



Financial Inclusion and its Determinants: An Empirical Study on the Inter-State Variations in India*

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ABSTRACT: The access to finance by the poor is a prerequisite for poverty reduction and sustainable economic development of a country. This paper attempts to measure the inter-state variations in the access to finance using credit and deposit penetration ratios and attempts to identify and analyze the determinants of financial inclusion using panel data analysis of 29 states spanning over a period from 2006 to 2014. The study corroborates the theory of importance of regional economic conditions on the level of financial inclusion in India. The level of economic activity reflected by per capita state domestic product, the proportion of factory and employee base are found to be significantly positive variables which indicates that income and employment generating schemes improves financial inclusion as the people become more aware and it also more desirable to access banking and financial activities.

JEL codes: G21, G23, G28, O16

Keywords: Access to Finance, Financial Inclusion, Poverty Alleviation, Economic Development.

I. INTRODUCTION

Financial sector development fosters economic growth and reduces poverty by widening and broadening access to finance and allocating society's savings more efficiently. "A mature system supports higher levels of investment and promotes growth in the economy with its depth and coverage India has a functioning financial market/system comprising of money market, forex market, capital market, debt market to cater to financial needs and requirements of various participants and segments of society" [10]. The fulfillment of credit requirements ensures the regular and efficient flow of financial resources so as to meet the funding needs required for growth and prosperity.

The tremendous growth in terms of volume and range of banking services are witnessed during the last decade. The significant improvements in the banking industry in terms of financial efficiency, profitability and competitiveness have failed to reach a large segment of population, especially the poor section of the society. In fact, there is a lack of access of basic banking services of having a bank account for the significantly large section of population. This is termed as "financial exclusion" which further leads to "social exclusion". In India, "only 55% of the population has deposit accounts and 9% have credit accounts with banks. The number showing access to other financial services are even more disappointing. Less than 20% of Indian population has life insurance coverage and only 10% have an access to any other kind of insurance coverage. The number of credit cards has remained stagnant at around 20 mn for last five years. Studies have proved that lack of inclusion or rather exclusion from the banking system results in a loss of 1 per cent to the GDP" [13-18]. Thus, financial inclusion is not just an economic imperative but also a socio-political one [1]. An attempt is made in the present study to evaluate the dynamics of level of financial inclusion and factors explaining the variation in financial inclusion across different states of India. The panel data analysis during the period 2006-2014 has been applied to explore the determinants of financial inclusion.

The rest of the paper is organized as follows: Section II briefly provides the significance of financial inclusion in India. The source of data and key variables is given in Section III. Section IV explains the econometric methodology employed for the analysis. The exploratory results are discussed in Section V. Section VI provides the empirical results analysis. The Section VII summarizes the major findings of the study.

II. CONCEPTUAL FRAMEWORK OF FINANCIAL INCLUSION

"Financial Inclusion is the process of ensuring access to appropriate financial products and services needed by all sections of the society in general and vulnerable groups such as weaker sections and low income groups in particular at an affordable cost in a fair and transparent manner by mainstream institutional players" [11].

“Access to safe, easy and affordable credit and other financial services by the poor and vulnerable groups in disadvantaged areas and lagging sectors is recognized as a pre-condition for accelerating growth and reducing income disparities and poverty. Access to a well-functioning financial system, by creating equal opportunities, enables economically and socially excluded people to integrate better into the economy and actively contribute to development and protects themselves against economic shocks” [19]. Huge business opportunities are prevalent if financial inclusion effectively is pursued to include a large section of population under the ambit of formal financial system. The penetration into vast unbanked areas and population will increase the financial base and economic activities of the financial institutions and would help them to improve profits and would allow the infrastructural development for economic growth [2-4].

“Financial Inclusion is considered to be an important determinant for social inclusion of poor and vulnerable. It is in fact, one of the essential conditions for reduction of poverty and socioeconomic inequalities in the society” [11]. Financial inclusion has the multiplier effects on the economy with the mobilization of savings of the large section of society and underprivileged people from the bottom of the society by formal financial institutions [5, 7]. This results into an expansion of credit and investment activities of the banks for productive uses. The access to the credit to the excluded section allows for the generation of productive assets to improve their income levels and efficiently meet the “livelihood shocks”. The transfer of public welfare benefits of Government can be easily transferred to the targeted underprivileged persons which allows the plugging of leakages of the benefits. The non-inflationary growth process can be triggered effectively by monetary policy of the country [8]. The dependency on informal sector is reduced and evils of money laundering and financing terrorism can be combated successfully.

