How financially inclusive the Asian's are – an empirical analysis

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Abstract

Purpose – This study aims to measure and further compare the countries in terms of the achievement in the degree of financial inclusion over the study period and between income groups considering 26 nations from Asia for the period 2013-2017.

Design/methodology/approach – While measuring the degree of financial inclusion, the study prepares an index using weighted arithmetic mean and the inverse of the Euclidean distance method. Further, comparison between the study period and between the income groups has been made using the dependent samples *t*-test as well as the Wilcoxon signed-rank test and independent samples *t*-test, respectively.

Findings – The study extends empirical insights by laying out the ranks for the countries considered for each of the study periods individually as well as in terms of mean financial inclusion scores for the study period. Further, comparison in terms of mean financial inclusion scores shows significant differences between the income groups, whereas the differences between the study periods turn out to be non-significant.

Research limitations/implications – Less availability of intended variables over time restricts the predictive capability of sketching the phenomena in a true sense and claims further an exhaustive research to pursue in the future.

Practical implications – With the declining trend except for 2016-2017 in the achievement of financial inclusion scores over time, the study suggests emphasizing the initiatives targeted to include the excluded within the ambit of the formal financial system, which somehow seems unstable.

Originality/value – The novelty of the study lies in the portrayal of a measure that seems representative of the scale for development with deeper insight.

Keywords Financial inclusion, Exploratory factor analysis, Inverse of Euclidean distance, Index of financial inclusion

Paper type Research paper

Introduction

Drive of financial inclusion can be considered as one of the important channels of fostering development. Providing a wide array of services with ease of access, at an affordable price and also at the time when it is needed caters to the service provider, the whole formal financial system, the economy as well as the person in need to grow (Levine, 1997; Yang and Yi, 2008; Abu-Bader and Abu-Qarn, 2008; Pal, 2011; Bittencourt, 2012).

Although the literature in this regard primarily started its journey by focussing on the concept of exclusion (Leyshon and Thrift, 1995) evolving its root from the closures of the then bank branches limiting people to access and use the formal financial services extended

by financial intermediaries. Of late in 2005, the concept arrived in India, when Y.V. Reddy (Former Reserve Bank of India Governor) emphasised on the term to address the reduction of informal sources of finance and in ultimate put a brake to exclusion (Reddy, 2015). Including the excluded in the formal financial system enhances the efficiency of the service provider by reduction of costs and in turn providing a variety of services at a more affordable or simply cheaper price to its clients (Barik and Sharma, 2019). Increment in the clientele base also helps to stabilise the service provider, financial system and the economy which in turn strengthens the inherent capacity to absorb unexpected shocks. Such a reference can be drawn from the experience of Bank Rakyat Indonesia, a government-owned development bank, mainly operative in rural Indonesia which ended up with profits at the time of financial crisis in 2008.

Among the prominent measures on removing exclusion are the Community Reinvestment Act (1977) by the USA; a voluntary code as introduced by The German Bankers' Association in 1996 providing for an "everyman" current banking account and in ultimate ensuring facilities of basic banking transactions to a larger group; the law on exclusion (1998) as enforced by the "Gouvernement de la République française" (The Government of French Republic) focusing on the right to have bank accounts; and finally, effort by South African Banking Association (South Africa), with the aim to provide a low-cost bank account called "Mzansi" for financially excluded people in 2004 deserves mention (Maity, 2018). In India, the concept emerged under the three-fold layers of recommendation as submitted in reports by the three most impacting committees, the Khan Commission (2005-2006), the Rangarajan Committee (2007-2008) and the Mor Committee (2012-2013), each focusing on the problem of reducing financial exclusion with a unique aspect.

Throughout the world, such initiatives aiming at bringing the excluded within the mainstream started hitting the targets with deeper insights. Yet a consensus was missing on how the achievement can be computed uniformly for all countries or states within a geographical territory and set a platform to track the changes over time and further in drawing comparisons among them.

