Annals of Management and Organization Research (AMOR)
ISSN: 2685-7715, Vol 1, No 3, 2020, 187-202 https://doi.org/10.35912/amor.v1i3.415

Exploring the direct relationship between GDP per-capita and financial inclusion

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Article History
Received on 11 December 2020
1st Revision on 23 December 2020
2nd Revision on 14 January 2021
Accepted on 8 February 2021

Abstract

Purpose: This paper predicted the direct relationship between the four indicators of "Financial Inclusion" and "GDP per-capita" of the country. Previous studies presented in this scenario are qualitative in nature.

Research methodology: In this paper, "step-wise multiple linear regression" is used to establish the cause-and-effect relationship between the four indicators of "financial inclusion"; "Deposit accounts per 1000 population"; "Number of credit accounts per 1,000 people"; "Bank branches per 100,000 of adult population", and "ATMs per 100,000 of adult population" and "GDP per capita".

Results: Regression model showed only "Credit accounts per 1,000 people" have a significant relationship with the "GDP per capita". In this article, secondary data were obtained from the RBI website and the reports of international financial institutes.

Limitations: Data on "ATMs" and "Bank branches per 100,000 of the adult population" is not present before 2004, decreasing the depth of analysis.

Contribution: There is a cause-and-effect relationship between the country's "GDP per capita" and the "F.I." "Credit accounts per 1,000 people" only have a significant relationship with GDP per capita, so the change in the number of credit account will show a change in GDP per capita for Indian economy.

Keywords: *Financial inclusion (F.I), GDP (Gross Domestic Product) per capita, Deposit accounts, Credit accounts, ATMs (Automated Teller Machines), Bank branches*

How to cite: Sonkar, S., & Sarkar, A.K. (2020). Exploring the direct relationship between GDP per-capita and financial inclusion. *Annals of Management and Organization Research*, 1(3), 187-202.

1. Introduction

The paper aims to create a cause-and-effect relationship between the "Financial inclusion" and the "GDP per capita, so it is necessary to consider the "F.I" and its indicators, and GDP per capita, one by one. "Financial inclusion" is essential for improving the quality of life of people of all nations, including poor farmers, rural non-farm businesses and other disadvantaged groups (Jayanthi & Rau, 2017). In India, "financial inclusion" marks can be traced back to 1969 when 14 banks were nationalized under (Sathye, 2003) "Banking Companies (Acquisition and Transfer of Undertakings) Ordinance, 1969" and it came in to force from midnight on 19 July 1969, and that bank's accounted for 85 percent of the bank deposits of that time. In 1980, six more banks were nationalized in which the Indian government managed 91 percent of India's banking sector. The nationalization of banks in "1969 and 1980" has contributed to expanding commercial banks' regional and operating reach, Regional Rural Banks (RRB's) and cooperative credit institutions. Despite the tremendous expansion of banking services in rural and remote areas major portion of the population including farmers, people from weaker section of society and the low-income category remained disconnected from opportunities and facilities offered by the financial sector (Iqbal & Sami, 2017). So there is a need to expand financial inclusion in the entire society and PMJDY is a good step towards it. "Financial Inclusion" plays a crucial role in this

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socioeconomic development of its citizens. So different scholars and academicians defined it in different ways, which is given in Table 1.

Table 1. Financial inclusion definition

Sr. No	Year	Author	Definition
1	1995	(Leyshon & Thrift, 1995)	"Financial exclusion as referring to those processes that serve to prevent certain social groups and individuals from gaining access to the formal financial system."
2	2005	(Santiago Carbo, 2005)	Financial exclusion has been widely described as the incapability of some groups of society to access financial services and products.
3	2006	(Conroy, 2006),	"Financial exclusion is a process that prevents poor and disadvantaged social groups from gaining access to the formal financial systems of their countries."
4	2006	(Mohan, 2006)	"Financial exclusion signifies the lack of access by certain segments of the society to appropriate, low-cost, fair and safe financial products and services from mainstream providers".
5	2011	(Mandira Sarma, 2011)	"Financial inclusion refers to a process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy."
6	2011	(C. Kumar & Mishra, 2011).	The ongoing method of providing all sections of society with links to financial services and products at a reasonable price is called financial inclusion.
7	2014	(Kapoor, 2014)	"Financial inclusion is an equalizer that enables all citizens to contribute to economic growth and to gain from it."
8	2015	(Sahay, Cihak, N'Diaye, Barajas, & Mitra, 2015)	"It is the access to and use of formal financial services by households and firms."
9	2016	(J. H. Kim, 2016)	"Financial inclusion generally refers to a state in which all working-age adults have effective access to credit, savings, payments, and insurance from formal service providers."

Apart from scholars and academicians, government organizations and committees also described financial inclusion in the following manner:

(RBI, 2008) defines "Financial inclusion" as a mechanism to ensure the availability of financial resources and timely and sufficient credit where disadvantaged populations, such as poor sections and low-income groups, are required at an affordable rate (Bhaskar, 2013). According to Chakraborty (2011), "financial inclusion" is the mechanism by which, at an acceptable rate, conventional institutional actors are equal and open in their access to appropriate financial products and services required by all sectors of society, including lower classes and lower-income groups (Central, 2011). "Financial inclusion is the process of ensuring access to appropriate financial products and services needed by all society members in general and vulnerable groups in particular, at an affordable cost fairly and transparently by mainstream institutional players" (Chakrabarty, 2012).