“The Government of India and the Reserve Bank of India have been making concerted efforts to promote financial inclusion as one of the important national objectives of the country. Some of the major efforts made in the last five decades include - nationalization of banks, building up of robust branch network of scheduled commercial banks, co-operatives and regional rural banks, introduction of mandated priority sector lending targets, lead bank scheme, formation of self-help groups, permitting Business Correspondents/Business Facilitators to be appointed by banks to provide door step delivery of banking services, zero balance accounts, etc. The fundamental objective of all these initiatives is to reach the large sections of the financially excluded Indian population” [10].

III. DATA SOURCE AND KEY VARIABLES

The state-wise panel data analysis is used to evaluate the inter-state variations in the financial inclusion across state during 2006 to 2014. The Variables are defined as follows:

A. Dependent Variables

The following two proxy variables for financial inclusion has considered as dependent variable:

- (i) Deposit Penetration Indices defined as number of deposit accounts per thousand of population
- (ii) Credit Penetration Indices defined as number of credit accounts per thousand of population.

Separate regressions have been performed for deposit and credit penetration indices.

B. Independent Variables

Population Density is an important explanatory variable in the study. The population density is the population per square kilometer to capture the role of population concentration on the penetration of banking system.

C. The Other Explanatory Variables are explained as follows

Average Population per bank branch (APPBB) is obtained by dividing the population (in thousands) with the number of branches in a particular state. The level of *Income* is measured by net state domestic product per capita (SDPC) at 2004-05 constant prices. SDPC as a proxy for economic growth level of the state is captured by logarithm of per capita SDP and is used to study the impact of income level on the financial inclusion.

Credit deposit ratio (CD ratio) indicates the efficiency of the deposits mobilization and its utilization for the investment and capital formation activities. It is expected that a high CD ratio will allows for the higher investment and economic growth. The degree of industrialization is visualized by the *proportion of factories*. The role of banking and financial services is likely to improve with the process of industrialization. *Employment status* represents the employment status of individuals. “Those of a more secure status economically are less likely to be financially excluded” [6].

The annual Basic Statistical Return Relating to Commercial Banks in India are used to derive the information on deposit and credit accounts (state-wise). The census of India’s document on projected population data is used to derive the annual population of each state. The annual survey of Industries forms the basis for the collection of information on the number factories in each state of the country. The information on number of factories and employees has been divided by the state population to estimate the proportion of factories and proportion of employment in the total state population. The RBI publication of Handbook of Statistics on Indian Economy is used to collect the information on SDP of each state.

IV. ECONOMETRIC MODEL AND METHODOLOGY

The study involves the use of the techniques of the fixed and random effects model of panel data analysis to regulate the state level fixed or random variations. The econometric analysis applied in the study will proceed in two stages: At the First stage, the level of financial inclusion will be measured using the credit penetration ratios and deposit penetration ratios as mentioned above of the 29 selected states during the sample period of 2006-2014.

At the Second stage, the determinants of financial inclusion using certain factors will be explored by applying panel linear regression analysis. The second-level of analysis will attempt to identify the variables that influence the level of financial inclusion during the sample period i.e. 2006-2014. It will help to evaluate potential correlates of inter-state disparity in financial inclusion using different financial inclusion indicators as dependent variable of different states in India:

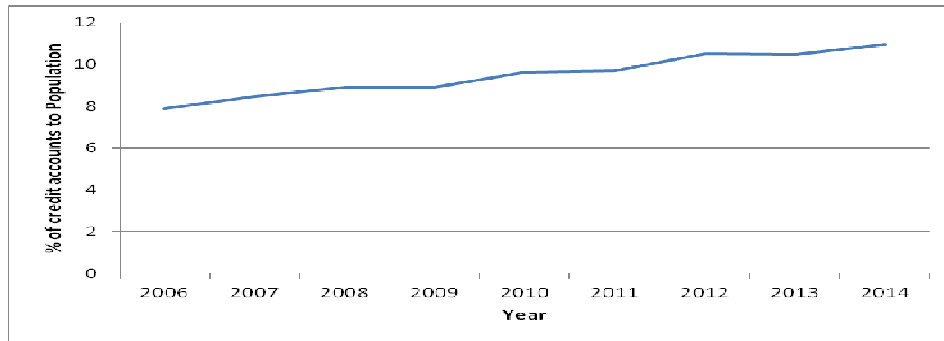
The basic functional form of the regression equation is as follows:

