Assessing Financial Inclusion in Bangladesh: A Comprehensive and Inclusive Measurement

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Abstract

Problem: The measurement of financial inclusion is one of the most important issues in the recent literatures of finance. For ensuring the required financial services for all people and groups by the financial institutions of a country, one of the essential steps is to measure the level of financial inclusion existed in that country. It assists the concerned to take suitable initiatives for bringing all people under formal financial network quickly by realizing the real scenario. But, no earlier studies measure financial inclusion of Bangladesh comprehensively. In Bangladesh, a cursory attention has been given for measuring financial inclusion using various dimensions. In this backdrop, this study measures the financial inclusion of Bangladesh using an improved and comprehensive index. **Approach**: A comprehensive financial inclusion measurement index has been used to measure financial inclusion level incorporating three dimensions. The dimensions of financial inclusion are access, availability, and usage. This study used twenty-three indicators for measuring financial inclusion under the three dimensions. Time series data ranging from 2004 to 2020 have been employed .**Findings**: An upper mid-level of financial inclusion had been achieved in Bangladesh with financial inclusion index (FII) value of 0.709 in 2020 (where 1.00 indicates full financial inclusion). It suggests that a significant portion of people are still out of the coverage of formal financial services in the country. It was also found that access to financial inclusion in the country is higher than other two dimensions of financial inclusion, namely, usage and availability. Among three dimensions of financial inclusion, Bangladesh scored high level only in access (0.837) dimension. But mid-level of financial inclusion existed in Bangladesh as per availability (0.640) and usage (0.661) dimensions. The findings indicate that urgent initiatives are to be taken to enhance the availability and usage of financial services for the people. **Conclusion**: The study provides a wealth of insights and knowledge about access, availability, and usage of financial institutions and their services in Bangladesh that might help policymakers and financial service providers to design and implement better policies to enhance level of financial inclusion in the country.

Key Words: Financial Inclusion, Measurement, Financial Inclusion Index, Access, Availability, Usage, Bangladesh

1. Introduction

Financial inclusion means that people from all walks of life have access to and can effectively use appropriate financial services (such as transaction accounts, savings, affordable loans, life insurance and general insurance products and so on) provided by the formal financial institutions (Thomas and Subhashree, 2020). Financial inclusion is crucial for reducing poverty and strengthening inclusive economic growth in a resource-poor country like Bangladesh (Social Science Research Institute, 2018). Bangladesh has taken numerous strategies and policies for fostering its national development during the past few decades. Financial inclusion has been treated as high policy priority in this regard (Financial Institution Division, 2021). The availability and accessibility of financial services are essential for making the development meaningful and sustainable (Alliance for Financial Inclusion, 2018).Bangladesh is the member country of Alliance for Financial Inclusion and signed in Maya Declaration Commitments in 2014 for fostering financial inclusion (Bangladesh Bank, 2018). Accordingly, the country is trying to bring people of all walks of society under formal financial system. Particularly, the government of Bangladesh had formulated National Financial Inclusion Strategy (NFIS) in 2021 to bring the adult people under formal financial system.

For bringing all adults under formal financial system, one of the most crucial steps is the measurement of financial inclusion. The reason is that measurement of financial inclusion provides an indication of financial inclusion level achieved in an economy. In the recent years, several studies provided efforts to measure the level of financial inclusion in Bangladesh. For instance, as per the Global Findex Database, 50% of Bangladeshi adults had account ownership with commercial banks till 2017 (Demirgüç-Kunt, et al., 2018). A study by Akter (2016) mentioned that 75% of Bangladeshi adults were financially included, while this rate was 47% as per the study of Azim (2019).In line with the previous studies, Bangladesh Bank (2019) reported that 76% of adults in Bangladesh were financially included.

The above-mentioned evidence indicates that variations are existed in opinion among scholars about the level of financial inclusion in Bangladesh. Some important reasons behind these variations can be highlighted here. Firstly, many scholars measure financial inclusion based on the proportion of people having accounts with commercial banks. But only having account is not sufficient to explain financial inclusion in an economy. Along with deposit and loan accounts, outstanding deposit with respect to GDP, outstanding loan with respect to GDP, branches of financial institutions, ATMs, transactions in terms of GDP etc. are needed to be considered for measuring financial inclusion. Secondly, the extent of measurement of financial inclusion depends on the number of indicators are being considered. The more indicators are used, the more representative will the measurement be. Hossain et al. (2015) opined that a single indicator is not able to measure financial inclusion properly. Sarma (2015) stressed on multidimensional index for measuring financial inclusion. Finally, the measurement of financial inclusion also depends on the types of institutions which are being incorporated. The main participants of financial system in Bangladesh are commercial banks, microfinance institutions, credit unions and cooperatives, insurance companies, and other deposit takers. According to Bangladesh Bank (2019), the key drivers of financial inclusion in Bangladesh are commercial banks, microfinance institutions, cooperatives, mobile financial service providers, agent banks and insurance companies. It is needed to consider all types of participants, instead of partial, to get more meaningful view of financial inclusion in Bangladesh. In fact, it is crucial to measure financial inclusion in Bangladesh using an index that considers all the possible indicators of financial inclusion at the same time. The incorporation of many indicators for measuring financial inclusion entails the necessity of using a composite and comprehensive index.

However, to the authors' best knowledge, no earlier studies measure financial inclusion in Bangladesh separately using index based on comprehensive set of indicators of time series data. The study by Hossain et al. (2015)attempted to measure the level of financial inclusion by calculating index value using five

indicators relating to banks, agent banking, mobile banking, microfinance institutions, and Grameen Bank for five years ranging from 2010-2014.In line with the previous study, Choudhury (2015) tried to assess the degree of financial inclusion in two villages in Northeastern Bangladesh. Subsequently, Akter (2016) presented the overview of financial inclusion in Bangladesh. SSRI (2018) conducted an ethnographic study on financial inclusion in Bangladesh. The study tried to explore the obstacles of financial inclusion and understand the financial needs and behavior of marginalized communities in the country. Similarly, Choudhury (2014) conducted a study addressing background, issues, regulatory measures, and challenges of financial inclusion in Bangladesh. Khanam (2017) conducted a study addressing the status and issues of financial inclusion in Bangladesh. Islam and Mamun (2011) tried to explore the role of Bangladesh Bank (i.e. the central bank of Bangladesh) on financial inclusion in the country. Similarly, the study of Hussain et al. (2019) investigated the effect of financial inclusion on financial resilience in Bangladesh. Khalily (2016) conducted a study focusing on financial inclusion, regulation and education in Bangladesh. The study by Bangladesh Bank (2018) tried to identify the financial inclusion indicators of Micro, Small and Medium Enterprises (MSME).

Therefore, this study aims to measure the financial inclusion in Bangladesh using an improved and comprehensive index. The current study is perhaps the first academic attempt that has incorporated the maximum possible set of indicators for measuring financial inclusion in the country. It has included a total of twenty-three (23) indicators and integrated time series data from banks, microfinance institutions, credit cooperatives, other deposit takers, and insurance companies which were not incorporated by the previous studies.