"Financial inclusion" provides financial services to all the segments of society with particular importance to the economically backward section of society at an affordable cost. The "Financial Inclusion" strategy aims to increase the number of account holders in banks and other financial institutes.

A next important question is what are the "financial inclusion Indicators" in case of India. (Reyes, 2010) in her report divided the "financial inclusion indicators" into two groups qualitative and quantitative indicators. In quantitative she considered "number of bank branches per 10000 population", "number of ATMs per 10000 population", "number of agents per 10000 population" in Access domain similarly in uses she included "Number of depositors per 1000 populations", "Number of borrowers per 1000 populations", "Average size of total deposits per depositor" to "GDP per capita", "Average size of total loans per borrower" to "GDP per capita" and "Population not covered by financial services" and in third domain availability she considered "borrower present in the region, distribution of agents" and "socioeconomic needs along with total loan provided in the region." Similarly (Lenka & Sharma, 2017) considered " bank accounts per 1,000 people; the number of bank branches and ATMs per 100,000 adult population and amount of bank deposits" as four significant financial inclusion indicators that can be used as a measure of financial inclusion. Apart from these indicators many other indicators of "financial inclusion" have been formulated by the different organization across the globe which are given in table: 2 as follows

Table 2. Indicators of financial Inclusion

Sr. No	Year	Organizations/Institutions/Authors	Indicators of financial Inclusion
1	2000	"Asian Development Bank (ADB)"	"Deposits, loans, payment services, money transfer and insurance."
2	2001	"Stephen P. Sinclair"	"Basic banking services for money transmission, credit, insurance, debt and debt assistance, long-term savings and financial literacy."
3	2004	"Chant Link and Associates, Australia"	"Deposit accounts, direct investments, home loans, credit cards, personal loans, building insurance and home insurance".
4	2004	"Treasury Committee, House of Commons, UK"	"Affordable credit and savings for all and access to financial advice".
5	2005	"Scottish Government"	"Access to products and services, and/or capacity, skills, knowledge and understanding".
6	2006	"United Nations"	"Access to credit, insurance, savings, payment services."
7	2008	"Report of the Committee on Financial Inclusion in India (Rangarajan, 2008)"	"Access to financial services and timely and adequate credit".
8	2008	"World Bank"	"Access to financial services such as deposit, credit, payments and insurance."
9	2012	"Financial Inclusion – Issues in Measurement and Analysis* K. C. Chakrabarty"	"Credit, Insurance, Payments, Savings."
10	2012	"IFM"	"ATMs per 1,000 km, ATMs per 100,000 adults, Commercial bank branches per 1,000 km, Commercial bank branches per 100,000 adults, Deposit accounts with commercial banks per 1,000 adults, Household deposit accounts with commercial banks per 1,000 adults, Household loan accounts with commercial banks per 1,000 adults, Loan accounts with commercial banks per

			1,000 adults, Outstanding deposits with commercial banks(Percent of GDP), Outstanding loans from commercial banks (Percent of GDP)".

Source: (Kablana & Chhikara, 2013), &IMF's Financial Inclusion Survey July 2012.

The "Financial Inclusion" strategy aims to increase the number of account holders in banks and other financial institutes. Financial Inclusion has three dimensions (Roa, 2014) which are given in table: 3 as follow:

Table 3. Financial inclusion dimensions

ACCESS	Availability of formally regulated financial services and products at affordable cost. It has been measured by the "number of bank A/C per 1,000".
USAGE	True use of financial services and products: Regularity, Frequency of use and period of use. It applies to the combined volume of GDP deposits and loans.
QUALITY	Products are according to customers' needs and should be developed according to a different society segment.

Measuring "F.I" is essential because it helps to understand the result of various measures considered by stakeholders and in order to decide which plan to follow (Ambarkhane, Singh, & Venkataramani, 2016). The bank framework plays a vital role in bringing the financially excluded under the financial framework (Srinivasan, 2007). The study focuses on building the relationship between various "F.I" indicators and India's "GDP per capita". These financial indicators are chosen based on the IMF financial inclusion survey glossary (Fund, n.d.). The relationship between four indicators of "F.I" and "GDP per-capita" of India is established in this study by using step-wise multiple linear regressions. "GDP per capita" is dependent variable and four "F.I" indicators are independent variables. The "GDP per capita" means gross GDP divided by the country's estimated adult population as of first July of the same year (Rahman, 2013). This study gains importance as this is the era of inclusive development for developing countries and financial inclusion is vital (A. Sharma & Sumita, 2013). The study focuses on the relationship between four major "F.I" indicators and "GDP per-capita."