$$Y_{ij} = \beta_0 + \beta_1 x_{ij} + \alpha_i + \epsilon_{ij} \quad (1)$$

Here, Y_{ij} represents the value of dependent variable for the i^{th} state at the t^{th} period and that will be the financial inclusion indicator. Credit penetration and Deposit penetration are used as dependent variables. β_0 stands for the intercept term and X_{ij} is the matrix of exogenous/explanatory variables or determinants of financial inclusion defined in the section III. B_1 are the regression coefficients of these parameters. " α_i is treated as a random variable with a specified probability distribution (usually normal, homoscedastic, and independent of all measured variables) in case of random effects model, whereas a set of fixed parameters in fixed effects model. ϵ_{ij} is the usual stochastic disturbance term following normal distribution with mean 0 and variance σ^2 " [9].

V. EXPLORATORY RESULTS

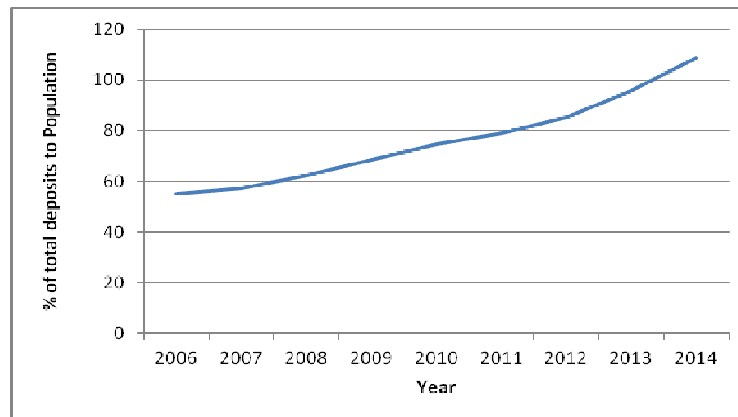
"As per Sarma (2008) [12] index of penetration has been constructed separately for deposit and credit accounts as percentage of deposit/credit accounts to population". Fig. 1 depicts the movements of credit penetration index as measured by the ratio of credit accounts to population. During 2006 to 2014 there has been an increase in the ratio from 7.89 to 10.94 per cent.



Source: Author's own calculation

Fig. 1. Ratio of Credit Accounts to Population.

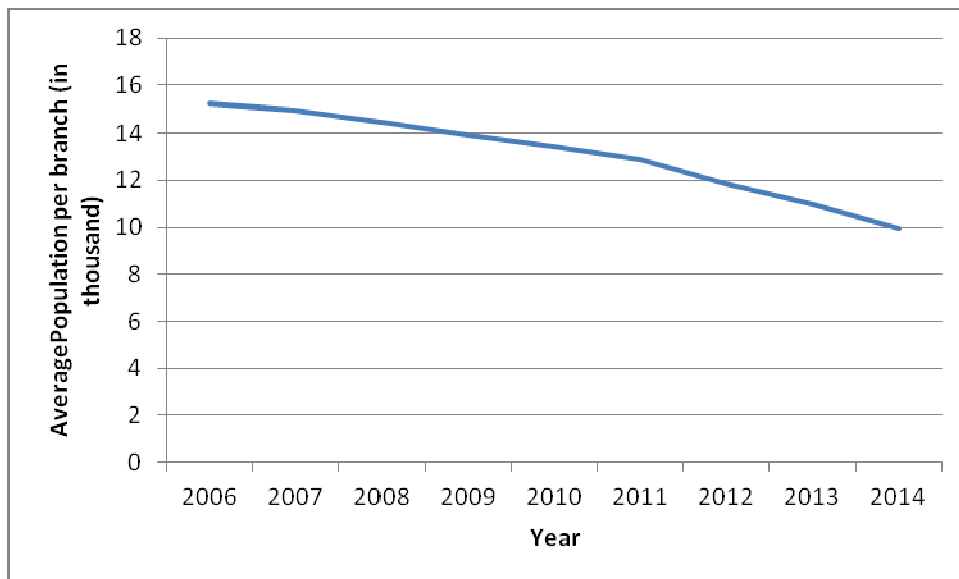
The ratio of deposit accounts to population (deposit penetration index) has also recorded a consistent growth during the sample period (Fig. 2).