2. Literature review

2.1 Financial inclusion: definition

Financial inclusion is the universal access of the people from all walks of life to broad set of financial services including banking products, insurance, financial literacy and so on at reasonable costs (Rajan, 2009). According to the World Bank (2008),financial inclusion is the wide access of financial services without both price and non-price barriers to use financial services smoothly. It focuses on delivering funds to creditworthy customers who want to utilize their capabilities and skills. The target of financial inclusion is to bring the unbanked people into formal financial system that allows them to have a wide range of financial services including savings, credit, payments, money transfer and insurance (Hannig & Jansen, 2010).Chakrabarty (2013) defined financial inclusion as the "process of ensuring access to appropriate financial products and services needed by all sections of society including vulnerable groups, such as weaker sections and low income groups at an affordable cost in fair and transparent manner by mainstream institutional players."

Access to finance and financial inclusion is not the same thing though financial inclusion begins with having a bank account (Demirguc-Kunt et al., 2015). Rather, financial inclusion is more than access to finance and focuses on the availability, affordability, usage, training, counseling etc. In other words, the main themes of financial inclusion are effective use, comprehensive sets of products and services, quality, accessibility, fairness, transparency, formal regulated entities, and sustainability (Nyagadza, 2019). For achieving the true goal of financial inclusion, the coordination between demand side and supply side along with financial literacy is essential (Akter, 2016).

2.2 Financial inclusion: measurements

Financial inclusion is an inclusive concept. It has many components, dimensions and indicators. The key components of financial inclusion are accounts, savings, credit, insurance, fund transfer, financial advice and financial literacy (Arora, 2014; Ozili, 2018; United Nation, 2016). Although there is consensus among researchers about the concept of financial inclusion, wide variations exist in the use of measurement method, indicators, and types of data. Particularly, there is a lack of standard method in existing literatures

for measuring financial inclusion across economies (Akter, 2016; Omar and Inaba, 2020).Therefore, a standard and comprehensive index is needed to incorporate more indicators in the measurement process.

Sarma (2012, 2015, 2016) used bank related data and constructed multi-dimensional index for measuring financial inclusion using three dimensions of financial inclusion namely, banking penetration, availability, and usage. The indicators under each dimension were banking penetration: number of deposit accounts with commercial banks per 1,000 adults; availability: number of bank branches and ATMs per 100,000 adults; and usage: the volume of credit and deposit to adult individuals as a proportion of gross domestic products (GDP).Similarly, Park and Mercado (2018) used commercial banks' data for measuring financial inclusion. They measured financial inclusion using different indicators, but the same dimensions used by Sarma (2016). The indicators for respective dimensions were banking penetration: percentage share of the adults with an account; availability: number of bank branches and ATMs per 100,000 adults; and usage: share of adults who borrowed and saved from a financial institution, and the domestic credit to GDP ratio. Using eight indicators of banks, credit unions and cooperatives, microfinance institutions, and mobile banking, Nguyen (2020) measured financial inclusion following the index of Sarma (2016) based on access, availability, and usage dimensions.

In line with the previous studies, Ahamed and Mallick (2019) measured financial inclusion based on three dimensions namely, demographic outreach, geographic outreach, and usage. The respective indicators under the dimensions were the number of bank branches and ATMs per 100,000 people, the number of bank branches and ATMs per 1,000 km^2, and the number of bank accounts per 1,000 populations. Gupte et al. (2012) also used the data of banks and measure financial inclusion based on outreach, usage, ease of transactions, and cost of transactions dimensions. The indicators under outreach dimension were number of bank branches and ATMs per 1,000 km^2, number of bank branches and ATMs per 100,000 people, and number of accounts (deposits and loans) per 1,000 adults. Usage related indicator included volume of deposits and loans as proportion of GDP. The ease of transactions related indicators were the number of locations to open deposit or loan accounts, affordability of deposits and loans, minimum amounts to open savings or checking accounts, minimum amounts of consumer and mortgage loans, number of documents required to open savings or checking accounts, and number of days required to process loan applications. The cost of transactions related indicators were annual fees charged to customers for ATM cards, accounts holdings, and the cost of international money transfer.

Mialou et al. (2017) measured financial inclusion utilizing the outreach, usage, and quality dimensions. Indicators for respective dimensions were outreach: number of ATMs and branches per 1,000 km^2; usage: number of household borrowers and depositors per 1,000 adults; and quality: financial literacy, disclosure requirements, dispute resolution, and cost of usage. Similarly, the central bank of Brazil, Banco Central Do Brasil (2015) measured financial inclusion using three dimensions viz. access, usage, and quality. Cámara and Tuesta (2017) quantified financial inclusion through a multidimensional index using eleven indicators under three dimensions namely usage, access, and barriers. Goel and Sharma (2017) developed a financial inclusion index for India to present the general overview of financial inclusion in the country. The respective dimensions and indicators were banking penetration: accounts per 1,000 population; availability: ATMs per 100,000 population, bank branches per 1,000 population, ATMs per 1,000 square kilometer, and schedule commercial banks per 1,000kilometers; and access: number of life insurance offices. Using primary data from households, Nandru and Rentala (2020) conducted a study from beneficiaries' perspective.

A very recent study used fourteen indicators related to both traditional and digital financial inclusion (Khera et al., 2021). Variables relating to traditional financial inclusion were ATMs per 100,000 adults, branches per 100,000 adults, proportion (%)of adults having account at financial institution, proportion (%) of adults saving at financial institution, proportion (%) of adults using debit cards, proportion (%) of

adults receiving wages through financial institution accounts, and proportion (%) of adults using financial institution accounts for paying utility bills. On the other hand, digital financial inclusion related variables included mobile phone subscription per 100 people, proportion (%) of people having access to internet, number of registered mobile money agents per 100,000 adults, proportion (%) of adults having mobile account, proportion (%) of adults using internet to pay bills, proportion (%) of adults using mobile phone for receiving salaries and wages, and proportion (%) of adults paying utility bill through mobile phone.

The review of the above-mentioned studies indicates that there exist wide variations in the use of indicators and variables among the researchers around the world for index development to measure financial inclusion. In some cases, the researchers used limited numbers of indicators due to lack of data. Therefore, a multidimensional index is needed to measure financial inclusion which requires lots of indicators. In other words, a good measure of financial inclusion index should consider as many indicators as possible (Gupte et al., 2012). Besides, the data of different types of financial institutions needed to be incorporated.

In Bangladesh, a few studies attempted to measure financial inclusion using a limited number of indicators and focusing on partial of the financial sector. Islam and Mamun (2011) incorporated banks, Micro finance institutions, and cooperatives to present the status of financial inclusion in Bangladesh based on selected indicators. Subsequently, Hossain et al. (2015) conducted a study to evaluate financial inclusion initiatives and explore the challenges. They use three dimensions to measure financial inclusion by incorporating banks and micro finance institutions. The respective dimensions and indicators were banking penetration: deposit accounts per 1,000 adults; availability: branches per 100,000 adults and ATMs per 100,000 adults; and usage: credit and deposit to GDP. However, there is no outright study in Bangladesh regarding the measurement of financial inclusion by incorporating comprehensive indicators as well as the entire financial sectors. Therefore, this study provides efforts to bridge the gap by integrating indicators and sectors as much as possible to measure financial inclusion in Bangladesh using a comprehensive and composite financial inclusion index (FII).

3. Methodology

3.1 Data collection

This study used time series data for the period of 2004-2020 of scheduled banks, microfinance institutions, other deposit takers, credit cooperatives, and insurance companies of Bangladesh. The data was collected from Financial Access Survey of International Monterey Fund (IMF).