2. Literature review and hypotheses development

"F.I" is defined as a system providing easy access to financial services and products to its citizens (Iqbal & Sami, 2017). But looking at the significant work on financial inclusion, we find that "F.I" is defined primarily as the ongoing process (Bech & Kunt, 2012) of bringing the vulnerable under the financial network.

The Indian banking industry has blossomed both technically and size wise and provided healthy and affordable banking services to its citizens in the last few decades (N. Kumar, 2013). Banks' role gains more importance in the development of the Indian economy as banks help in the mobilization and circulation of finance, which is the key requirement for developing any economy (Joseph & Varghese, 2014). The supply-side of banking data is useful in measuring financial inclusion (Chakravarty & Pal, 2013). (Sarma, 2008) in her paper developed a Financial index using the four indicators of "financial inclusion," including "number of bank account per hundred of populations", "number of bank branches per thousand of populations," and "the ratio of saving and credit account to the GDP of the country". Researchers and academicians have tried to find a relation between "financial inclusion" and economic development.GDP isevery country's economic growth indicators. GDP influences the financial inclusion significantly (Evans & Alenoghena, 2017). The research conducted in Kenya shows that the "F.I" has direct relationship with economic development (Julie, 2013). For poor people, access to

finance is key for removing poverty to achieve inclusive growth and substantial economic development (Swamy, 2010). Financial inclusion helps eradicate poverty in turn, helps in inclusive development and achieving the millennium development goal (Chibba, 2009). Financial inclusion has four major indicators " bank accounts per 1,000 people; several bank branches and ATMs per 100,000 adult populations and amount of bank deposits" (Lenka & Sharma, 2017)(Sarma, 2008b).

"F.I" and economic development are related together in the long term (Sethi & Sethy, 2019). Research conducted on 55 OIC "{Organization of Islamic Cooperation}" countries by using the "Dynamic panel, VAR, IRFs and the Panel granger causality test" suggested that "F.I" has a favorable economic development effect (D. W. Kim, Yu, & Hassan, 2018). A similar type of research is also done for the set of 31 countries fixing the bond between countries' economic growth and "F.I" (Dinabandhu Sethi, 2018). Banking side data may be used to calculate the financial inclusion (Chakravarty & Pal, 2013). There is a positive relationship between country's economic growth and different financial inclusion indicators, including banking penetration, availability, and usage of banking in terms of deposits to its citizens(D. Sharma, 2016). Financial inclusion is not always a result of economic development in any country, but it may be the driver of economic growth, as Nigeria's case (Babajide, Adegboye, & Omankhanlen, 2015). The number of active ATMs, bank branches and government expenditure are the strongest indicator of "F.I" for the poverty reduction in developing country (Williams, Adegoke, & Dare, 2017)

There is a relationship between the domestic credit by the banking sector and GDP per capita in balanced payment framework in Latin American countries between 1960 to 2010 (Gozgor & Gozgor, 2013). Similar kind of relationship can exist between number of credit and debit accounts present in India, which we attempt to predict in the paper. Financial inclusion is the driver of economic growth (Dinabandhu Sethi, 2018) proved by establishing the long term relationship between financial inclusion and economic growth by running a panel causality test that shows bi-panel causality.

Financial inclusion plays a significant role in reducing the income inequality in developing Asian countries (Park & Mercado, 2015) for this they used four indicators of financial inclusion including "automated teller machines (ATMs) per 100,000 adults", "commercial bank branches per 100,000 adults", "borrowers from commercial banks per 1,000 adults", "depositors with commercial banks per 1,000 adults", and "domestic credit to GDP ratio". There exist a unidirectional relationship between financial inclusion and economic growth (Lenka & Sharma, 2017) they focused on the indicators of financial inclusion like "deposit and credit accounts from scheduled commercial banks per 1000 adults", "number of bank branches per 1000 adults" and "number of bank employees as per the ratio of bank branches".

In this study, a relationship is being established between "F.I" and "GDP per-capita" using banking data. It has been observed that many studies are not present representing the direct relationship between the indicators of "financial inclusion" and "GDP per capita" for Indian economy.

Research Gap: Financial inclusion is an ongoing phenomenon that started with the nationalization of banks in India in 1969. Many steps are being taken by the Indian government, including the introduction of PMJD {Pradhan Mantri Jandhan Yojana}, and the introduction of Payment banks in 2017. Financial inclusion is a vital step towards the economic growth of India. Some studies are conducted through scholars and academicians by individual states and banks. However, very few studies are present in framing cause and effect relationship between four indicators of "financial inclusion" and "GDP per capita" of our country. Hence, in the study we tried to predict the cause and effect relationship between the two.

Objective

1. To demonstrate the relationship between the numbers of accounts' credit and deposit with "per capita GDP" of the country.
2. To examine the relationship between the "Bank branches and ATMs per 100,000 of adult population" with "GDP per capita."

Hypothesis Framed: In order to check this relationship between the "GDP per capita" and "financial inclusion" in Indian scenario, a series of Hypothesis are framed and tested between major four factors of "financial inclusion" and "GDP per capita" which are as follows:

H01: The relationship between "F.I" and "GDP per capita" is not significant.

