusion captured by various indicators of financial availability, accessibility and usability can help individuals to spend more on their health, education and consumption. That means with the expansion of more credit and the increase in saving, the individuals are expected to promote their expenditure in areas that improve human development, such as education, food consumption and healthcare. Furthermore, access to credit can also lower unemployment and raise income level by encouraging business start-up among individuals. The fulfilment of various socio-economic goals is also linked with the process of human development improvement. Hence, providing more employment and boosting income can also assist individuals in spending more on their further human development process. The results of this study are well supported by the earlier findings (for example, see Kuri and Laha, 2011; Laha, 2015; Nanda and Kaur, 2016; Raichoudhury, 2016; Nanda and Kaur, 2017; Qureshi and Xiong, 2018; Datta and Singh, 2019; Ofosu et al., 2019; Matekenya, et al., 2020; Peria and Shin, 2020).

Dependent Variable: Human Development Index (HDI)						
Variable	FE	RE	PCSE	FGLS	HTR_RE	
FII	0.0986***	0.1469***	0.1469***	0.1469***	0.3192***	
	(0.0194)	(0.0294)	(0.0187)	(0.0192)	(0.0231)	
SSE	-0.8399***	4.2913***	4.2913***	4.2913***	4.8656***	
	(0.3352)	(0.5646)	(0.4601)	(0.3652)	(0.3230)	
PCSGDP	231.0326***	1069.654***	1069.654***	1069.654***	666.1297***	
	(65.7105)	(116.362)	(88.5334)	(71.4718)	(67.3002)	
R_POP	-0.2086***	-0.5293***	-0.5293***	-0.5293***	-0.7722***	
	(0.0314)	(0.0769)	(0.0672)	(0.0888)	(0.2383)	
CR	0.8094***	-0.6859*	-0.6859*	-0.6859*	0.0420	
	(0.2579)	(0.2897)	(0.4045)	(0.3139)	(0.2111)	
North	2.8768***	2.8822***	2.8822***	2.8822***	24.1923***	
	(0.3579)	(0.4853)	(0.5212)	(0.8096)	(2.2829)	
Northeast	2.9014***	8.2544***	8.2544***	8.2544***	17.0447***	
	(0.2897)	(0.7516)	(0.5769)	(0.8706)	(2.0899)	
East	0.3949*	0.9149***	0.9149***	0.9149	25.6136***	
	(0.2013)	(0.2858)	(0.2889)	(0.8505)	(2.8002)	
South	4.3560***	1.8369***	1.8369*	1.8369*	25.8182***	
	(0.6109)	(0.3962)	(0.7988)	(0.8576)	(2.8161)	
West	3.4998***	0.8082	0.8082	0.8082	30.8758***	
	(0.6678)	(0.5022)	(0.5778)	(0.9910)	(2.9788)	
С	11.4159***	-24.4122***	-24.4122***	-24.4122***	-36.2562***	
	(1.6265)	(3.6552)	(2.6894)	(1.9522)	(3.4779)	
Obs.	620	620	620	620	620	
R-	0.9189	0.7817	0.7817			
squared						
F-	1821.61					
statistics						
Prob. (F-	0.0000					
statistics)						
Wald		12792.48	8447.86	2219.92	6381.96	
chi2						
Prob >		0.0000	0.0000	0.0000	0.0000	
chi2						
Log				-1774.821		
likelihood						
Hausman		361.81***				
test		(0.0000)				
No. of	28	28	28	28	28	
States						

Table 10.8: Regression Results of Financial Inclusion and Human Development Dependent Variable: Human Development Index (HDI)