3.2 Operational definition and measurement of the indicators

Access: Access is the dimension of financial inclusion that denotes the numbers of adults per 1,000 have deposit and loan accounts at scheduled banks, microfinance institutions, credit unions and credit cooperatives, and other deposit takers. It also considers the people who have policies at insurance corporations.

Availability: Availability is the supply side phenomena of financial inclusion that indicates the number of branches of scheduled banks, microfinance institutions, credit unions and credit cooperatives, and other deposit takers for each 100,000 adults. Insurance and ATMs services are also incorporated to explore the scenario of availability of financial products and services.

Usage: Usage dimension indicates the habit of people for saving money and taking loans from scheduled banks, microfinance institutions, credit unions and credit cooperatives, and other deposit takers. Outstanding deposits and loans are expressed as a percent of GDP to investigate the trends of people's habit. Table 1 shows the indicators used by the current study to measure financial inclusion index (FII) under access, availability, and usage dimension.

Table 1: Dimensions and Indicators for Financial Inclusion

Indicators relating to access dimensions:
Number of deposit accounts per 1,000 adults at commercial banks
Number of deposit accounts per 1,000 adults at deposit taking microfinance institutions
Number of deposit accounts per 1,000 adults at credit unions and credit cooperatives
Number of loan accounts per 1,000 adults at commercial banks
Number of loan accounts per 1,000 adults at deposit taking microfinance institutions
Number of loan accounts per 1,000 adults at credit unions and credit cooperatives
Number of life insurance policies per 1,000 adults
Number of non-life insurance policies per 1,000 adults
Indicators relating to availability dimensions:
Branches of commercial banks for per 100,000 adults
Branches of deposit taking microfinance institutions for per 100,000 adults
Branches of credit unions and credit cooperatives for per 100,000 adults
Branches of other deposits takers for per 100,000 adults
Number of insurance corporations for per 100,000 adults
Number of Automated Teller Machines (ATMs) for per 100,000 adults
Indicators relating to us age dimensions:
Outstanding deposits with commercial banks as a percentage %of GDP
Outstanding deposits with deposit taking microfinance institutions as % of GDP
Outstanding deposits with credit unions and credit cooperatives as % of GDP
Outstanding deposits with other deposit takers as % of GDP
Outstanding technical reserves with insurance corporations as % of GDP
Outstanding loans from commercial banks as % of GDP
Outstanding loans from deposit taking microfinance institutions as % of GDP
Outstanding loans from credit unions and credit cooperatives as % of GDP
Outstanding loans from other deposit takers as % of GDP

Sources: Financial Access Survey (FAS), International Monetary Fund (IMF), 2020

3.3 Developing the index

This study has followed the methodology of Goel and Sharma (2017) to develop a multi-dimensional index that is similar to the Human Development Index (HDI) of United Nations Development Program (UNDP). The researchers used only six (6) indicators under penetration, availability, and access dimensions to calculate FII for India using time series data from 2004 to 2015. It is noteworthy to mention that the current study used twenty-three (23) indicators under access, availability, and usage dimension for calculating FII in Bangladesh. In addition, this study used time series data related to financial inclusion for a longer period ranging from 2004 to 2020.

Equations 1, 2, and 3 have been used to calculate indicator index ($d_i...d_n$), dimension index (D_1, D_2, and D_3), and financial inclusion index (FII), respectively (Sarma, 2012).

$$d_i = w_i \frac{(A_i - m_i)}{M_i - m_i} \quad \text{---(1)}$$

$$D_i = \frac{1}{n} \sum_{i=1}^{n} di \quad \text{-- (2)}$$

$$FII = \frac{1}{2} \left[\frac{\sqrt{D_1^2 + D_2^2 + \cdots + D_n^2}}{\sqrt{n}} + \left(1 - \frac{\sqrt{(1-D_1)^2 + (1-D_2)^2 + \cdots + (1-D_n)^2}}{\sqrt{n}} \right) \right] \text{-------------- (3)}$$

Where,

d_i = the country's achievement in each particular i^{th} indicator,

w_i= the weight attached to each indicator/dimension i, and it ranges between $0 \leq w_i \leq 1$ (weight indicates the relative importance of indicator/dimension i, in calculating financial inclusiveness),

A_i= the actual value on indicator i,

m_i=the lower value of indicator i,

M_i=the upper value of indicator i,

D_i= the dimension index,

FII = the financial inclusion index.

It is important to note that equal weights have been assigned to each indicator and dimension since each of them are quite important for calculating financial inclusion index.

As per the formula provided by Sarma (2015), the range of FII is $0 \leq FII \leq 1$, where 0 indicates full financial exclusion and 1 indicates full financial inclusion. Lower the value of FII, lower the level of financial inclusion exists in a particular county, and vice versa. However, existing literatures opined the variations about the level of financial inclusion based on the corresponding index values. For example, depending on the value of FII, Gupta et al. (2014) classified a country's financial inclusion into the following three levels:

> i) $0.0 \leq FII < 0.3$: Low financial inclusion
> ii) $0.3 \leq FII < 0.7$: Medium financial inclusion
> iii) $0.7 \leq FII \leq 1.0$: High financial inclusion

Subsequently, Goel and Sharma (2017) provided a different categorization of a country's level of financial inclusion as below:

> i) $0.0 \leq FII \leq 0.4$: Low financial inclusion
> ii)$0.4 < FII \leq 0.6$: Medium financial inclusion
> iii) $0.6 < FII \leq 1.0$: High financial inclusion

By considering the studies of both Gupta et al. (2014) and Goel and Sharma (2017), this study has set a little bit different criteria for classifying the level of financial inclusion in Banglades has presented in Table 2. This criterion seems to be more logical because division of 1 by 3 generates 0.667 which is near 0.7.One (1) is divided by three (3) because the existing literatures set three categories of financial inclusion namely low, medium, and high level. Moreover, this study calculates FII of a particular country using time series data that is rising over time. Therefore, usage of 0.7 instead of 0.6 as the entry point of high financial inclusion would be more representative in this case.

Table 2: Classification Criteria for Financial Inclusion

| Range	Level of financial inclusion
$0.0 < FII \leq 0.4$	Low financial inclusion
$0.4 < FII \leq 0.7$	Medium financial inclusion
$0.7 < FII \leq 1.0$	High financial inclusion

4. Results

4.1 Measurement of access dimension

Movement of access related indicators over time (2004 - 2020):Figure 1 presents the average number of deposit accounts and loan accounts per 1000 adults at different financial institutions in Bangladesh for the period of 2004- 2020.The study revealed that the mean number of deposit accounts for each 1,000 adults

with commercial banks increased from 351.39 in 2004 to 989.26 in 2020. The analyses showed that commercial banks in Bangladesh experienced a rapid growth in having deposit accounts per 1,000 adults during the past two decades. The rate of access to commercial banks was very high because all types of deposit accounts maintained with commercial banks were taken into consideration. Similarly, the average number of deposit accounts per 1,000 adults with microfinance institutions increased from 161.50 in 2004 to 276.89 in 2020. Credit unions and credit cooperatives also experienced an overall rising trend in access indicator though there were ups and downs in having average number of deposit accounts. The findings indicate that commercial banks are the top contributor in financial sector of Bangladesh with respect to deposit accounts holding. It reveals the greatest popularity of commercial banks among all categories of financial institutions in Bangladesh.