- H01a: -Insignificant relationship is present between the number of "Deposit account per thousand people" and "Per capita GDP."
- H01b: -Insignificant relationship is present between the number of "Credit account per thousand population" and "Per capita GDP."
- H01c: -Significant relationship is not present between the numbers of "ATMs per 100,000 of adult's populations" and "GDP per capita."
- H01d: Significantrelationship is not present between the number of" Bank branches per 100,000of adults" and "GDP per capita."

3. Research methodology

In this paper, exploratory research methodology is used. Secondary data is collected from RBI reports, Inclusive Finance India report, IBEF report, Global Findex database, and World bank reports. In this paper step-wise multiple linear regression is applied to evaluate the cause and effect relationship between "GDP per capita" and four indicators of "F.I" including "Number of ATMs per 100,000 of adults population ; Bank branches per 100,000 of adults population" (D. Sharma, 2016) and "number of deposit and credit accounts per 1000 populations" respectively (Sarma, 2008b) for this purpose regression model is proposed in the paper. SPSS 21 is used in research for examination.

4. Results and discussions

Penetration trend in bank branches, ATMs and Accounts

Over the last two decades, the number of account holders has increased in India due to financial inclusion and the number of branches and "ATMs" has increased at a significant rate. **Table: 4** is showing data from 2005 to 2017.

Table 4. (Data is taken from RBI and World bank)

Years	"Numbers of bank branches per 100000 adult population"	"Number of ATMs per 100000 adult population"	"Number of deposit accounts per 1000 population"	"Number of credit accounts per 1000 population"	"GDP per-capita"
2005	8.8999	2.2871	406.7514	67.2275	714.8610
2006	8.8700	2.7329	416.2193	73.3050	806.7532
2007	8.9799	3.3700	438.8056	79.8184	1028.3347
2008	9.2862	4.2770	484.4437	89.1094	998.5223
2009	9.5751	5.2972	543.8849	90.3782	1101.9608
2010	10.0104	7.2489	595.3821	96.1272	1357.5637
2011	10.4863	8.8302	647.9543	96.5568	1458.1035
2012	11.1599	10.985	713.5505	103.3984	1443.8795
2013	11.8301	12.8435	815.9489	100.158	1449.6059
2014	12.8497	17.7720	946.8246	107.0928	1573.88149
2015	13.5571	19.6848	1099.0263	110.0940	1605.60543
2016	14.2644	21.2303	1242.8116	122.5917	1732.5642
2017	14.5680	22.07371	1364.5388	128.7736	1981.6510

Table: 4 Depicts the increase in "Number of bank branches per 100,000 adult populations", "Number of ATMs per 100,000 adult populations"; "Number of deposit accounts per 1,000 populations" and "Number of credit accounts per 1000 populations" throughout 2005 and 2017 due to the various financial reforms carried out by the Indian government**.**

Descriptive Stats of the given data:

"Table 5. Descriptive Statistics"

	"Mean"	"Std. Deviation"	"N"
"GDP Per Capita."	1327.175902	373.2234237	13
"Number of Bank Branches per 100,000 adult populations".	11.102846	2.1048155	13
"Number of ATMs per 100,000 adult populations".	10.664047	7.3568518	13
"Number of credit accounts per1, 000 populations".	97.279308	17.8835183	13
"Number of deposit accounts per 1,000 populations"	747.395538	324.0453733	13

Figure 1

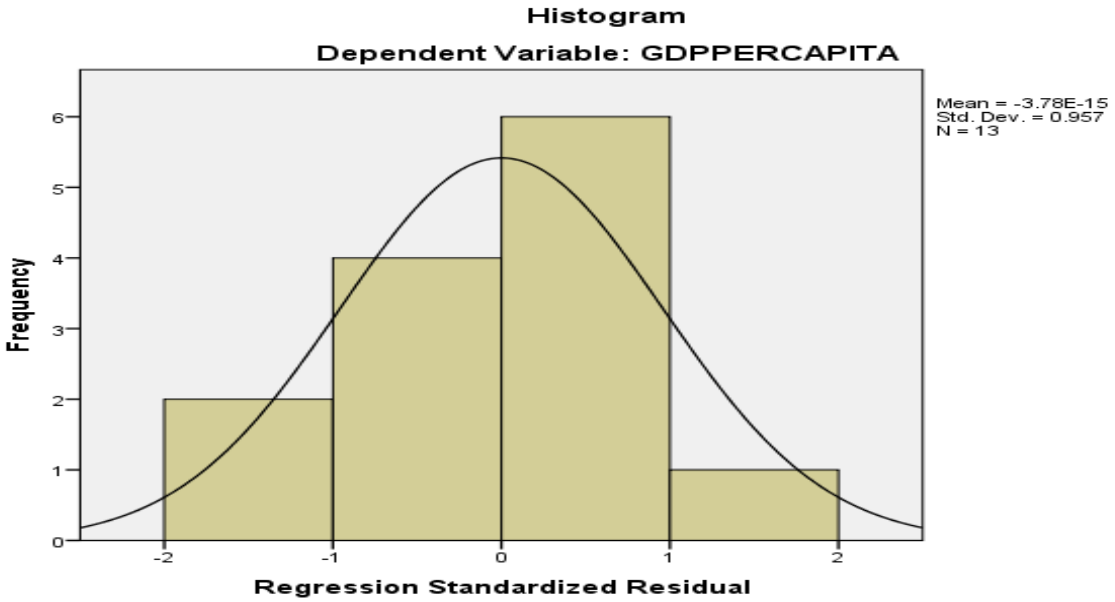
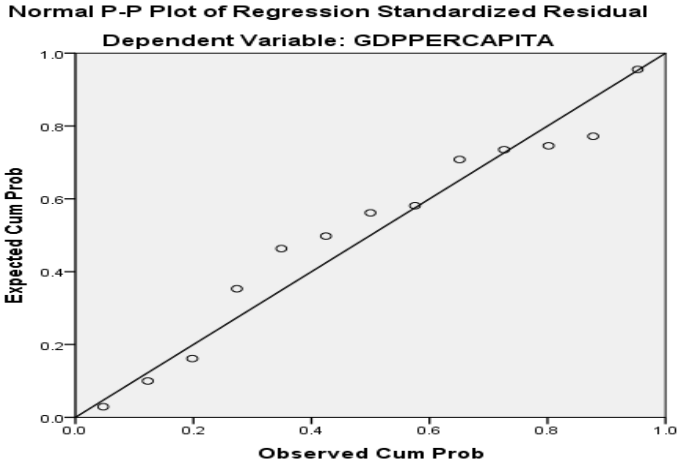