Furthermore, with regard to the results of control variables, our findings depict that SSE, PCSGDP and CR are having a positive impact on human development. However, the result of R_POP is showing a negative and significant impact on human development (see table no. 10.8). The probable reasons for the positive impact of social sector expenditure are that the post-liberalized Indian has seen tremendous growth in the social sector expenditure. Every year, both the central government and various state governments are spending huge amount of money for the wellbeing of the general citizens. Over the years, the government has realized that one of the major roles of a democratic government is to improve the quality of life of the people, which can be carried out by incurring public expenditure in areas such as health, education, and other social services (Agarwal, 2015). Public spending on health and education is always considered as the merit goods which have positive externalities. Correspondingly, the market sources have failed to provide basic amenities like health and education to the poorer section of people. As a result of this, government intervention through public expenditure has become an indispensable requirement for the wellbeing of people. It is always assumed that when the government expand its public expenditure, this will help to improve the human development condition of the states. Hence, our empirical result supports the hypothesis and depicts that social sector expenditure has a positive and significant impact on the human development condition of the 28 Indian states. Similarly, as it was expected, the Per Capita State GDP has a positive impact on human development. It is very obvious that with the rise in income, people will tend to spend that income on their consumption, better health care and in education, which would help to enhance their human development condition. Likewise, another control variable i.e., CR is having a positive impact on human development. That means the more the capital inflow to the state economy, it would improve the human development condition of the state through various public expenditure. However, our control variable 'R POP' is showing a negative and significant effect on human development. That means the presence of a higher percentage of rural

people can hamper the process of human development. As it is known that India's rural area lacks better education and healthcare facility, low literacy, and less income. Hence, the greater presence of rural population can hinder the improvement in human development condition in the Indian states. Similarly, our zonal-wise effect results illustrate that the overall impact of all five zones has a positive impact on human development.



Figure 11: Relationship between Financial Inclusion and Human Development across the 28 Indian States from 1993 to 2015

Source: Author's Preparation

6.2. Causality between Financial Inclusion and Human Development

Like the causality between financial inclusion and poverty, the study here also checked the inter-causality between financial inclusion and human development among the 28 Indian states. It is quite obvious that the availability of more cash through financial inclusion would encourage the individuals to invest that money in their various developmental activities such as spending money on better education, healthcare, building houses and toilets, acquiring new working skills, and any other activities that provide well-being to the Individuals. On the other hand, the improvement in human development condition can raise the efficiency and productivity of the people, which would further help to increase their income. With the rise in people's income, they can move for formal banking services like opening bank account, saving, deposit, withdrawal etc. In this context both financial inclusion and human development can help each other for the improvement in both the conditions. Thus, in-order to empirically examine the inter-causality between these two variables (i.e., financial inclusion and human development), this study used the Granger causality test. Before doing the Granger causality test, the study checked the stationarity of the data by applying the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test for the period of 1993 to 2015 (see table 10.9).

The findings of the inter-causality of financial inclusion and human development indicate that both financial inclusion and human development have a bi-directional relationship between them (see table 10.10). That means the process of financial inclusion is helping to improve the human development condition among the 28 Indian state. Correspondingly, the improved human development condition also assists to expand the process of financial inclusion among the same Indian states.

Variable	ADF test		PP t	est
	Intercept	Trend and	Intercept	Trend and Intercept
		Intercept		
FII	-3.2050**	-3.6622**	-4.0646***	-4.4402***
HDI	-8.5071***	-8.5272***	-8.9004***	-8.9224***

Table 10.9: Unit Root Test

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

Table 10.10: Pairwise Granger Causality Test between Financial Inclusion and Human Development

Null Hypothesis	Direction of causality			
	Obs.	Lags	F-stat	Prob.
FI does not Granger Cause HDI	619	1	9.1934	0.0025
HDI does not Granger Cause FI	619	1	3.0530	0.0811
FI does not Granger Cause HDI	618	2	4.8291	0.0283
HDI does not Granger Cause FI	618	2	4.3131	0.0138
FI does not Granger Cause HDI	617	3	5.8682	0.0034
HDI does not Granger Cause FI	617	3	2.8348	0.0375