Figure 1: Number of Deposit Accounts and Loan Accounts per 1,000 Adults at Different Financial Institutions over Time (2004-2020)
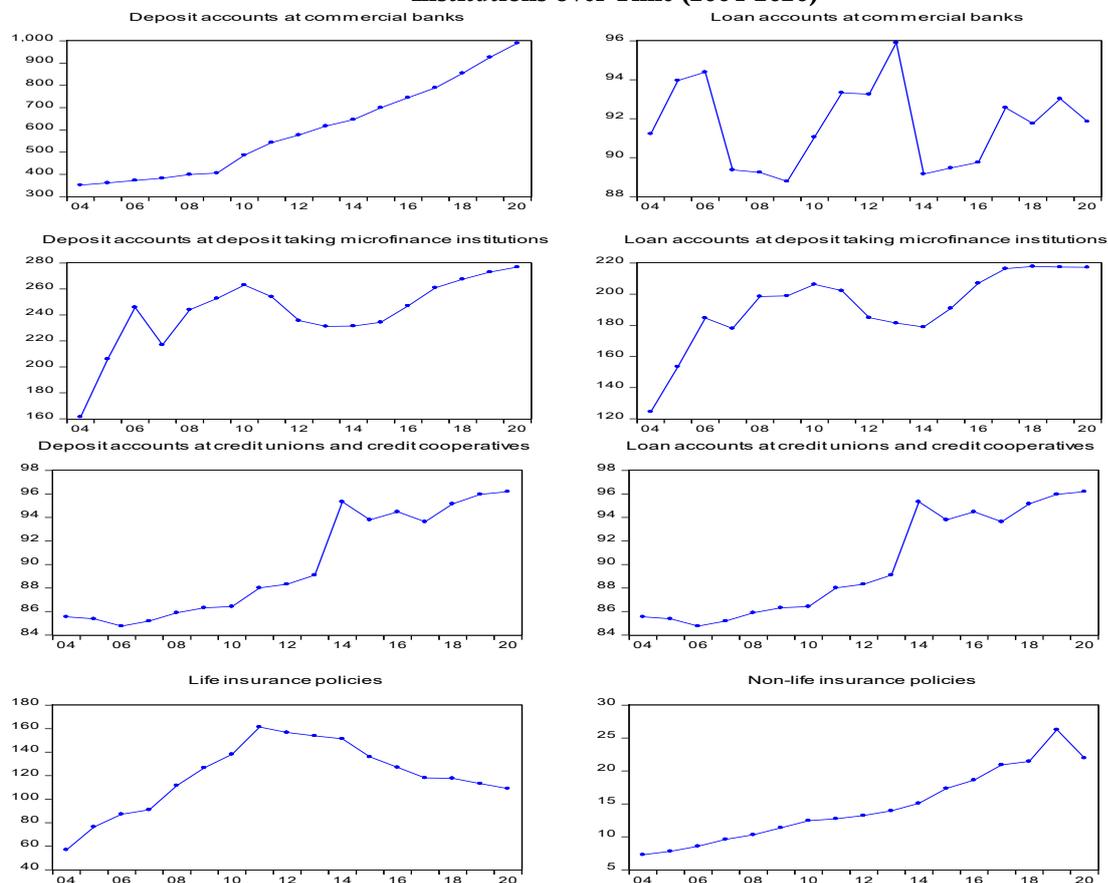
In contrast, if the average numbers of loan accounts per 1,000 adults with different financial institutions in Bangladesh are taken into consideration, it shows a different scenario (figure 1). The analyses revealed that the average number of loan accounts for each 1,000 adults with commercial banks followed a very irregular trend for the period of 2004-2020. In other words, there were very big ups and downs in having loan accounts with commercial banks during the past two decades. On the other hand, microfinance institutions observed a rising trend for having loan accounts. It was found that the mean number of loan accounts per 1,000 adults with microfinance institutions increased from 124.49 in 2004 to 217.20 in 2020. The credit unions and credit cooperatives also experienced increasing trend over time for this indicator.

The findings indicate the dominance of the microfinance institutions over commercial banks, and credit cooperatives in terms of having average number of loan accounts per 1,000 adults. The study also found that the average number of policies per 1,000 adults of both life and non-life insurance policies increased during the past two decades though the rate of increase was very trivial. The figures imply the very worsen situation of risks management endeavor through insurance in Bangladesh.

Descriptive statistics of access related indicators: Table 3 presents the descriptive statistics of the indicators related to access dimension. It was found that based on number of deposit accounts per 1,000 adults, commercial banks were the top players among all types of financial institutions in Bangladesh. On the other hand, the deposit taking microfinance institutions played a lead role in terms of having loan accounts per 1,000 adults. The higher standard deviations indicate higher divergence/ discrepancies in providing financial services by the financial institutions and vice versa. The study revealed that commercial banks experienced a wide gap in terms of holding deposit accounts and loan accounts.

Table 3: Descriptive Statistics of Access Related Indicators (2004-2020)

Indicators	N	Range	Min	Max	Mean	Std. Deviation
Deposit accounts per 1000 adults at commercial banks	17	637.867	351.394	989.261	596.714	209.716
Deposit accounts per 1000 adults at deposit taking microfinance institutions	17	115.390	161.495	276.885	241.287	28.119
Deposit accounts per 1000 adults at credit unions and credit cooperatives	17	11.430	84.765	96.195	89.970	4.465
Loan accounts per 1000 adults at commercial banks	17	7.130	88.775	95.905	91.652	2.143
Loan accounts per 1000 adults at deposit taking microfinance institutions	17	93.258	124.486	217.744	191.659	24.739
Loan accounts per 1000 adults at credit unions and credit cooperatives	17	11.430	84.765	96.195	89.970	4.465
Life insurance policies per 1000 adults	17	104.318	57.032	161.350	119.583	29.465
Non-life insurance policies per 1000 adults	17	18.987	7.280	26.267	14.646	5.598

Values of access related indicators and dimension: Table 4 shows the values of access related dimension and indicators for the period of 2004 - 2020.The analyses revealed that individually, different indicators followed separate pattern of movement. Among the indicators, deposit accounts at commercial banks (d_1), microfinance institutions (d_2), credit cooperatives (d_3), and loan accounts at credit cooperatives (d_6) followed an overall rising trend during the past two decades and were highest in year of 2020. But the directions of movements of other indicators are not same. For example, loan accounts at commercial banks (d_4) were highest in 2013 and lowest in 2014, and then it followed an increasing trend. Similarly, life insurance policies (d_7) were highest in 2011 and then it experienced a decreasing trend.

**Table 4: Values of Access Related Indicators and Dimension**

Year	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	D_1
2004	.000	.000	.069	.343	.000	.069	.000	.000	.060
2005	.016	.386	.054	.727	.310	.054	.186	.027	.220
2006	.033	.731	.000	.788	.645	.000	.289	.068	.319
2007	.049	.481	.037	.083	.574	.037	.326	.123	.214
2008	.075	.714	.099	.065	.793	.099	.524	.160	.316
2009	.085	.790	.136	.000	.798	.136	.668	.215	.354
2010	.211	.880	.145	.320	.877	.145	.777	.273	.453
2011	.300	.801	.284	.639	.833	.284	1.000	.288	.554
2012	.353	.643	.311	.629	.648	.311	.956	.314	.521
2013	.417	.604	.379	1.000	.610	.379	.928	.351	.583
2014	.461	.606	.924	.054	.583	.924	.904	.411	.608
2015	.546	.632	.790	.098	.713	.790	.757	.530	.607
2016	.616	.741	.850	.138	.885	.850	.671	.597	.668
2017	.686	.861	.776	.531	.986	.776	.586	.719	.740
2018	.789	.918	.909	.417	1.000	.909	.583	.746	.784
2019	.901	.966	.980	.596	.996	.980	.539	1.000	.870
2020	1.000	1.000	1.000	.431	.994	1.000	.499	.774	.837

The combined result of these eight indicators is expressed in access dimension, D_1. It was found that the access dimension (D_1) followed an overall increasing trend during the last decades though there were ups and downs in the yearly values. The findings imply that the overall accessibility of adult people to financial services in Bangladesh is increasing over time.