Figure 2



In figure 1 curve and histogram represent the linearity of data taken for regression analysis. While Figure 2 depicts the normality of data and it can be seen that the data used is normal up to some extent.

Figure 3

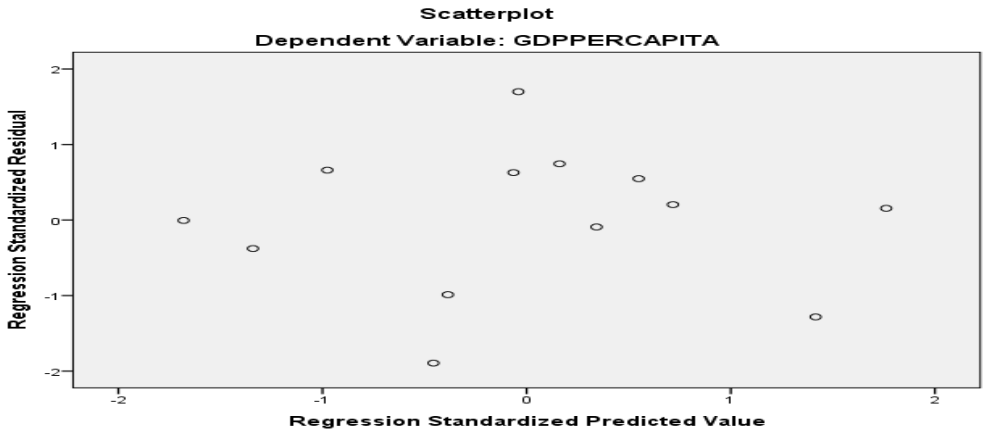


Figure 3 represents the homoscedasticity of the data taken in the analysis. Data is homogeneous as the points are somewhat scattered in the diagram and do not take any particular shape.

Figures 4 &5 represent the number of "ATMs per 100,000 adult population" and "Bank branches per 100,000 adult population" and "GDP per capita," "Deposit accounts per 1,000 people" and "Credit accounts per 1,000 people", respectively.

Figure 4

The following column graphs show the growth in the number of "ATMs and Bank branches per 100,000 adult populations" data is taken from RBI reports and World Bank.

