Measuring Financial Index of India: A Multidimensional Approach

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Abstract—*Economic growth is facilitated by participation of all the sections of society ensuring higher level of financial inclusion. It is necessary to provide some index to measure this important factor in both developed as well as developing economies. It requires to study various dimensions that can be used to indicate financial inclusion through various parameters. The present study contributes towards the field by developing a robust and comprehensive measure for measuring the financial inclusion in a country. The Financial Inclusion Index (FII) is computed using the three elementary dimensions -Availability, Accessibility and Usage of banking services by all sections of the society. These dimensions are assigned fixed weights to create a robust index for analysis of financial inclusion. The index value is categorised into varying ranges– Low, Medium and High, indicating the degree of financial inclusion from 1996 to 2022. The study finds the rise in the financial inclusion level of India in later half of the study period mainly due to radical upliftment in financial policy transformations for underprivileged sections of the society.*

Keywords: *Financial Inclusion, Financial System, Economic growth, Banking*

JEL Classification: *O43, O430, G21.*

Introduction

Financial Inclusion is a crucial factor in contribution for sustainable development goals at global level. The economic, political and social empowerment of financially backward people can be improved through resource mobilisation which makes them to save, invest and earn. In developing countries like India, vast majority of population lives below poverty line and are deprived of most of the financial benefits and schemes of the government mainly due to lack of awareness. In order to increase the economic growth rate along with better economic opportunities and reduction in the poverty rate, there is need to provide an inclusive financial system. The current study studies the multidimensional approach of measuring the financial inclusion called as Index of Financial Inclusion. It includes the weighted indexation of three demand side parameters, namely availability, accessibility and usability to determine the final value of the coefficient. The measurement is quite useful to comprehend the intensity of financial inclusion in countries over the period of time. Hence, the paper computes the Financial Inclusion Index of India from 1996 to 2022 to get an idea about the evolution of the index of financial inclusion in the country. As per the analysis, the position of India lies under the low level of financial inclusion from 1996 to 2013 and medium financial inclusion during 2014-2022. Therefore, it is evident that the overall efficiency of the financial system in the economy is raised through better accessibility to formal financial services during the above-mentioned time period.

Financial Inclusion

Financial Inclusion is a process that confirms the accessibility, availability and usability of various formal financial services with much ease by all sections of the society (Sarma, 2008). Together, all these dimensions from the perspective of demand side forms the inclusive financial system. For the purpose of analysing the financial inclusion in a country, the measurement can be done through financial facilities available through bank gateways as banks are considered as the most basic form of financial gateways and that is why, is considered as the analogous to financial inclusion. The paper discusses the banking inclusion as similar to financial inclusion in the economy.

Rational of the Study

India, being the most populous country in the world, have around 6,00,000 villages and around 640 districts.

However, only around 40% of the total households are having the bank accounts which is quite low. Around 38 per cent of the total commercial bank branches are situated in rural areas of the country revealing that a great majority of population excludes from that of accessibility to financial facilities of banks (World Bank Report, 2023). Hence, financial Inclusion has become a priority of Government of India which stresses upon the imperative need to develop an index for it. Different aspects of financial services explaining the financial inclusion is used by the researcher to construct Index of Financial Inclusion. The progress of Financial Inclusion measured through current status and the progress can be outlined to plug in the adequate measures to fulfil the deficiencies in the system. For this, the methodology of measuring the extent of financial inclusion as proposed by Sarma (2008) is used, as discussed in detail as under.

Review of Literature

The literature of using the various dimensions of financial inclusion for statistical estimation are limited. Beck et al.(2006) was the first one to demonstrate the measurement of financial sector inclusion across countries. New indicators were designed by the author for the banking sector to measure the accessibility, affordability and eligibility. Another study by Sarma, M. and Paise, J. (2008) worked for finding the association between the financial inclusion and that of human development which is a major study to contribute towards policy measures for poverty reduction and improvement in standard of living. Also, he proved that high income of a country may lead to higher financial inclusiveness in the country by analysing various data. By attaching equal weights to all the dimensions, FII was calculated and countries were categorized as having Low, Medium and High level of Financial Inclusion on the basis of FII value.