4.2 Measurement of availability dimension

Movement of availability related indicators over time (2004 - 2020): Figure 2 presents the branches per 100,000 adults of different financial institutions in Bangladesh over 2004 - 2020. The study found that the average numbers of branches of commercial banks for each 100,000 adults was7.13 in 2004 and reached slowly to 8.99 in 2020. As a pioneer of microfinance, Bangladesh has done well in terms of availability of microfinance services. The average numbers of branches per 100,000 adults of microfinance institutions increased nearly three times over the past two decades and reached to17.32 in 2020 from 6.85 in 2004. However, the availability of credit unions and credit cooperatives observed a dismal picture. The number of branches of credit unions and credit cooperatives increased gradually from 2004 to 2013. But it followed a sharp decline during the next five years though it started to increase after 2018. The findings indicate that in terms of availability, credit unions and credit cooperatives have failed to keep pace with the growth of population in Bangladesh.

Figure 2: Branches per 100,000 Adults of Different Financial Institutions over Time (2004-2020)
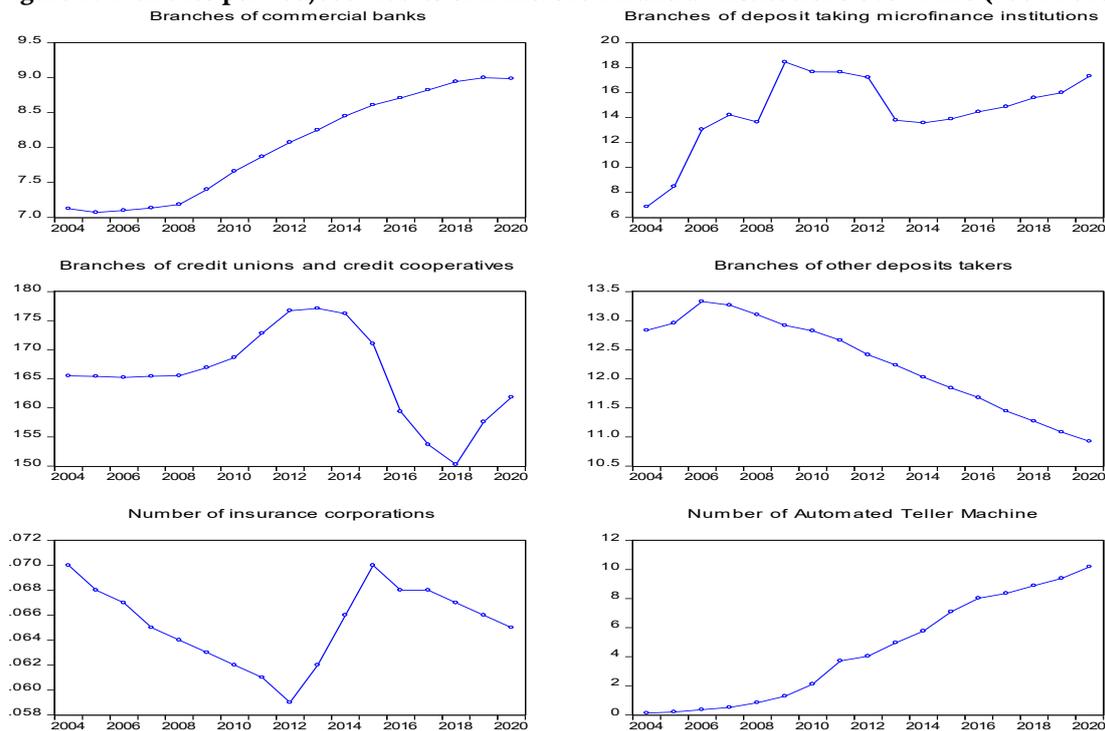
The other deposit takers also experienced a disappointing scenario. The average number of branches per l00,000 adults of other depositor takers was 12.83 in 2004 which increased slightly in the subsequent two years. However, it declined gradually over the next fourteen years and reached to 10.92 in 2020. The scenario for availability of insurance service over 2004 - 2020 was also not pleasing. The study observed a huge fluctuation in yearly data on insurance corporations in Bangladesh during the past two decades. The number of insurance corporations per 100,000 adults decreased continuously till 2012 and then it increased sharply over the next three years. After 2015it started to fall again and reached to 0.065 in 2020. In contrast, the availability of ATMs showed an optimistic scenario. It has increased many times over time. The average number of ATMs per 100,000 adults was only0.13 in 2004. Surprisingly it increased many folds during the next few years and reached to 10.18 in 2020.

Descriptive statistics of availability related indicators: The descriptive statistics of the indicators related to availability dimension are presented in table 5. It was revealed that among the four categories of financial institutions in Bangladesh, the average number of branches of credit unions and credit cooperatives per 100,000 adults were the greatest (165.846), followed by deposit taking microfinance institutions (14.515), other deposit takers (12.283), and commercial banks (8.023) between 2004 - 2020. In contrast, the average number of insurance corporations per 100,000 adults was tremendously low (0.065) indicating a very weak state of availability of insurance in Bangladesh. The higher standard deviation signifies the greater changes in the number of branches over time.

Table 5: Descriptive Statistics of Availability Related Indicators (2004-2020)

Indicators	N	Range	Min	Max	Mean	Std. Deviation
Branches of commercial banks per 100000 adults	17	1.930	7.070	9.000	8.023	.751
Branches of deposit taking microfinance institutions per 100000 adults	17	11.606	6.848	18.454	14.515	3.102
Branches of credit unions and credit cooperatives per 100000 adults	17	26.840	150.270	177.110	165.846	7.723
Branches of other deposits takers per 100000 adults	17	2.407	10.923	13.330	12.283	.791
Insurance corporations per 100000 adults	17	.010	.059	.070	0.065	.003
Automated Teller Machines (ATM) per 100000 adults	17	10.055	.129	10.184	4.463	3.643

Values of availability related indicators and dimension: The values of availability related dimension and indicators for the period of 2004 - 2020 are shown in table 6. The study revealed that among the six (6) indicators of availability dimension, ATMs services (d_6) followed a solid increasing trend during the past two decades and was highest in 2020. Similarly, the availability of branches of commercial banks (d_1) followed an overall increasing trend. The branches of deposit taking microfinance institutions (d_2) showed an increasing trend at the early of the period (i.e. 2004 - 2020) and were highest in 2009. However, it continued to decrease till 2014, and after that started to increase continuously. The branches of credit unions and credit cooperatives (d_3) were in peak in 2013, and then it continued to decrease. The branches of other deposit takers (d_4) were highest in 2006, and then it decreased continuously. Insurance corporations (d_5) observed a declining trend till 2012 and after that it started to increase gradually. Finally, if the overall availability index (D_2) is taken into consideration, it reveals that the availability of financial institutions in terms of adult population is increasing in Bangladesh with the passage of time.