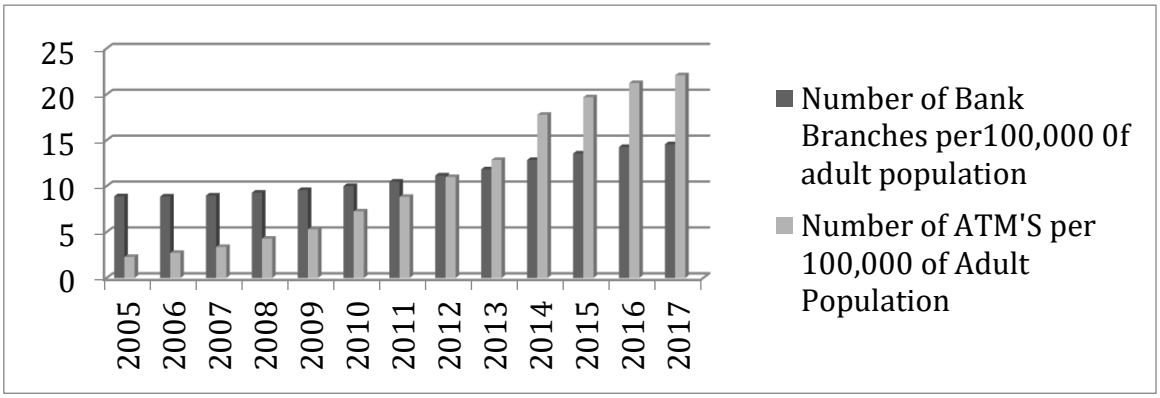
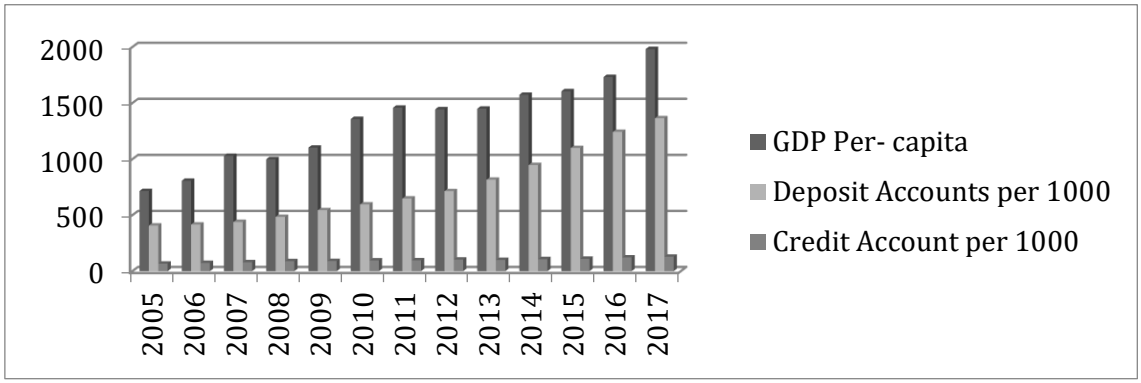


Figure 5

Growth in the number of "Deposit and credit accounts per 1,000 population" along with the change in" per capita GDP" over the years starting from 2005 to 2017 is shown below {data is taken from RBI reports & world bank}



Note:

$$\frac{\textbf{Number Of deposit accounts with commercial banks}}{\textbf{Total population of the country}}\textbf{x1000} \quad \ldots\ldots\textbf{(1)}$$

$$\frac{\textbf{Number of loan accounts with commercial banks}}{\textbf{Total population of the county}}\textbf{x1000} \quad \ldots\ldots\ldots\ \textbf{(2)}$$

The financial inclusion index mainly depends on three parameters: -Accessibility, Availability and Utility.

Accessibility: Represents the "Bank accounts present per thousand of populations".

Availability: It is calculated by the number of "Bank branches and ATMs per 100,000 adult populations" (Sethi & Sethy, 2019).

Utility: -Financial products are according to citizen needs.

Analysis and hypothesis testing: To test the relationships between four indicators of " F.I" and "per capita GDP" in the Indian scenario, a series of hypotheses are framed and tested which are as following:

Hypothesis Analysis: In hypotheses, an attempt is made to understand the relationship between the number of "Deposits accounts per thousand population" and "Credit accounts per thousand Population", "Bank branches and "ATMs per 100,000 adults populations" and "GDP per capita". For this, step-wise multiple linear regressions was carried out between the variables. In this study "GDP per capita" is taken as dependent variable and deposit accounts, credit accounts, bank branches, and ATMs as independent variables. The test is carried on the data from 2005 to 2017. The proposed model is given in "**Table: 6.**"

Table 6. Model

"Model"	"R Square"	"Adjusted R Square"	"Std. Error of the Estimate"	"R"	"Durbin Watson"
1	.952	.947	85.7040856	.976[a]	1.879

The given model in **Table: 6** shows a 97.60% correlation between dependent and independent variables. Its adjusted "***R***" square indicates that the credit accounts can estimate 94.70% of the GDP variance per capita per credit accounts 1,000 of the population. The value ***"F"*** is calculated by dividing the mean square regression value (1590751.595) by the mean square residual value (7345.190), yielding "***F"***= 216.571 as given in **Table: 7.** The "***P"*** value or level of significance associated with "***F***" value is zero, which is less than the standard value of .05. So independent variable credit accounts for every one thousand people will estimate the GDP per capita. Details of the model are given in **Table: 7.**

Table 7. ANOVA [a]

"Model"	**"Sum of Squares"**	**"df"**	**"Mean Square"**	**"F"**	**"Sig"**
Regression	1590751.59	1	1590751.59	216.571	.00[b]
Residual	80797.093	11	7345.190		
Total	1671548.688	12			

a. "DependentVariable: GDP Per Capita"

b. "Predictors: (Constant), "Number of credit accounts per 1,000 of populations".

Table 8

Coefficients[a]													
Model		"Unstandardized Coefficients"		"Standardized Coefficients"	t	Sig.	"95.0% Confidence Interval for B"		"Correlations"			"Collinearity Statistics"	
		"B"	"Std. Error"	"Beta"			"Lower Bound"	"Upper Bound"	"Zero-order"	"Partial"	"Part"	"Tolerance"	"VIF"
1	(Constant)	-653.339	136.662		-4.781	.001	-954.131	-352.547					
	Number of credit accounts per 1000 populations	20.359	1.383	.976	14.716	.000	17.314	23.404	.976	.976	.976	1.0	1.00
a. Dependent Variable: "GDPPer Capita"													

According to the details given in **Table: 6** and **Table: 8** there will be a change of .976 in "GDP per capita" for every unit change in credit accounts per 1,000 of the adult population. In this case "***t"*** value is 14.716 which is >= 2 so the proposed hypothesis is false and the alternative hypothesis is true.