A Financial Inclusion Index (FII) was constructed by Mehrotra, et al. (2009) to find the relationship between economic growth and financial inclusion through measurement of level of financial inclusion. Another important study by Chakravarty and Pal (2010) discussed about the axiomatic approach considering the data from the study of Beck et al. (2007) recording eight indicators of financial inclusion and calculating the FII for 21 countries on the basis of differences in the income level. In India, low level of financial inclusion was experienced between 1991 to 2001 by most of the states whereas, the level increased from the period 2001 to 2007 mainly due to improvement in demand side factors of Banking services. Interestingly, the study of Chattopadhyay (2011) found that the dominance of money lenders still exist majorly in rural informal credit and loan market. In 2012, Gupte et al. found the impact of Financial Inclusion in India on the basis of FII by using updated data and information. He found the major improvement in the index value because of demand side factors. Further, another study by Yorulmaz (2013) was to use the same methodology as described by Sarma (2008) for measuring the financial inclusion in Turkey where it was found that there is positive association between high income groups and level of FII. T.P., (2018) assessed the economic and social consequences of financial inclusion for vulnerable people within society. The study indicated that the level of awareness of financial inclusion programmes is low, and that crucial elements accelerating financial inclusion are financial awareness, financial literacy, and the availability of financial products and services. Kochar et al. (2022) provides that to improve the decision-making ability of a married women in India, it is necessary to raise the accessibility to financial resources by them. Goel, S. and Sharma, R. (2023) computed FII by analysing 62 indicators under nine dimension from 2012 to 2019 for India. It was evident in the study that India is gradually attaining higher financial inclusion level as 0.62 was its value in the final year of the study.

Objectives of Study

The prime objective of the paper is to quantify the degree of financial inclusion of India from the year 1996 to 2022 through demand side indicators of banking system. These factors measure the degree, direction and intensity of Financial Inclusion in India.

METHODOLOGY

Research Design

The nature of present study is empirical. The data for all the dimensions for the period from 1995 to 2022 was extracted from secondary source like varying scheduled commercial banks websites, central bank of India - RBI website, World Bank, International Monetary Fund, etc. The period of study was 1995 to 2022 as the major financial and economic reforms of Liberalisation, Privatisation and Globalisation in India were introduced due to financial crisis situation. The entire period of study was divided on the basis of the level of financial inclusion computed from given parameters as discussed above. The tool used to analyze the data is Microsoft Excel as the calculations was done using the given formula for Index of Financial Inclusion by Sarma (2008).

Calculation of Index of Financial Inclusion

The computation part of Financial Inclusion Index (FII) is similar to other popular indices as the methodology involves giving weightage to certain factors directly affecting the inclusiveness of financial system. Examples of such United Nation Development Programme (UNDP) developed indices are Human Development Index, Human Poverty Index and Gender Development Index, etc. FII is evaluated using several dimensions for inclusiveness of financial system.

In order to measure the degree of financial inclusion, numerous indicators including number of bank accounts per 1000 adult persons, number of bank branches per 100000 population, amount of credit deposits in lakhs and amount of deposit amount in lakhs are used. The minimum and maximum value of Financial Inclusion Index lies between 0 and 1, 0 being the lowest rate of financial inclusion and 1 indicating the complete financial inclusion.

$$d_i = w_i * \frac{A_i - m_i}{M_i - m_i} \qquad ...(1)$$

The value of each dimension d_i lies between 0 and w_i. The achievement of a country in dimension 'i' is directly dependent on the value of d_i.

where w_i = weightage of dimension 'i'

A_i= actual value of dimension i

mi = lower most limit given to the value of dimension i

Mi = upper most limit given to the value of dimension i

$$\mathbf{X_1} = \frac{\sqrt{d_1^2+d_2^2+\cdots+d_n^2}}{\sqrt{(w_1^2+w_2^2+\cdots+w_n^2)}} \qquad ...(2)$$

$$\mathbf{X_2} = 1 - \frac{\sqrt{(w_1-d_1)^2+(w_2-d_2)^2+\cdots+(w_n-d_n)^2}}{\sqrt{(w_1^2+w_2^2+\cdots+w_n^2)}} \qquad ...(3)$$

$$\text{FII} = \frac{1}{2}(\mathbf{X_1} + \mathbf{X_2}) \qquad ...(4)$$

The values assigned to 'Mi' and 'm_i' are based on some prespecified rule. Achievement in dimension 'i' is directly related to the value of d_i. A country's achievements in n number of dimensions will be characterized by a particular point on n-dimensional space, X= (d_1, d_2, d_3,….d_n) when 'n' dimensions are used for financial inclusion. For final value of FII, simple mean value of Euclidian distance and that of inverse Euclidian distance will be used when these distances are normalized when its value lie between 0 and 1. Therefore, X_1 represents the distance amid X and O. Similarly, the inverse distance of X and W is represented by value of X_2. Then, average value of X_1 and X_2 will be taken to ultimately get the FII by incorporating the worst point and the perfect point distance. By giving equal importance to all the dimensions in order to measure the comprehensiveness of a financial system, w_i = 1 for all 'i'. Hence, the point W = (1,1,1….1) in n-dimensional space is taken embracing equal weightages to all the three dimensions for computation of FII.