Sources: Author's Estimation

7. Concluding Remarks

The main aim of this chapter is to present the empirical findings of the three objectives and provide a vivid discussion on the findings. The chapter begins by discussing the constructed index of financial inclusion. First, the chapter presented the index of each dimension of financial inclusion; then it presented the overall composite index of financial inclusion among the 28 Indian states. Then, the chapter ties to discuss both demand side and supply side factors that are impacting the process of financial inclusion. The next section of this chapter then moves to discuss the results of financial inclusion and poverty reduction. Here, the chapter extensively discusses how has the degree of financial inclusion assisted in reducing the overall state poverty and state's rural-urban poverty as well. After discussing the impact of financial inclusion

on poverty reduction, the chapter then discusses the inter-causality between financial inclusion and overall state poverty. Then the next section of this chapter intends to discuss the results of human development. Firstly, it presents each dimension of human development and then demonstrates the overall composite index of human development. Then this section moves to discuss the regression results of financial inclusion and human development among the 28 Indian states. Lastly, the chapter ends with a discussion of the results of the inter-causality between financial inclusion and human development across the 28 Indian states.

Chapter-5

Summery and Conclusion

This thesis endeavour to examine the factors (both demand and supply side) affecting the degree of financial inclusion among the 28 Indian states. And how this financial inclusion has impacted to reduce poverty and improve human development in the post-liberalized Indian states. Chapter 2 of this thesis provides an extensive literature survey of previous studies. This chapter covers both theoretical and empirical literature survey which covers the measurement of financial inclusion, its various determinants, its effect on poverty and human development. Chapter 3 of this thesis provides detailed methodological issues and different econometrics tools used for the empirical analysis. The used data and empirical specifications of each hypothesis are described vividly in this chapter systematically. Chapter 4 of this thesis presents empirical findings of three objectives with a different subsection.

The present chapter is organized in the following ways. Section 5.1 and 5.1.1. provides the overall summary of this thesis with a brief description of the empirical findings. Section 5.2, 5.2.1. and 5.2.2. synthesizes all the empirical findings for policy suggestions for the Indian states. Section 5.3 describes the major contribution of this study. Section 5.4 explains the limitation of the present study and shows the future direction of this research. Finally, section 5.5 provides a concluding remark.

5.1. Overall Summary

Financial inclusion is an imperative policy instrument to improve livelihood, reduce poverty and inequality (Kapoor, 2014; Sinha, 2014). Easy and affordable access to financial products and services works a productive means for the poor and marginalised people to access other basic necessities of life. Hence, exclusion from the formal financial system of an individual has an intrinsic negative value of its own, and it can also lead the individual to face other kinds of deprivation, thereby limiting further basic living opportunities. Therefore, financial exclusion is also termed as "social exclusion.

In this context, while looking at the data of financial inclusion for India, it was realized that 'India' was the second largest populous country in the world, comprises a large number of unbanked people. Additionally, it was also found that there were high inter-state disparities in financial inclusion in India. Some states in India were having high accessibility of financial inclusion, whereas some states had very low financial inclusion. Therefore, understanding the significance of financial inclusion for societal progress in general and individual development in particular, both governments of India and RBI have undertaken numerous policy measures to include India's unbanked population into to the banking fold. The process of financial inclusion in Indian had been started from a very early stage of banking sector development. The first initiative of financial inclusion in India can be traced bank to the period of nationalization of the bank in 1969. Similarly, the pre-liberalised period also seen some other important policy initiatives (such as the establishment of RRBs, and NABARD) to enhance the process of financial inclusion in Indian. However, the period of financial reform in 1991 show a paradigm alteration in the functioning of the financial market in general and banking sector in particular. With the implementation of financial liberalization, many foreign banks were given consent to operate in the Indian financial market. And it was expected that the operation of foreign banks would enhance the process of financial inclusion in India. Furthermore, the period of financial reform also faced the withdrawal of social banking policy which had a significant impact on India's poverty reduction (see Burgess et al., 2005; Burgess and Pande, 2005). Additionally, the post liberalization period, specifically the post-2000 period shows a huge popularization of the term financial inclusion. Correspondingly, India also welcomed a number of pro-financial inclusion policy implications during this time period to include the poorer section of people into the formal sector banking. Hence, as the financial reform period has been realized as a major policy change, here an obvious question ascends among the economists and policymakers of India to know what are the factors impacting the process of financial inclusion and how has the process of financial inclusion performed in the post-liberalized India to reduce poverty and improve human development condition. Some of the researchers have endeavoured to find-out the various demand-side and supply-side determinants of financial inclusion in India through conducting a primary survey or through secondary data analysis (such as Chattopadhyay, 2011; Kumar, 2013; Sukumaran, 2015; Kundu, 2015; Mukhopadhyay, 2016; Nandru et al., 2016; Nandru, et. al., 2016; 2019; Sahoo et al., 2017; Ramakrishna and Trivedi, 2018; Raichoudhury 2020; Kaur and Kapuria in 2020). Similarly, few studies also have tried to empirically examine the impact of financial inclusion on poverty and human development in the different time period with diverse variables of financial inclusion (see Inoue, 2011; Inoue, T., and Hamori, 2012; Inoue, 2018; Kuri and Laha, 2011; Laha, 2015). Thorough-out our literature journey, we observe that majority of studies have constructed the financial inclusion index by using the distance-based method. Additionally, studies examining the determinants of financial inclusion either have focused on demand side only or supply side only. There is shortage of studies focusing on both demand and supply side determinants of financial inclusion. Similarly, while looking at the studies related to financial inclusion and poverty, we found that studies have constructed financial inclusion with limited financial access indicators and have analysed with poverty data either at overall statelevel or only rural-urban context. Likewise, with context to financial inclusion and human development, we found that most of the studies have calculated financial inclusion and human development with the distance-based approach with limited financial access indicators and human development components.