On testing Hypothesis H01a, H01c and H01d **Table: 9** clearly demonstrate the step-wise multiple regression in three factors ("Bank branches per 100,000 of the adult population" ; "ATMs per 100,000 of adult population", "Deposit accounts per one thousand of the population") do not show a significant relationship with dependent variable "GDP per capita". "***P"*** value or significance value for all three are .670, .523, .892 respectively which are comparatively larger than .05 as a result, and these three don't have a major impact on "GDP per capita". There will be a change of .088, .132 in "per capita GDP" for per unit change in "Bank branches per 100,000 adult population" and "ATMs per 100,000 adult population" respectively. This change of .030 will also be observed in "GDP per capita" with every unit change in "Deposit accounts per 1000 of the population". Results were found to support all of the proposed hypotheses. **Table 9**

Table 9

"Excluded Variables[a]"								
"Model"		"Beta In"	"t"	"Sig".	"Partial Correlation"	"Collinearity Statistics"		
						"Tolerance"	"VIF"	"Minimum Tolerance"
1	"Number of bank branches per 100,000 populations"	.088[b]	.439	.670	.137	.119	8.437	.119
	"Number of ATMs per 100,000 adult populations"	.132[b]	.661	.523	.205	.116	8.595	.116
	"Number of deposit accounts per 1000 populations"	.030[b]	.139	.892	.044	.105	9.539	.105
a. Dependent Variable: "GDP Per Capita"								
b. Predictors in the Model: (Constant), "Number of Credit accounts per 1000 of population".								

After using step-wise multiple linear regression, the t-values for Bank branches per lakh, ATMs per 100,000 of population and account debited per 1000 of a population are .439, .661, and .139 respectively which are less than 2, so the proposed hypothesis holds true. Apart from this, strong correlation is observed between GDP per capita and four indicators of financial inclusion. VIF value in case of credit accounts per 1000 population is 1.0, which is acceptable as a thumb rule says VIF value around 1 is good and anything less than 10 is acceptable. So the model is free from the problem of multicollinearity.

A VIF value equal to 1 for credit accounts per thousand of the population represents the complete absence of collinearity between this predictor variable and other predictor variables including "Bank branches per 100,000 of adult populations", "ATMs PER 100,000 of adult populations" and "Debit accounts per 1000 of the population" (Daoud, 2018). Likewise, the VIF value for "Bank branches per 100,000 of adult populations", "ATMs per 100,000 of adult populations" and "Debit accounts per 1,000 population" are 8.437, 8.595 and 9.539 which are close to 10 as such they show a high level of collinearity (O'Brien, 2007) but acceptable.

The Durbin Watson test is used to check the autocorrelation between the variables in the multiple regressions model. The value for the test came as 1.879 which shows a small degree of positive autocorrelation. However, as it is close to 2 it is accepted as the rule of thumb says value between 1.5 and 2.5 is acceptable.The final equation of regression can be composed as follows:

$$Y = 20.359X - 653.339 \qquad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Y = "GDP per capita".

X = "Credit accounts per 1,000 of population".

While considering the above result, there is a significant relationship between "credit accounts per 1,000 of populations" and "GDP per capita." Further, it is checked on a more significant set of data from 1989 to 2017 given in **Table 10**

Table 10.
Data in the given table is taken from RBI statistics and World Bank data

Years	"GDP per capita"	"Credit A/C per 1,000 populations"	"Deposit A/C per 1,000 populations."
1989	346.1128	60.9270	353.0816
1990	367.5566	61.6642	381.6815

1991	303.0556	69.5028	398.5208
1992	316.9539	72.4287	406.6382
1993	301.1590	66.9783	409.4343
1994	346.1029	63.0825	419.7104
1995	373.7664	60.2714	404.6331
1996	399.9500	57.6903	399.0470
1997	415.4937	55.5679	396.2223
1998	413.2989	52.5609	392.3868
1999	441.9987	50.3873	391.0262
2000	443.3141	51.4596	390.7103
2001	451.5730	48.7116	398.1664
2002	470.9867	51.5760	402.4367
2003	546.7266	53.5220	401.3231
2004	627.7742	58.7717	404.6994
2005	714.8610	67.2275	406.7514
2006	806.7532	73.3050	416.2193
2007	1028.3347	79.8184	438.8056
2008	998.5223	89.1094	484.4437
2009	1101.9608	90.3782	543.8849
2010	1357.5637	96.1272	595.3821
2011	1458.1035	96.5568	647.9543
2012	1443.8795	103.3984	713.5505
2013	1449.6059	100.158	815.9489
2014	1573.8814	107.0928	946.8246
2015	1605.6054	110.0940	1099.0263
2016	1732.5642	122.5917	1242.8116
2017	1981.6510	128.7736	1364.5388

Table 11. Descriptive analysis
"Descriptive Statistics"

	"Mean"	"Std. Deviation"	"N"
"GDPPer Capita"	821.348610	528.3850057	29
"Number of credit accounts per1000 population"	75.852869	23.4601968	29
"Number of debit accounts per 1000 populations."	553.995176	276.7532906	29

Table 12 shows the model summary of a more extensive data set after running multiple linear regressions by adopting the step-wise method.