The formula for FII will be-

$$\text{FII} = \frac{1}{2}\left[\frac{\sqrt{d_1^2+d_2^2+\cdots+d_n^2}}{\sqrt{n}} + \left(1 - \frac{\sqrt{(1-d_1)^2+(1-d_2)^2+\cdots+(1-d_n)^2}}{\sqrt{n}}\right)\right] \qquad ...(5)$$

For calculating IFI, three dimensions are used, namely, Accessibility, Availability and Usage of the Financial Services.

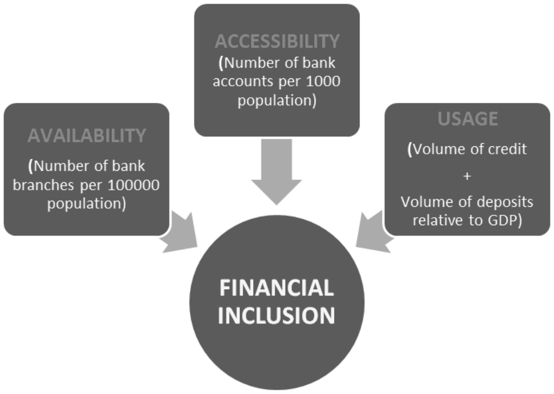
i. **Availability (Dimension 1):** Total number of banking outlets in the form of bank branches, number of ATMs, offices, etc. represents the availability of banking services. Using the number of bank outlets per 100000 of adult population is useful to have an average number of bank branches according to population.

ii. **Accessibility (Dimension 2):** Deposit accounts numbers that of credit outstanding bank accounts per 1000 of adult population represents the measure of banking accessibility/ penetration of the system.

iii. **Usage (Dimension 3)**: The volume of bank credits and deposits of adult population as a proportion of GDP represents the usability of the banking system.

For each dimension, M_i and m_i need to be fixed to normalize the values between 0 and w_i. Also, these values should remain same throughout the period of study to maintain the same benchmark for different dimensions. For the lower bound, m_i, it is safe to choose 0 but for maximum value or upper limit, empirically observed highest value of the dimension can be considered.

Figure 1: Dimensions of Financial Inclusion Index



Source: *Author's own design*

The data of each of these dimensions and calculated values of these dimensions using formula (1) are given in appendix. Also, the values of X_1 and X_2 are calculated using above formula (2) and (3). Finally, the value of FII was done using these two values and formula (4) to reach at formula (5).

RESULTS AND DISCUSSION

Index of Financial Inclusion of India

The Index value was found by first obtaining the value of various indicators for the given period of study using equation (1) above. These dimension values will indicate the contribution of each of the dimension towards final value of FII. During the initial phase of the study, the dimension values are quite low, either 0.00 or below 0.10. These low values will result in low value of X_1 and X_2 signaling lower FII as well. The same values have improved during the later years of study signifying improvement in FII as well.

Table 1: Financial Inclusion Index computed values along with category of FI during 1996-2022 in India

Year	Computed Value of FII	Nature of Financial Inclusion
1996	0.152	Low FI
1997	0.152	Low FI
1998	0.153	Low FI
1999	0.155	Low FI
2000	0.160	Low FI
2001	0.167	Low FI
2002	0.174	Low FI
2003	0.177	Low FI
2004	0.180	Low FI
2005	0.150	Low FI
2006	0.197	Low FI
2007	0.210	Low FI
2008	0.228	Low FI
2009	0.241	Low FI
2010	0.247	Low FI
2011	0.263	Low FI
2012	0.275	Low FI
2013	0.294	Low FI
2014	0.320	Medium FI
2015	0.342	Medium FI
2016	0.367	Medium FI
2017	0.386	Medium FI
2018	0.392	Medium FI
2019	0.404	Medium FI
2020	0.411	Medium FI
2021	0.492	Medium FI
2022	0.510	Medium FI

Source: Author's own compilation using given formulas

According to Sarma (2008), regions with 'Low' Financial Inclusion are having the value of FII as $0.0 < \text{FII} < 0.3$. Regions with 'Medium' Financial Inclusion have range as $0.4 < \text{FII} < 0.5$ and finally, the regions having 'High' Financial Inclusion have range between $0.6 < \text{FII} < 1.0$.