Hence, realizing the research gaps in the previous literature, this study has tried to fulfil the research gaps. Firstly, this study tries to see

the determining factors of financial inclusion among the 28 Indian states from both demand and supply side factors during the period of 1993 to 2015. Secondly, this study empirically examined the impact of financial inclusion on the overall state poverty and rural-urban poverty as well during the same time period. Thirdly, taking a greater number of financial inclusion indicators and human development components, this study examined how the process of financial inclusion helped to improve human development condition of the 28 Indian states during the same time period.

In order to materialize the above-cited objectives, the study has gathered state-level data from diverse data sources. To provide a basic view of financial accessibility around the world in general and India in particular, this study has gathered data from Global Findex Database (2017), World Bank, and the financial access survey data of the IMF. However, for empirical analysis, the study has used state-level data that includes basic statistics of RBI, Census of India, CMIE data, NITI Ayog data, data from NSSO, NFHS and data on handbook of statistics on Indian states (RBI). Similarly, the study has used different econometric models for various objectives of this study. For finding the determinants of financial inclusion, this study has relied on open Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Error (PCSE), and Feasible Generalized Least Square (FGLS) for its analysis. Similarly, for measuring the impact of financial inclusion on poverty and human development. The study uses Fixed Effect (FE), Random Effect (RE), Panel Corrected Standard Errors (PCSEs) and Feasible General Least Square Method (FGLS) Hausman-Taylor Regression (HTR_RE) models. Moreover, the study has applied Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test for stationarity check before moving for regression analysis. Similarly, for constructing a composite index of financial inclusion and human development, this study has applied PCA method.

5.1.1. Main Findings of the Study

The findings of this study suggest the following points.

- I. The results of each dimension of financial inclusion suggest that financial availability, accessibility, and usability have increased in every state over the years. However, the rate of growth of financial indicators is not identical for all states.
- II. Similarly, the overall financial inclusion index depicts the general regional inequalities in the degree of financial inclusion. It shows the inter-state inequalities in the overall magnitude of financial inclusion.
- III. The results of the composite financial inclusion index suggest that Maharashtra has occupied 1st rank securing highest index score (i.e., 91.05). Next to Maharashtra, states like Goa and Kerala have ranked 2nd and 3rd rank, respectively.
- IV. Next to these three top-ranked states, other states such as Punjab, Tamil Nadu, Haryana, Himachal Pradesh are performing well in financial inclusion.
- V. Similarly, about the bottom side of the ranking, our results demonstrate that Utter Pradesh has occupied 28th rank securing the lowest index value of 12.65. Next to Utter Pradesh, states like Uttarakhand and Bihar have ranked 27th and 26th rank, respectively.
- VI. Next to these three bottom line states, other states from the North-East regions like Manipur, Nagaland, Arunachala
 Pradesh have performed worse in financial inclusion.
- VII. In the aggregate sense states from southern, western, northern (except Uttar Pradesh and Uttarakhand) and central regions of India are relatively better placed in financial inclusion, whereas eastern and north-eastern regions are less financially included.
- VIII. The empirical findings of this study illustrate that among the four demand side determinants (i.e., Literacy Rate, Rate of