Source: Author's own calculation

Fig. 2. Ratio of Deposit Accounts to Population.

The trends in average population served by bank branches (APPBB) is exhibited in Fig. 3, which shows an improvement of APPBB from 15248 persons being serviced by one branch in 2006 to 9926 persons in the year 2014. This is an indicator of branch expansion of commercial banks in India.

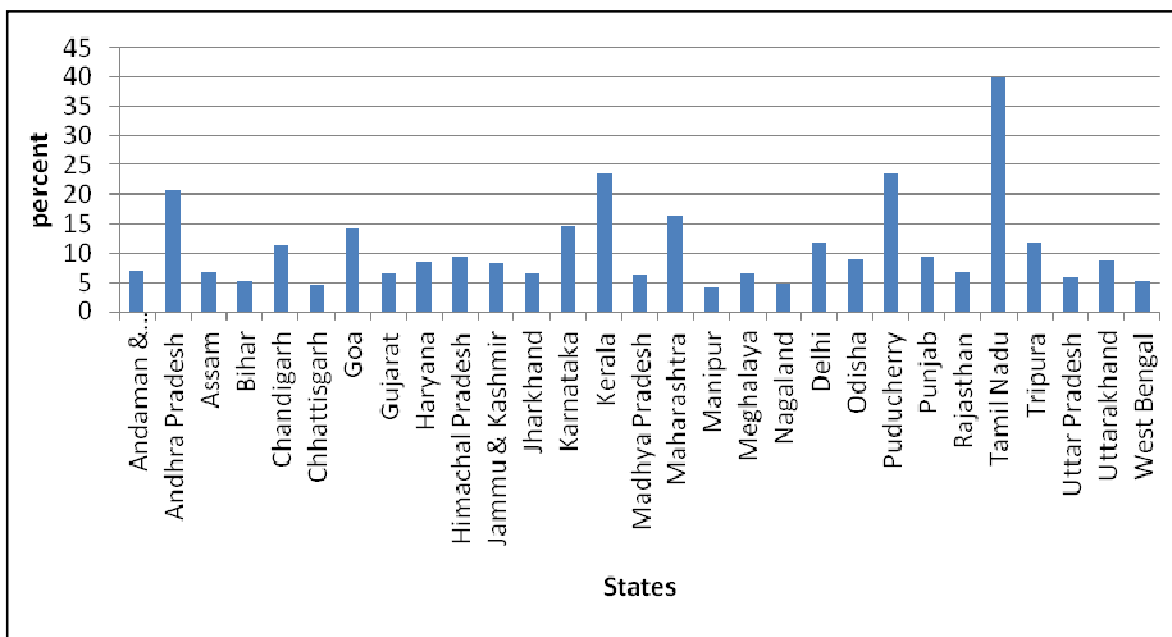


Source: Author's own calculation

Fig. 3. Average Population per Branch.

The credit activity of the banking system as indicated by credit penetration index for the year 2014 is shown in Fig. 4. The diagram depicts the dynamics of the variations of penetration of credit throughout the different regions of India. The highest credit penetration is achieved by states, such as, Tamil Nadu, Puducherry, Kerala with 39.8, 23.59 and 23.48 per cent respectively, whereas, the worst performing states in terms of credit penetration are found to be Manipur and Chhattisgarh at 4.2 and 4.5 per cent.