Table 6: Values of Availability Related Indicators and Dimension

Year	d_1	d_2	d_3	d_4	d_5	d_6	D_2
2004	.028	.000	.567	.794	.986	.000	.396
2005	.000	.140	.564	.846	.831	.007	.398
2006	.016	.535	.558	1.000	.697	.022	.471
2007	.033	.636	.565	.974	.573	.038	.470
2008	.059	.586	.569	.905	.456	.071	.441
2009	.171	1.000	.621	.828	.342	.115	.513
2010	.305	.932	.685	.790	.231	.197	.523
2011	.414	.931	.841	.722	.113	.356	.563
2012	.521	.894	.985	.619	.000	.389	.568
2013	.612	.598	1.000	.545	.255	.480	.582
2014	.716	.580	.966	.460	.680	.561	.661
2015	.797	.607	.773	.381	1.000	.693	.709
2016	.850	.657	.339	.313	.877	.786	.637
2017	.908	.692	.127	.217	.842	.818	.601
2018	.970	.754	.000	.144	.725	.871	.578
2019	1.000	.788	.273	.066	.615	.922	.611
2020	.993	.903	.431	.000	.512	1.000	.640

*4.3 Measurement of usage dimension*

Movement of usage related indicators over time (2004 - 2020): Figure 3 presents the proportion of outstanding deposits and loans of different financial institutions as a percent of national GDP in

Bangladesh for the period of 2004- 2020. Outstanding deposits measure the extent of savings by people at different financial institutions while outstanding loans reveal the extent of credit people receive from various financial institutions. When outstanding deposits and loans are expressed as a percent (%) of GDP, it implies the usage of financial institutions by people at broader economy perspective, both for saving and borrowing money.

The analyses revealed that commercial banks in Bangladesh played a very crucial role in collecting deposits from people as well as contributing to the national GDP during the past two decades. Though the contribution of others financial institutions, namely microfinance institutions, credit unions and credit cooperatives, and other deposit takers is not substantial, they have been able to attract people for saving and depositing their money over time which is a good sign for the Bangladeshi economy. Interestingly, the contribution of outstanding technical reserves with insurance corporations to GDP increased gradually over time till 2013. But from 2014 it continued to decline. It can be highlighted that the proportion (%) of contribution of outstanding deposits of all types of financial institution to the national GDP has increased over time. This indicates the positive habit of people in terms of depositing their money at financial institutions.

Like the deposit collection, commercial banks in Bangladesh played a lead role in loan disbursement between 2004 and 2020. It was found that the contribution of commercial banks to the national GDP in terms of loan disbursement increased gradually though there were ups and downs in yearly loan disbursement. Similar patterns were observed for deposit taking microfinance institutions and other deposit takers. However, the credit unions and credit cooperatives experienced a disappointing scenario in terms of loan disbursement. It followed an overall decreasing trend over time regarding outstanding loan as a percent of GDP. The findings indicate that people's propensity to borrow from financial institutions has increased over time.

Figure 3: Outstanding Deposits as Percent of GDP and Outstanding Loan as Percent of GDP at Different Financial Institutions over Time (2004-2020)
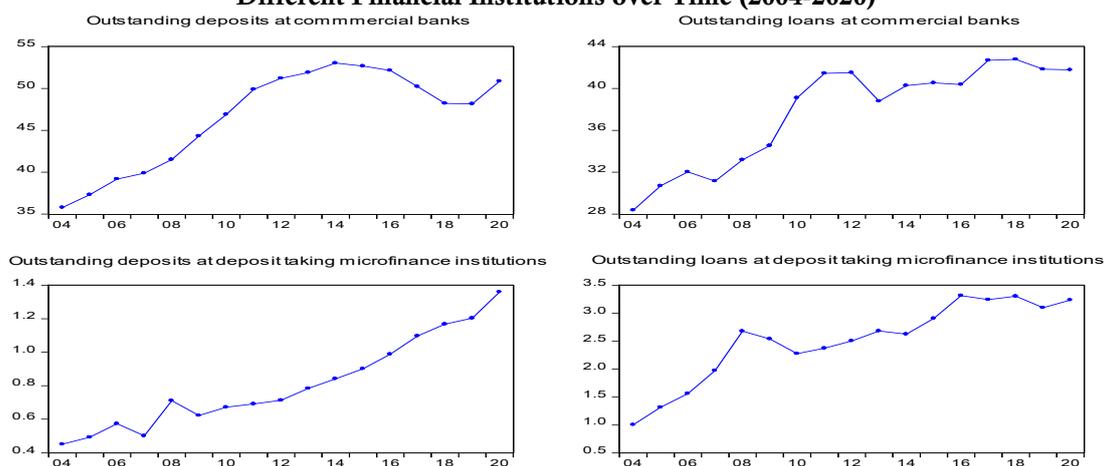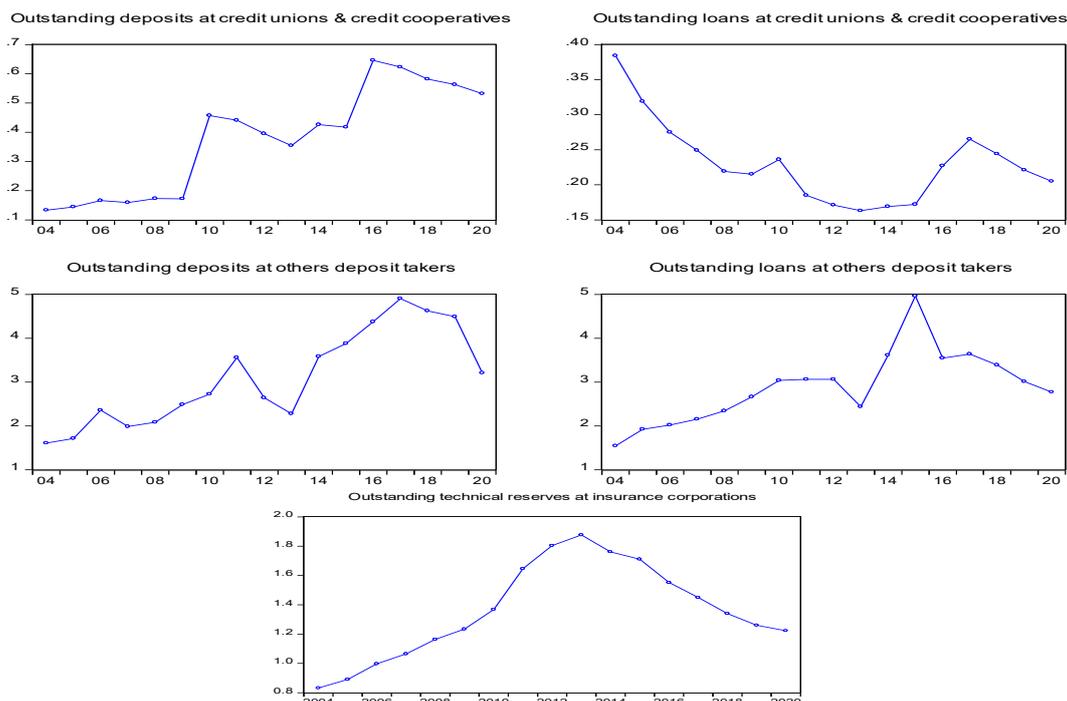
The rising pattern of both savings and borrowings by people in proportion to GDP over time is very supportive for financial inclusion in Bangladesh. Moreover, the findings imply that people have more trust on banks, and they feel convenience with banks for both saving and borrowing. But the contributions of other financial institutions, i.e. microfinance institutions, credit cooperatives, and other deposit takers are very negligible. Therefore, it is very necessary to expand investments and employment opportunities.