Unemployment, Per Capita State GDP, Percentage of Rural Population) of financial inclusion, Literacy (LIT) and Per Capita State GDP (PCSGDP) have a positive impact on financial inclusion whereas other two variables like Rate of Unemployment (UNEMP) and Percentage of Rural Population (R_POP) have a negative impact on financial inclusion among the 28 Indian states.

- IX. Similarly, with context to the four supply side determinants (i.e., Road Length, Electricity Supply, Social Sector Expenditure and Capital Receipt) of financial inclusion, our empirical findings show that all the four variables are having a positive and significant impact on the process of financial inclusion among the 28 Indian states.
- X. With context to the impact of financial inclusion on poverty reduction, the estimated empirical results depict that financial inclusion is having a negative and significant impact on the overall state poverty and rural-urban poverty as well. That means financial inclusion in the post-reform period is playing a significant role in the overall state poverty reduction and rural-urban poverty reduction as well.
- XI. The control variables result for financial inclusion, and poverty shows that the per capita state GDP has a negative and significant impact on poverty in all the poverty categories (i.e., overall sample, rural and urban poverty). The result of the rural population (R_POP') depicts that 'R_POP' has a positive effect on poverty across the three poverty categories analysis. Similarly, the empirical result of another control variable capital receipt (CR) shows that CR has a negative effect on the poverty condition in all three poverty categories. However, the result for social sector expenditure (SSE) varies for three poverty categories. The estimated results for SSE depict that social sector expenditure have a negative impact on the overall state poverty and rural

poverty, whereas for urban poverty, the social sector expenditure has a positive impact.

- XII. The causality result of financial inclusion and poverty sows that at lag one, financial inclusion causes poverty but not vice-versa. That means at the initial state, financial inclusion and poverty have a unidirectional relationship. However, on the lag 2nd and 3rd, financial inclusion causes poverty and poverty also cause financial inclusion. That means on the latter stage (i.e., in lag 2nd and 3rd), both financial inclusion and poverty are bi-directional in nature.
- XIII. Like, financial inclusion index, the study also constructed a human development index using the same PCA methodology. First, the study constructed each dimension of human development. The dimension-wise index of human development depicts that over the years, progress has been observed in every dimension of human development among all the 28 Indian states. However, the growth rate of each dimension is not identical for every state. There are interstate disparities in the progress rate of each dimension of human development.
- XIV. The results of the composite index of human development show the overall regional inequalities in the improvement in human development among the 28 Indian states in the postliberalized India. The results of the constructed index show that states like Kerala and Maharashtra have been ranked as 1st and 2nd by securing 55.24505 and 50.11554 value respectively. Whereas states like Assam, Utter Pradesh and Jharkhand have been placed in 28th, 27th, and 26th place by securing 19.2904, 20.40644 and 22.29654 index values, respectively.
- XV. The regression results of financial inclusion and human development depict that financial inclusion has a very positive and significant impact on human development. That means the higher degree of financial inclusion will help to

improve the human development condition among the 28 Indian states.

- XVI. The results of the control variables demonstrate that social sector expenditure (SSE), per capita state GDP (PCSGDP) and capital receipt (CR) are having a positive impact on human development. However, the result of the rural population (R_POP) has a negative and significant impact on human development.
- XVII. Similarly, the causality result of financial inclusion and human development suggests that both the variables are causing each other. That means both the variables are having bi-directional causality between them.