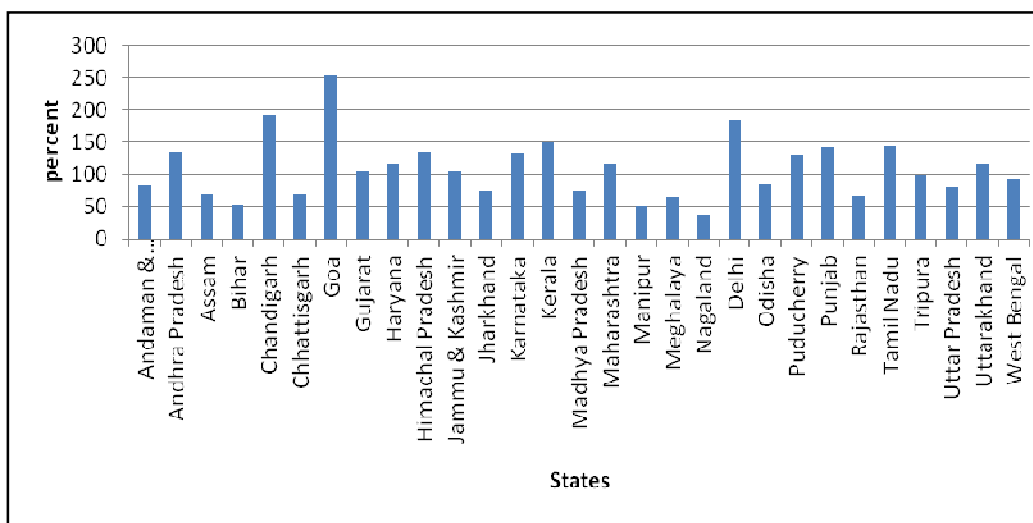
The scenario of deposit penetration graph is slightly different whereby the best performer states are Goa, Chandigarh and Delhi with highest level of deposit penetration of 252.42, 192.17 and 184.66 per cent (Fig. 5). The states performing poorest in terms of deposit penetration are observed to be same as that of credit penetration i.e. Manipur and Chhattisgarh at 4.2 and 4.55 respectively.



Source: Author's own calculation

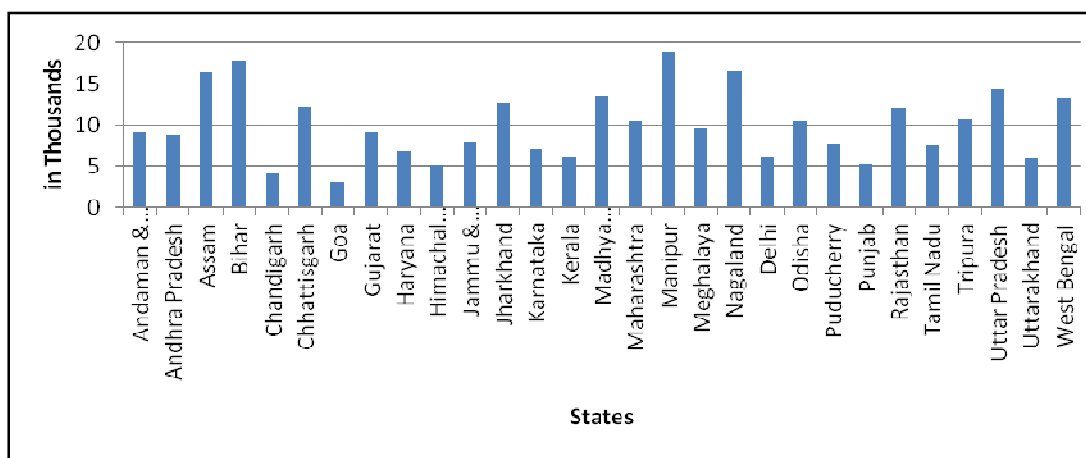
Fig. 4. State-wise Credit Penetration (2014).

The Fig. 6 portrays the APPBB. The states with lowest branch network are Nagaland Bihar and Manipur which also have lowest penetration indexes. These states are catering to more than 16,000 to 19,000 persons per branch. Goa, Chandigarh and Himachal Pradesh, Delhi and various southern states such as Kerala, Tamilnadu etc. have depicted a high branch density with less than 10,000 persons per branch.



Source: Author's own calculation

Fig. 5. State-wise Deposit Penetration (2014).



Source: Author's own calculation

Fig. 6. Average Population per Person (2014).

The summary of variables is graphically presented in Table 1. From the Table, it is evident that the banking sector in India has witnessed a drastic spur in number of branches of to around 50,000 during the period 2006-2014. There was a significant increase of number of credit accounts of around 85 lakhs in 2006 as compared to 2014. Overall, other variables have risen in magnitude.