Descriptive statistics of usage related indicators: Table 7 presents the descriptive statistics of usage related indicators of financial inclusion in Bangladesh over past seventeen years (2004-2020). Outstanding deposits and loans are expressed as a percent of GDP to measure the usage of financial services. The analyses revealed that commercial banks were the greatest contributor in terms of outstanding deposits as a percent of GDP (on average, 46.66% of the GDP), followed by the other deposit takers (on average, 3.09% of the GDP). Insurance corporations were also found to have a mentionable contribution in terms of outstanding technical reserves as a percent of GDP (on average, 1.36% of the GDP).

Table 7:Descriptive Statistics of Usage Related Indicators (2004-2020)

Indicators	N	Range	Min	Max	Mean	Std. Deviation
Outstanding deposits at commercial banks as a % of GDP	17	17.255	35.779	53.033	46.659	5.813
Outstanding deposits at deposit taking microfinance institutions as a % of GDP	17	.908	.451	1.360	.810	.272
Outstanding deposits at credit unions & credit cooperatives as a % of GDP	17	.513	.133	.646	.376	.183
Outstanding deposits at others deposit takers as a % of GDP	17	3.297	1.608	4.905	3.088	1.078
Outstanding technical reserves at insurance corporations as a % of	17	1.045	.832	1.877	1.363	.324

GDP						
Outstanding loans at commercial banks as a % of GDP	17	14.412	28.366	42.778	37.708	4.872
Outstanding loans at deposit taking microfinance institutions as a % of GDP	17	2.181	1.132	3.314	2.514	.685
Outstanding loans at credit unions & credit cooperatives as a % of GDP	17	.221	.163	.384	.230	.058
Outstanding loans at others deposit takers as a % of GDP	17	3.421	1.545	4.966	2.892	.821

Like the outstanding deposits, the biggest contribution to the usage of financial services in Bangladesh was received from the commercial banks in terms of outstanding loans as a percent of GDP (on average, 37.71% of the GDP). The other deposit takers and microfinance institutions also made a decent contribution in terms of outstanding loans as a percent of GDP (on average, 2.89% and 2.51% of the GDP respectively).

Values of usage related indicators and dimension: Table 8 shows the values of indicators related to usage dimension during 2004 - 2020. It was found that the contributions of commercial banks to GDP in terms of outstanding deposits (d_1) and outstanding loans (d_6) followed rising trends and reached their highest in 2014 and 2018 respectively. Deposit taking microfinance institutions were also found to have overall rising trends of contribution to GDP through outstanding deposits (d_2) and outstanding loans(d_7) and reached their peakin 2020 in 2016 respectively.

Table8:Values of Usage Related Indicators and Dimension

Year	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9	D_3
2004	.000	.000	.000	.000	.000	.000	.000	1.000	.000	.111
2005	.089	.045	.023	.032	.056	.161	.083	.703	.110	.145
2006	.197	.134	.065	.227	.158	.254	.196	.504	.139	.208
2007	.237	.055	.052	.114	.223	.192	.385	.387	.178	.203
2008	.332	.286	.079	.144	.318	.334	.708	.250	.233	.298
2009	.496	.188	.077	.267	.385	.428	.644	.232	.326	.338
2010	.644	.243	.633	.339	.513	.745	.523	.328	.437	.489
2011	.818	.264	.602	.592	.779	.907	.568	.096	.443	.563
2012	.895	.288	.512	.314	.931	.911	.628	.036	.443	.551
2013	.934	.366	.432	.203	1.000	.723	.709	.000	.261	.514
2014	1.000	.429	.572	.599	.889	.827	.684	.027	.604	.626
2015	.979	.495	.554	.689	.842	.844	.813	.039	1.000	.695
2016	.949	.591	1.000	.839	.689	.833	1.000	.289	.585	.753
2017	.837	.711	.956	1.000	.591	.994	.967	.458	.612	.792
2018	.721	.790	.876	.915	.487	1.000	.995	.364	.539	.743
2019	.718	.829	.838	.875	.410	.935	.901	.260	.429	.688
2020	.875	1.000	.778	.485	.374	.931	.964	.188	.358	.661

The contributions of credit unions & credit cooperatives as well as other deposit takers to GDP in terms of outstanding deposits and outstanding loans more or less increased over time. The insurance corporations were able to increase steadily their contributions to GDP through outstanding technical reserves (d_5) and reached the highest heigh in 2013, and then continued to decrease. The overall state of usage dimension of

financial inclusion is reflected in D_3. It was found that usage of financial services (particularly deposits and loans) offered by different financial institutions in Bangladesh rose at a slower rate over time.

5. Discussion

5.1 Financial inclusion index (FII): an inclusive measurement

Table 9 reports the index values of three core dimensions namely, access (D_1), availability (D_2), and usage (D_3); and the values of the composite financial inclusion index (FII) for the period of 2004 - 2020. Based on the values of FII, this study categories financial inclusion of Bangladesh into three distinct levels, namely low financial inclusion (0.0 < FII ≤ 0.4), medium financial inclusion (0.4 < FII ≤ 0.7), and high financial inclusion (0.7 <FII ≤ 1.0) as described in table 2. The analyses revealed that the values of all three dimensions followed overall rising trends over time. However, the access dimension was in better position as compared to two other dimensions and it reached the entry point (i.e. 0.7) of high financial inclusion in 2017. This finding is supported by the study of Cámara and Tuesta (2017). Moreover, the researchers reported that Bangladesh ranked the first position on access dimension among 137 countries in 2014. So, it can be opined that accessibility of financial services is increasing over time in Bangladesh. This is happening so because the Central Bank of Bangladesh has taken substantial initiatives to open account with banks for all people of Bangladesh. In addition, Bangladesh Government had formulated National Financial Inclusion Strategy in 2021 to bring all people under the formal financial system.

Although the values of availability dimension are increasing gradually, it continued the pace up to 2015. After that year, it continued to fall though started to rise again from 2019. The values related to availability dimension imply that the availability of financial services is not sufficient for the huge number of populations in Bangladesh. In this circumstance, new branches of financial institutions need to be opened in rural and remote areas to serve the under-served segment of population. The study of Ahammed (2021) revealed almost similar findings about availability dimension of financial inclusion in Bangladesh. The researcher also opined that instead of establishing new banks, Bangladesh government should extend banking services by increasing the number of branches of existing banks, ATMs, and agent banking outlets at rural and remote areas.