5.2. Synthesis and Policy Implications

5.2.1 Synthesis of the Empirical Results

This thesis is mainly intended to examine the impact of financial inclusion on state-wise poverty and human development in India. Before moving for poverty and human development analysis, this thesis first measured the demand and supply side determining factors of financial inclusion among the Indian states. Then this study moved to measure the effect of financial inclusion on poverty and human development. In the poverty analysis, this thesis analyzed the effect of financial inclusion on both the overall state poverty and rural-urban poverty as well. While empirically examining the impact of financial inclusion on poverty, the study also tried to investigate the inter-causality between these two variables (i.e., financial inclusion and poverty). In the next step, the thesis moves to empirically examine how has financial inclusion helped to improve human development condition among the 28 Indian states. Similar to poverty analysis, here the study also tries to verify the inter-causality between financial inclusion and human development.

The empirical finding of this study clearly depicts that in the demand side, factors like Literacy rate and Per Capita State GDP plays a significant role in promoting financial inclusion, whereas other two variables such as the rate of unemployment and Rural Population are
negatively impacting the process of financial inclusion among the 28 Indian states. Similarly, with context to supply side determinants of financial inclusion, our findings depict that all the four independent variables (i.e., Road Length, Electricity Supply, Social Sector Expenditure and Capital Receipt) are having significant positive role to expand the degree of financial inclusion. With context to the analysis of financial and poverty, we find that financial inclusion is having a negative and significant impact in all three poverty categories (i.e., overall state poverty, rural and urban poverty). The causality result of financial inclusion and poverty depict that at the initial stage, financial inclusion causes poverty but not vice-versa. While at the latter stage, both financial inclusion and poverty are causing each other. Similarly, the result of financial inclusion and human development shows that financial inclusion has a very positive impact on human development. From the results of poverty and human development, one common thread we can observe that financial inclusion has played a very crucial role for both reducing poverty and improving human development condition in all 28 Indian states in the post-reform period. Similarly, while observing the results of causality between financial inclusion and human development), it is found that both financial inclusion and human development are causing each other. Hence, they have a bidirectional relationship between them.

5.2.2. Policy Implications

Based on our empirical findings, this study takes an opportunity to suggest the following thoughts for policy consideration.

I. The overall composite index of financial inclusion depicts that there are variations in financial inclusion among the 28 Indian states. States from eastern and north-eastern regions of India are having low financial inclusion than states from southern, western, northern and central regions. Hence, in order to minimize the financial inclusion gaps between the Indian states, state-specific policy initiatives should be undertaken by the government. Strengthening good governance, promoting financial literacy, developing infrastructure facilities and enhancing institutional quality in low ranked financial inclusion states will be good policy initiatives to promote financial inclusion among these states.

- II. As the demand side determinants results show that literacy and per capita state GDP has a positive impact on financial inclusion. Hence the study suggest that both the central government and state governments should endeavour to increase literacy rate and per capita income of the citizens. And financial institutions should try to promote financial literacy in-order to enhance the process of financial inclusion. Similarly, as the results show the rate of unemployment and percentage of rural people have a negative impact on financial inclusion, hence it is advised that the government should try to reduce the rate of unemployment in the country and provide basic services to the rural areas (like increase rural literacy, upsurge rural income, provide basic banking facilities etc.), so that the rural people will not be excluded from the formal banking system.
- III. Similarly, our supply side determinants results depict that all the four variables (i.e., road length, electricity supply, social sector expenditure and capital receipt) have a positive impact on financial inclusion. Hence, based on these results, it is advised that both central government and all state governments should extend more infrastructural and economic supports so that more people can be brought into the formal banking system.
- IV. Our empirical results for financial inclusion and poverty illustrate that financial inclusion have a negative and significant effect on the overall state poverty and rural-urban poverty reduction as well. Our findings advise that financial inclusion plays a major role in lowering overall poverty. Hence, more financial inclusive policies must be undertaken,

and more unbanked poorer people should be encompassed within the banking fold.