To examine the relationship between the credit and deposit penetration indices, the correlation coefficient between credit and deposit penetration indices is depicted in Table 2. It is clearly evident that maximum number of the states has significantly positive association between credit and deposit penetration index. However, few states have negative and/or insignificant relationship. It can be summarized that the regions with high deposit penetration also depict the high credit penetration and vice versa.

In order to know the extent of dispersion in the credit and deposit penetration indices of different states, the coefficient of variation is computed in Table 3. It is clear that there is a significant variation in the penetration indices across different states. For example, 6 percent is the deposit index for Chandigarh which varied to as high as 47 per cent for Manipur. This dispersion level amongst states is lower in case of credit index. The state of Karnataka has the lowest variation in credit penetration of standard deviation of around 4 per cent. On the other hand, the credit penetration index of Maharashtra revolves around 29 per cent.

Table 1: The Descriptive Statistics of Variables for Select Years.

Year	Statistics	Branches (in no.)	Deposit Accounts (in no.)	Deposit Amount (in ₹) Million	Credit Accounts (in no.)
2006	Sum	70533	484005418	20861066	85302801
2006	Average	2432.172	16689842	719347.1	2941475.897
2006	S.D.	2293.923	17118984.3	1008394	3728724.134
2007	Sum	72934	518032537	25908480	94287742
2007	Average	2514.966	17863190.9	893395.9	3251301.448
2007	S.D.	2362.633	18375076.8	1327721	4295591.765
2008	Sum	77415	580298950	32418384	106822693
2008	Average	2669.483	20010308.6	1117875	3683541.138
2008	S.D.	2505.193	20693403.2	1731935	5573925.735
2009	Sum	81507	660673446	39116014	109888620
2009	Average	2810.586	22781843	1348828	3789262.759
2009	S.D.	2638.543	23767807.4	2023098	5817851.491
2010	Sum	86651	733013596	45486917	118453871
2010	Average	2987.966	25276330.9	1568514	4084616.241
2010	S.D.	2806.684	25937834.6	2395350	6034589.422
2011	Sum	91779	807797567	53750996	120532185
2011	Average	3164.793	27855088.5	1853483	4156282.241
2011	S.D.	2964.502	29030278.1	2864454	5870514.593
2012	Sum	100423	900278429	60609135	130671483
2012	Average	3462.862	31044083.8	2089970	4505913.207
2012	S.D.	3240.706	32346208.8	3052965	6430015.067
2013	Sum	108854	1041914540	69913939	128071893
2013	Average	3753.586	35928087.6	2410825	4416272.172
2013	S.D.	3497.695	37631814.9	3520960	6054970.131
2014	Sum	120475	1223382755	79323979	138501115
2014	Average	4154.31	42185612.2	2735310	4775900.517
2014	S.D.	3865.466	44356673.4	3997251	6640040.593

Source: Author's own calculation

Contd. Table1a: The Descriptive Statistics of Variables for Select Years.

Year	Statistics	Amount of Credit (₹) Million	No. of factories	Employment (in no.)	Per Capita(Constant)
2006	Sum	15120534	137502	8967425	947183
2006	Average	521397.7	4741.448	309221.6	32661.48
2006	S.D.	969448.5	5971.487	385000.7	18514.17
2007	Sum	19448563	142133	10163857	1024401
2007	Average	670640.1	4901.138	350477.8	35324.17
2007	S.D.	1240343	6242.194	466202.8	20065.72
2008	Sum	24140001	143884	10280305	1089382
2008	Average	832413.8	4961.517	354493.3	37564.9
2008	S.D.	1575738	6073.009	429823	20810.04
2009	Sum	28443186	152726	11146414	1147322
2009	Average	980799.5	5266.414	384359.1	39562.83
2009	S.D.	1797027	6747.543	471386.5	21931.36
2010	Sum	33407745	156281	11562649	1223263
2010	Average	1151991	5389	398712	42181.48
2010	S.D.	2000659	6789.526	493777.5	23411.94
2011	Sum	40711665	208199	12465881	1305271
2011	Average	1403851	7179.276	429858	45009.34
2011	S.D.	2445360	9546.112	526587.3	25040.07
2012	Sum	47983688	214063	13204467	1369518
2012	Average	1654610	7381.483	455326.4	47224.76
2012	S.D.	2860501	9733.186	554584.3	26795.79
2013	Sum	55196797	205101	12012774	1428320
2013	Average	1903338	7072.448	414233.6	49252.41
2013	S.D.	3244338	9119.822	516898	27693.01
2014	Sum	62755174	207114	12520318	1503491
2014	Average	2163972	7141.862	431735.1	51844.52
2014	S.D.	3705541	9225.916	540609.6	29093.06

Source: Author's own calculation

The penetration index also shows variations in the ranking of different states of the country. The usage and access of banking services has significant variations as the needs, degree of awareness, habits and conveniences vary across people living in different states.