This study primarily focuses to develop an index of financial inclusion (IFI) that resolves the issue of weighting and in ultimate combat the evils of perfect substitutability between dimensions which had been in debates for long among the research community. For the sake of identifying dimensions of financial inclusion and assign suitable weights thereto, the study uses factor analysis (FA). Finally, using non-linear aggregation of intermediate dimensional indicators, the study arrives at the composite index for a study period 2013-2017 spanning over 26 countries belonging from the continent of Asia and extends further by tracking the significance of changes over the period of study for countries classified under different income groups.

Review of literature

Starting on the journey of reviewing literatures is expected to first provide the reason as to why the measure of inclusion becomes an important indicator of development. To explore the dimension of alliance between inclusion and other indicators of development, the study considers a number of literature of which King and Levine (1993) aims to establish the relationship existing between financial developments, growth and certain sources of growth and test the assertion of Schumpeter 80 years back. The findings of the study show that financial development variables are significantly associated with the growth variables.

Provision of microcredit through the formal financial institutions helps the poor to increase their banking habits, augment saving, smooth consumption and enhance their capability by investing on their non-income generating activities such as health, education,

sanitation and other basic entitlements (Barik and Sharma, 2019). Research finding describes that the expansion of financial inclusion can raise the financial condition and can improve the standard of living of the poor and disadvantaged groups of people (Srijanani, 2012). Similarly, Sen (1999) argues that the availability and easy access to finance have very significant effect on other economic entitlement. Including the excluded in the formal financial system aims to influence poverty and also inequality through providing ease of access to various financial services to the vulnerable sections of society (Sahoo *et al.*, 2017). A number of studies in this regard suggest that both poverty and inequality are negatively associated with access to formal financial services (Galor and Zeira, 1993; Honohan, 2004; Burgess and Pande, 2005; Buckland *et al.*, 2011; Clarke *et al.*, 2006; Beck *et al.*, 2007; Jeanneney and Kpodar, 2011).

Incorporation of the groups excluded from the ambit of formal financial system comes up with wide range, low-cost, fair and safe formal financial services, such as credit, deposits, insurance and payments, whenever needed, which in turn reduces the growth of informal sources of credit (such as moneylenders) which often tends to be exploitative (Leyshon and Thrift, 1995; Carbo *et al.*, 2005; Conroy, 2005; Mohan, 2006; Rangarajan Committee, 2008).

Kempson and Whyley (1999) define financial exclusion in a broader sense, which refers to those people who have been excluded from access to mainstream financial services and products. The finding of Sinclair (2001) converges with the views presented earlier and defines financial exclusion as the inability to access necessary financial services in an appropriate form.

Focussing on the studies concerned with the measurement of the degree of financial inclusion achieved (Sarma, 2008; Kumar and Mishra, 2011; Rahman, 2012; Sarma, 2012; Gupte *et al.*, 2012; Chakravarty and Pal, 2013; Amidžić *et al.*, 2014) are worth mentioning.

Following the concept as introduced by Zeleny (1974) and suggestions provided by Nathan *et al.* (2008), Sarma (2008) computes the IFI by using a combination of United Nations Development Program's (UNDP) calculation of Human Development Index (HDI) (for capturing the attainment level of significant variables considered for the study) and the inverse of Euclidean distance to consolidate the attainment levels in to a single metric and refrain from the criticism of perfect substitutability. The result of the study shows that for both the groups (i.e. the group of 55 countries where 3 dimensions are available and the group of 100 countries where 2 dimensions are available) Organisation for Economic Co-operation and Development (OECD) countries take the lead. Among notable exceptions under the three-dimensional group, it is observed that Malaysia and Singapore with higher IFI values crosses Norway (a member of the OECD group). However, India's performance under both the groups is not quite satisfactory. Similar methodology as used in Sarma (2008) continues to be followed by a number of scholarly articles in a different context, of which Arora (2010), Chattopadhyay (2011), Rahman (2012), Laha and Kuri (2014) and Kaleeswaran and Meera (2017) are noteworthy. Further, Sarma (2012) introduces the concept of assigning non-parametric weights to variables and computes a simple average of the Euclidean distance and the inverse of Euclidean distance to enhance the exposure of statistical integrity while measuring the achievement in financial inclusion. The literature remains consistent in findings with its previous version, where OECD countries are found to be placed at the top, consecutively for the whole study period (i.e. 2004-2010). Further, not surprisingly it is observed that the overseas financial centres such as Cyprus, Singapore and Malta also take a prominent position over the years in terms of the IFI computed. An apparent view of India's position reveals that it consistently remains at the border line of lower-middle IFI group.