It is quite evident from the above results that the level of Financial Inclusion in India was extremely low after the introduction of major financial reforms in 1991 in India. The calculated value of FII was less than 0.3 till the year 2013. However, there has been improvement in the value of FII and lies in the 'Medium' level of FII as the value raised from less than 0.3 to more than that and reached at 0.40 during the year 2019. It clearly highlights the rise in efficacy level and the aggressive efforts put by Government of India through various policy initiatives in financial and banking sector. For instance, introduction of Pradhan Mantri Jan Dhan Yojana in 2014 which is open for all Indian citizens so that accessibility to banking and other financial services can be expanded through easy access. Additionally, other strategies of RBI in the form of new products services launched, supportive steps in the form of relaxation of guidelines have proved to be useful in enhancing the Financial Inclusion Index. It started from nationalization of scheduled commercial banks and after that series of policy initiatives like introduction of priority lending schemes, lead banking, self-help groups, linkage program of banks, Regional Rural Banks, have brought a big turn around in the efficacy of financial inclusion approach. It got further enhanced through other measures like General Credit Card (GCC), Business correspondents and No-Frills account.

Conclusions and Recommendations

The paper introduces a multidimensional approach to provide exact valuation of the financial inclusion intensity in the country as per the updated available regarding reaching out to financial services, usage and the availability of these financial services. Also, the paper provides comprehensive review of measuring the financial inclusion index and other existing frameworks contributing towards the latest condition in the country. The proposed FII would be useful for further studies as a tool to understand the progress of financial inclusion by researchers, practioners and policy makers. Further financial and economic policy pronouncements can be developed by utilising this data and computed value of FII. The paper also confirmed the methodological development of the systematic approach for future calculations of the index, thereby contributing towards the best practices in the field. Hence, it is recommended to policymakers to prioritize awareness programs over financial schemes and facilities available. Provision of some kind of benefits on usage of digital services can prove to be a game changer in financial inclusion over a period of time. Role of technology upliftment is quite important in delivering varying range of available monetary products and facilities to all segments of society.

References

1. Beck, T., Demirgüç-Kunt, A., & Levine, R. (2006). Bank concentration, competition, and crises: First results. *Journal of banking & finance, 30*(5), 1581-1603.
2. Beck, T., & De La Torre, A. (2007). The basic analytics of access to financial services. *Financial markets, institutions & instruments, 16*(2), 79-117.
3. Charkravarty, S.R. & Pal, R. (2010). Measuring financial inclusion: an axiomatic approach. *IGIDR, WP 2010(3)*.
4. Chattopadhyay, S.K. (2011). *Financial Inclusion in India: A case study of West Bengal.* [Online] Available from: https://mpra.ub.unimuenchen.de/34269/1/MPRA_paper_34269.pdf [Accessed21/05/2023].
5. Goel, S., & Sharma, R. (2023). Financial Inclusion Index of India. *Journal of Southwest Jiaotong University, 58*(3), 699-713.
6. Gupte, R., Venkataramani, B., & Gupta, D. (2012). Computation of financial inclusion index for India. *Procedia-Social and Behavioral Sciences, 37*, 133-149.
7. Mehrotra, N., Puhazhendhi, V., Nair G. & Sahoo, B.B. (2009). Financial inclusion - an Overview. Department of Economic Analysis and Research, *National Bank for Agriculture and Rural Development (NABARD), Occasional Paper 48, Mumbai*.
8. Sarma, M. (2008). Index of financial inclusion. Working paper 215, *Indian Council for Research on International Economic Relations*.
9. Sarma, M. & Pais, J. (2008). Financial inclusion and development: A cross country analysis. *Annual Conference of the Human Development and Capability Association, New Delhi.*
10. T.P., S (2018). An evaluation of banking services and financial inclusion of district co-operative banks in Kerala. *Retrieved from https://sg.inflibnet.ac.in/handle/10603/22157*
11. World Bank Group. (2023). Global financial development report 2022: Financial inclusion (Vol. 2). World Bank Publications.
12. Yorulmaz, R. (2013). Construction of a regional financial inclusion index in Turkey. *BDDK Bankacılık ve Finansal Piyasalar Dergisi, 7(1)*, 79-101.
13. Data retrieved from https://dbie.rbi.org.in/DBIE/dbie.rbi?site=BsrPublications
14. Data retrieved from https://databank.worldbank.org/
15. Data retrieved from https://data.imf.org/?sk=e5dcab7e-a5ca-4892-a6ea-598b5463a34c