Table 12. Model Summary[b]

"Model"	"R"	"R Square"	"Adjusted R Square"	"Std. Error of the Estimate"	"Durbin-Watson"
1	.944[a]	.890	.886	178.2380664	.331

a. Predictors: (Constant), "Number of credit accounts per 1,000 populations"
b. Dependent Variable: "GDPPer Capita"

The proposed model shows 94.40% of correlation between "GDP per capita" and "accounts credited per 1,000 of populations". Adjusted R square shows 88.60% of the variance in "GDP per capita" can be predicted by "account credited per 1,000 populations". The model shows a high positive correlation between the variable as "Durbin-Watson" value is .331.

Table 13 represents the calculated ***F***value (219.070), ***P*** value (.000) and Mean squares residual (31768.808).

Table 13 ANOVA[a]

"Model"		"Sum of Squares"	"df"	"Mean Square"	"F"	"Sig."
1	**Regression**	6959582.175	1	6959582.175	219.070	.000[b]
	Residual	857757.824	27	31768.808		
	Total	7817339.999	28			

a. Dependent Variable:" GDP Per Capita"
Predictors: (Constant), "Number of credit accounts per 1,000 populations".

On dividing mean square regression by mean square residual, we get F value which is (219.070). Significant value is zero which is less than .05 so "account credited per 1000 of the population" can predict the "GDP per capita" hence the alternate hypothesis to H01b is true. Coefficients details are depicted in **Table 14** VIF value 1 for credit account per 1,000 is 1, representing the absence of collinearity between the predictor variables.

Table 14. Coefficients[a]

Model		"Unstandardized Coefficients"		"Standardized Coefficients"	"t"	"Sig."	"Correlations"			"Collinearity Statistics"	
		"B"	"Std. Error"	"Beta"			"Zero-order"	"Partial"	Part	"Tolerance"	"VIF"
1	**(Constant)**	-790.606	113.827		-6.946	.000					
	"Number of credit accounts per1,000 populations"	21.251	1.436	.944	14.801	.000	.944	.944	.944	1.000	1.000

a. Dependent Variable: "GDP per capita"
Derived regression equation from the above-proposed model can be written as follows:

***B= 21.251A -790.606*……** **(2)**

B = "GDP per capita".
A= "Credit accounts per 1,000 population".

Table 15. Excluded Variables[a]

"Model"		"Beta In"	"t"	"Sig."	"Partial Correlation"	"Collinearity Statistics"		
						"Tolerance"	"VIF"	"Minimum Tolerance"
1	**"Number of debit accounts per 1,000 populations."**	.222[b]	1.552	.133	.291	.189	5.288	.189

a. Dependent Variable: "GDPPer Capita"

b. Predictors in the Model: (Constant), "Number of credit accounts per 1,000 population"

Result found after analysis gives ***P*** value for "Deposit accounts per 1,000 of population" at .133 which is more than the acceptable value of .05 so "deposit accounts per 1,000 population" do not have a significant relation with "GDP per capita" and ***t*** value of 1.552 being<2 which makes the proposed hypothesis H01a true.

Results

- According to the above study, only the "Credit accounts per one thousand populations" depicts a significant relationship with "GDP per capita". Change in one variable shows a change in another.
- "Bank branches per 100,000 of the adult population" and "ATMs per 100,000 of adult population" along with "Deposit accounts per 1,000 population" do not significantly affect the GDP per capita.
- The data used in the analysis is considered normal, linear and homogeneous as three diagrams depict the same.

5. Conclusion

Financial inclusion is an ongoing process in which banks play an essential role in mobilizing finance from the source to where it is needed and helps in the country's economic growth. There is a cause-and-effect relationship between the country's "GDP per capita" and the "F.I". For this above analysis is performed and literature review is done, there is a positive effect of change in "Credit accounts per 1,000 population" on the "GDP per capita". The number of "Bank branches per 100,000 of the adult population"; "ATMs per 100,000 of adult population" along with "Deposit accounts per 1,000 of the population" have no significant impact on the "GDP per capita". Paper proves that only "Credit accounts per 1,000 people" have a significant relationship with "GDP per capita". So, if the number of "credit accounts" increases or decreases, that will show some change in GDP per capita.

Limitations and forward study

- Data on "ATMs" and "Bank branches per 100,000 of the adult population" is not present for the era before 2004, decreasing the depth of analysis. If the same is provided, an in-depth study may be conducted to establish the relationship between the four indicators of "financial inclusion" and "GDP per capita of the country."
- State-wise data do not present a comparative study between the states. It cannot find where the maximum impact of "financial inclusion" on "GDP per capita" is located.

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