Table 2: Correlation Coefficient between Credit and Deposit Penetration.

States	Pearson Correlation Coefficient	Spearman Correlation Coefficient
Andaman & Nicobar Islands	0.9761*	0.95*
Andhra Pradesh	0.9795*	1*
Assam	0.9928*	1*
Bihar	0.9261*	0.9333*
Chandigarh	-0.6658	-0.7*
Chhattisgarh	0.9405*	1*
Goa	0.7626*	0.7833*
Gujarat	0.9185*	0.9833*
Haryana	0.8889*	0.85*
Himachal Pradesh	0.8620*	0.9167*
Jammu & Kashmir	0.8674*	0.7833*
Jharkhand	0.9691*	0.8833*
Karnataka	0.2857	0.35
Kerala	0.9027*	0.7333*
Madhya Pradesh	0.9196*	0.9*
Maharashtra	-0.0014	0.1167
Manipur	0.9606*	0.9333*
Meghalaya	0.8455*	0.8
Nagaland	0.9018*	0.9833*
Delhi	-0.475	-0.55
Odisha	0.7706*	0.8667*
Puducherry	0.9397*	0.9833*
Punjab	0.9280*	0.95*
Rajasthan	0.9738*	1*
Tamil Nadu	0.9188*	0.8333*
Tripura	0.8679*	0.7167*
Uttar Pradesh	0.9935*	1*
Uttarakhand	0.9521*	0.95*
West Bengal	0.8839*	0.7667*

Source: Author's own calculation* Significant at 5 per cent

Table 3: Coefficient of Variation of Penetration Ratios Across States.

States	Deposit Penetration Ratio	Credit Penetration Ratio
Andaman & Nicobar Islands	0.202808	0.182126
Andhra Pradesh	0.339922	0.169467
Assam	0.30065	0.209425
Bihar	0.33485	0.177443
Chandigarh	0.064975	0.172953
Chhattisgarh	0.37371	0.076351
Goa	0.108548	0.078957
Gujarat	0.248253	0.100026
Haryana	0.274914	0.124962
Himachal Pradesh	0.254474	0.111361
Jammu & Kashmir	0.258851	0.235963
Jharkhand	0.30121	0.151464
Karnataka	0.291743	0.042433
Kerala	0.249588	0.137732
Madhya Pradesh	0.345672	0.123555
Maharashtra	0.303442	0.28998
Manipur	0.470874	0.129988
Meghalaya	0.306994	0.107185
Nagaland	0.319824	0.183304
Delhi	0.193285	0.186162
Odisha	0.381157	0.081766
Puducherry	0.172325	0.207204
Punjab	0.207128	0.088258
Rajasthan	0.263689	0.117711
Tamil Nadu	0.313652	0.249829
Tripura	0.373966	0.152275
Uttar Pradesh	0.276284	0.105195
Uttarakhand	0.256666	0.082994
West Bengal	0.27395	0.063075

Source: Author's own calculation

VI. EMPIRICAL RESULTS

The empirical results of the regression estimates of fixed effects panel model are provided in Table 4. The specification test of Hausman rejected the null hypothesis and justifies the use of fixed effects for both models with deposit and credit penetration as dependent variables (Table 4). The model 1 consists of the deposit penetration as dependent variable. The number of deposit accounts per thousand of population is used as the proxy for the same. The dummy for the specific state effect is used in model 1 to control for state-wise differences that depicts variations in socio-economic, cultural and demographic structure across different regions of the country. As expected, average population served by branches has significantly negative effect on deposit account per thousand of population. There will be an improvement of deposit penetration of approximately 2.0 accounts per thousand of population with every one unit of fall in APPBB. The income levels as measured by Net state domestic product (NSDP (constant prices))

positively and significantly impact the deposit penetration index. The results provide evidence that an incremental rise of one thousand rupees of income is likely to enhance the deposit accounts by approximately 7.2 units.