**Table 9:Various Dimensions and Financial Inclusion Index (FII) over time (2004 - 2020)**

Year	Access (D_1)	Availability (D_2)	Usage (D_3)	Index (FII)	Categories
2004	.060	.396	.111	.208	Low financial inclusion
2005	.220	.398	.145	.261	
2006	.319	.471	.208	.337	
2007	.214	.470	.203	.302	
2008	.316	.441	.298	.353	
2009	.354	.513	.338	.403	Medium financial inclusion
2010	.453	.523	.489	.489	
2011	.554	.563	.563	.560	
2012	.521	.568	.551	.546	
2013	.583	.582	.514	.560	
2014	.608	.661	.626	.631	
2015	.607	.709	.695	.669	
2016	.668	.637	.753	.685	
2017	.740	.601	.792	.708	
2018	.784	.578	.743	.698	
2019	.870	.611	.688	.717	High financial inclusion
2020	.837	.640	.661	.709	

The values of usage dimension also followed a rising trend over time. But after 2017 it started to fall and continued this decreasing trend. One of the most important reasons behind the fact is the inactivity of accounts. People are opening accounts with commercial banks, but not using the accounts. The IMF (2020) database also shaded light on the fact. The study reported that the registered number of mobile money accounts in Bangladesh was 99.5milliontill 2020 where the number of active mobile money accounts was only 32.5 million. This is the important problem of financial inclusion of Bangladesh that needs to be addressed to achieve the targeted level of financial inclusion. It is worthwhile to mention that Bangladesh ranked 97th position on usage dimension among 137 countries in 2014 (Cámara & Tuesta, 2017).

5.2 Financial inclusion index (FII): a graphical representation

The movement of values of all indices of financial inclusion in Bangladesh for the period of 2004 – 2020 is presented in figure 4.FII values revealed that in an overall sense, the financial inclusion in Bangladesh observed an increasing trend during the past two decades. It is important to note that Bangladesh entered medium level of financial inclusion in 2009(FII = 0.403) and maintained it over the next few years. The study by Sarma (2015) found similar results about the level of financial inclusion of Bangladesh. In addition, according to the current study, Bangladesh reached high level of financial inclusion in 2019(FII = 0.717)and it maintained in 2020 (FII = 0.709).This finding is supported by the study of Cámara and Tuesta (2017).The researchers reported that Bangladesh placed 22th rank among 137 countries in 20014 based on overall index of financial inclusion. In line with the previous study, Goel and Sharma (2017) provided efforts to assess the level of financial inclusion in India. The study revealed that India entered medium range of financial inclusion in 2013 and in high range of financial inclusion 2014. In an inclusive sense, Bangladesh is currently at the entry point of high level of financial inclusion.

Figure 4: Movement of Indices of Financial Inclusion over Time (2004 - 2020)
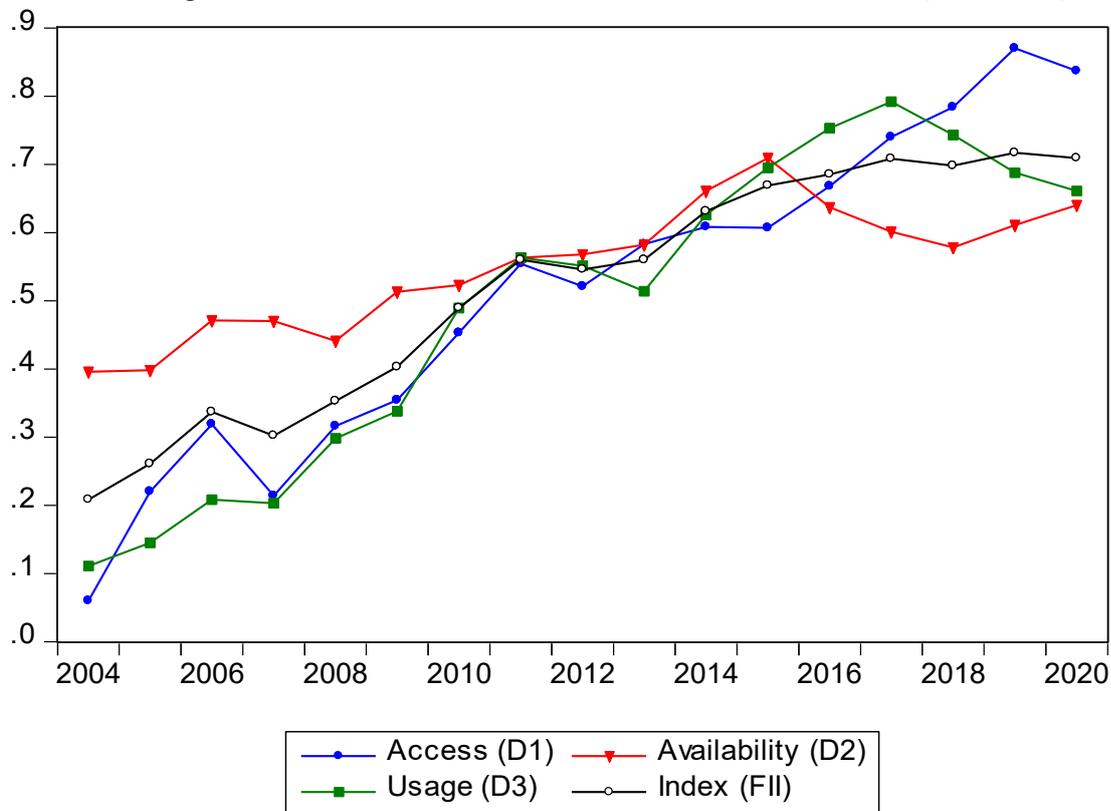
6. Conclusion

Financial inclusion is a comprehensive concept. Measurement of it is a very difficult task because there is no consensus about the use of fixed number of indicators in the measurement process of financial inclusion. Use of more indicators would make the measurement more representative. This studyprovides efforts to use maximum number of indicators for measuring the level of financial inclusion in Bangladesh. A total of twenty-three (23)indicators have been used under three dimensions, namely access, availability, and usage. The study found that the level of financial inclusion in Bangladesh improved during the past two decades. However, despite substantial achievement, there is still room for improvement of the position of financial inclusion in the country. According to the findings of the current study, the values of both availability and usage dimensions are below 0.70, and the values of FII are near to 0.7 up to 2020. All these values are far from the maximum limit of the index (i. e. 1; full financial inclusion). It implies that full ranges of financial services are not used by many people and a significant portion of people are still out of the coverage of formal financial service in Bangladesh. Hopefully, the proper implementation of National Financial Inclusion Strategy of Bangladesh will gear up the scenario. In addition, the policy makers and financial service providers should design and implement better policies to enhance the level of financial inclusion in the country.

The measurement of financial inclusion holds significant importance for Bangladesh because of its various practical consequences that might potentially influence the operational and strategic decisions of the country. It assists to identifying untapped areas or groups with inadequate access to financial services. This can provide useful information about possible consumer bases. Financial institutions can use this data to decide the best ways to reach underserved customers through mobile banking or agent networks. Understanding the financial requirements and preferences of underserved populations enables financial services providers to create specialized financial products and services for these niche markets. Measuring financial inclusion enables interested parties to comprehend the financial behavior of individuals and businesses, which enables financial institutions and businesses to more accurately assess credit risk. This can result in better lending decisions and lower default rates. Government might start financial literacy programs and workshops to educate marginalized groups about the benefits of financial services and how to utilize them responsibly. This can result in a more financially aware customer base. The measurement of financial inclusion facilitates comprehension of the financial ecosystem and the involvement of many stakeholders.

Though the current study tried to use maximum number of indicators, it could not incorporate agent banking and mobile banking in constructing FII due to the unavailability of time series data. Therefore, further research can be carried on to address the issue.

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