- V. The composite index of human development demonstrates that there are high disparities in the improvement of human development. Hence, states occupying lower rank in the human development index are advised to give more attention on their human wellbeing by providing better health, education and enhancing the standard of living of the citizens.
- VI. Our result on financial inclusion and human development shows that financial inclusion is playing a crucial role in improving the human development process. Hence, based on these findings, the study suggests that the states should try to enhance their financial inclusion process, so that it will help to improve the human development condition of the people.
- VII. Financial inclusion has a bidirectional relationship between poverty (in lag 2 and 3) and human development. Hence much efforts should be mand to extend the basic financial services to the poorer masses, which will help to reduce poverty and improve human development, and oppositely the reduced poverty and improved human development would help to further increment in the process of financial inclusion in the state.

5.3. Major Contribution of the Study

After conducting an extensive literature review, this study found research gaps in the previous literature. Based on the research gaps, this study tries to address five major questions. Firstly, using the PCA method, this study has constructed a composite state-level financial inclusion index considering various dimensions of financial inclusion. Secondly, the study tries to separately measure the state-level determinants of financial inclusion taking into consideration both demand side and supply-side variables. Thirdly, unlike previous literature, here, this study endeavors to measure the impact of financial inclusion on both state-level overall poverty and rural-urban poverty as well. Additionally, the study also tries to measure the causality between financial inclusion and poverty. Fourthly, like financial inclusion index, the study also constructs a state level composite human development index by considering wide range of indicators from three major dimensions of human development. Furthermore, along with measuring the impact of financial inclusion on human development, the study also measures the inter-causality between financial inclusion and human development.

5.4. Limitation and Future Research

Though this study has provided sufficient empirical evidence to support its primary objectives, but this study also has certain limitations. Firstly, this study has used six indicators of scheduled commercial banks for constructing financial inclusion index. However, with the availability of more data on the modern financial services (like use of ATM, UPI service, internet/mobile banking, remittance services etc.), a future study can use these data for constructing a complete financial inclusion index. Secondly, while measuring the determinants of financial inclusion from both the demand and supply side, the study has used four variables on each side. However, with the availability of data, a future study could be developed with using a greater number of demand and supply side determinants. Fourthly, the study has measured poverty through headcount ratio; a further study could be developed by constructing a multidimensional poverty index and also empirically can test the effect of financial inclusion index on multidimensional poverty index. Fifthly, with context to the construction of the human development index, the study has used nine indicators from three dimensions of human development. However, a future study could be conducted covering other dimensions of human development (such as environmental, civil and political liberties, human rights, cultural freedoms etc.).

5.5. Concluding Remarks

This thesis firstly attempts to understand what are demand side and supply side determinants of financial inclusion. Secondly, the study tries to empirically examine the how has the process of financial inclusion helped to reduce poverty (both overall state poverty and rural-urban poverty) and improve human development condition in 28 Indian states. The empirical results suggest that financial inclusion has a negative and significant effect on all three poverty categories. Additionally, the causality result of financial inclusion and poverty shows that financial inclusion and poverty are unidirectional at 1st lag, and in the latter stage (i.e., in 2nd and 3rd lag), they are having a bi-directional relationship between them. Likewise, in case of human development, the results depict that financial inclusion has a positive and significant impact on human development in 28 Indian states. That means the process of financial inclusion plays very crucial role among the 28 Indian states to reduce their poverty level and improve their human development condition. Similarly, the result of financial inclusion and human development depicts that both the variables have a bi-directional relationship between them.

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<u>Appendix</u>

Zonal-Wise Classification of States	
Central India	Chhattisgarh, Madhya Pradesh
East India	Bihar, Jharkhand, Odisha, West
	Bengal,
North India	Utter Pradesh, Haryana, Himachal
	Pradesh, Punjab, Rajasthan, Jammu
	and Kashmir.
North-East India	Arunachala Pradesh, Assam,
	Manipur, Meghalaya, Mizoram,
	Nagaland, Sikkim, Tripura.
South India	Andhra Pradesh, Karnataka, Kerala,
	Tamil Nadu.
Western India	Goa, Gujarat, Maharashtra.
Source: Authors Preparation	

Table A1: Zonal-Wise Classification of Indian States