Table 4: Panel Regression Estimates (Fixed Effects Model).

Independent variables	Model I: Deposit Penetration		Model II: Credit Penetration	
	Coefficient	Standard Error	Coefficient	Standard Error
Population Density	0.075871***	0.017669	-0.00852**	0.003594
APPBB	-0.02014***	0.004883	0.000549	0.000993
Log Per Capita Income	720.7953***	67.57466	69.78448***	13.74648
Credit-Deposit Ratio	-64.3251	64.73629	25.53444**	13.16908
Proportion of Factories	952.3472***	228.3177	186.5307***	46.44587
Proportion of Employment	8.00572*	2.907217	2.62674***	0.591405
Hausman Test	$\chi^2(5)=41.96$ *** P-value= 0.0		$\chi^2(5)= 11.51$ *** P-value= 0.000	
F-statistic ¹ (p-value)	F (28,226)=43.28*** (0.000)		F (28,226)=42.40*** (0.000)	
F-test ² (p-value)	F (6,226)=154.77*** (0.000)		F (6,226)=20.61*** (0.000)	
R ² within	0.8043		0.3536	
R ² between	0.7544		0.3277	
R ² overall	0.7389		0.3302	
No. of Observation	261		261	
No. of Groups	29		29	

Source: Author's own calculation

1. The F-1.Statistic of the equation (H_0 : All explanatory variables are equal to 0)

2. The F-test that all $v_i = 0$ ***Significant at 1% level of significance. S.E. - Standard Error of Estimate.

*Significant at 10% level of Significance. ** Significant at 5% level of Significance.

There is an insignificant impact of credit deposit ratio on deposit penetration. The proportion of factories which reflect the level of industrialization shows significant and positive impact on the deposit penetration. The bank personnel (number of employees) impact the level of deposit penetration in a positive and significant manner at 10 percent level of significance.

In Summary, economic development of the state significantly explains the variations in the banking activity of the state. The empirical results of model 2 reflect the dynamics of credit side activity of banking. It has credit accounts to population as a proxy for credit penetration as the dependent variable. The independent variable of population density has negative and significant effects on the credit penetration index. The deceleration of credit penetration of around 0.085 credit accounts per thousand of population is likely to occur with a unit increase in density of population. The average population served by one branch (APPBB) is positively associated with the credit penetration. The income level of the state has positive and significant impact on credit penetration. The proportion increase in the credit account is around 0.69 units with on unit of additional income of the state. The credit penetration is positively affected by Credit deposit ratio. The proportion of factories has significantly positive impact on credit activity of the banking system. However, level of state employment is significantly negatively related to credit penetration. Thus, the regional-specific, socio-economic developmental and infrastructural factors of the states are found to have significant positive implications for credit and deposit of banking activities.

VII. CONCLUSION

The phenomenon of heterogeneous financial across Indian states is well documented in literature. This study contributes to existing research by providing potential correlates in terms of demographic and economic factors that explain the inter-state variations in level of financial inclusion in India. The findings suggest the continuous improvement of credit and deposit penetration during the sample period of 2006-2014. The positive correlation between credit penetration and deposit penetration indices at the national level is supported by the study. The regions having high deposit penetration are also depicting high credit penetration and *vice versa*. As expected,

empirical evidence of panel data estimates supports the fact that the population density positively influence deposit penetration. However, the relationship is negative in case of credit penetration. It implies that the improvements of growth in the credit disbursements, has not been in pace with the population increase. It also reflects that improved economic conditions might have reduced the need of credit dependency. The deposit penetration is negatively affected by average population served by branch. Therefore, the branch network improvements contribute positively to the financial inclusion process as wider branch network offers better access and convenience. The economic growth as measured by the income level has a positive influence on credit and deposit penetration ratios. Thus, the economic condition level of the state is an important determinant of financial inclusion process of the state. The improvement of standard of living at individual level necessitates the greater usage and requirements of banking services. The level of industrialization as depicted by proportion of factories to population has significantly positive impact on deposit and credit penetration indices. It implies that the infrastructural and entrepreneurial development has a significant role in determining the financial inclusion process. The level of employment as measured by the employee proportion indicates that employed people seem to more aware and interested with regard to banking activities related to both credit and deposit activities.

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