Following the methodology considered in Sarma (2012), a number of studies also came up with certain changes in variable structure and contexts of which (Chotia and Rao, 2014) deserves mention. Instead of a cross-country comparison, Chotia and Rao (2014) consider a comparison among the states of India with a different set of variables and finds that the northern region takes place on the top whereas the north-east region places itself at the bottom of the list. Additionally, the states holding higher degree of IFI are also found with high GDP per capita and good HDI.

Similarly, Kumar and Mishra (2011) came up with certain modifications of the previous studies both in terms of methodology as well as variable structure. Instead of using the max–min approach, which may give biased results because of extreme values taken into consideration, the study uses the distance from the average method and constructs two separate indexes from the two different but related perspective of demand for and supply of financial services. Analysis of the supply side reveals that wide disparity exists among the states, which augments further when looking at the rural–urban classification. A review of the alternative (i.e. the demand side) shows that access to financial services is about one-third for savings, less than one out of five households with regard to credit, and one out of eight for insurance, resulting into a consolidated figure of 0.208.

A further modification of methodology was considered by Gupte *et al.* (2012), where variables within a dimension were consolidated using the arithmetic mean and dimensions were consolidated into the final value of index using a geometric mean. Combining a number of variables into four dimensions for the year 2008-2009, it is observed that India's position has gone better but not at a rate fulfilling the expectations. Likewise, a conceptual modification of Sarma (2008) is put forward by Chakravarty and Pal (2013), where the marginal rate of substitution (MRS) between variables is expected to hold value above or equal to 0, but less than 1. The study using certain axiomatic criterion on the data of supply side indicators highlights that considering the value of MRS as 1, inherently assumes that variables are perfectly substitutable. The findings of the study suggest that performance in financial inclusion among the states of India has a significant change from the pre-social banking era (1972-1976) to the social banking era (1977-1990). However, the change is not vibrant when it is considered between the social banking era (1977-1990) and the post-social banking era (1991-2009), which seems to indicate that the provision of formal financial services has increased concentration over the selected parts of the society.

Further, to counter perfect substitutability as well as to refrain from the impact of extreme values for variables considered in the study, Amidžić *et al.* (2014) uses a weighted geometric mean along with the distance to a reference point respectively to normalise the values of variables. The study also considers statistical identification of variables under each of the dimensions using FA and further uses the squared factor loadings to assign appropriate weights to each of the variables under study for the purpose of consolidation into a single metric. Findings of the literature shows that countries from higher and upper-middle income group finds place at the top of the inclusiveness order with a very little regional variation, whereas countries from lower and lower-middle income group stands at the bottom. Using the same methodology in the Indian context and also considering the contribution of cooperatives, Saravanabhavan (2018) explores the level of achievement in terms of financial inclusion for the states of India. However, Saravanabhavan (2018) uses max–min approach instead of the distance from a reference point as used in Amidžić *et al.* (2014) and finds a prominent increase in the degree of financial inclusion among the states of India for the study period 1984-2016.

The association between financial inclusion and income has been long proved (Demirguc-Kunt and Klapper, 2013; Amidžić *et al.*, 2014), but whether countries from high

income group are better financially included is an assertion yet to be tested. A very few of
the available literatures provide a comprehensive measure besides keeping track of changes
in achievement of inclusion over time. Further, we find very limited literary evidence
concentrating to explore the achievements in terms of financial inclusion specially covering
the continent of Asia which further is based on income classifications.

Based on the above literary documentations, the study endeavours to investigate the
degree of financial inclusion achieved by 26 nations covering a period from 2013 to 2017, by
defining a measure of the index of its own. Further, based on the values of inclusion index
obtained, it intends to find whether significant differences exist between the two income-
based groups and over the period of time for the constructs established in this regard.

Data and methodology
Selection of variables
Financial inclusion affects as well as is also affected by a diverse range of variables.
Therefore construction of an index that most appropriately projects the degree of inclusion
requires identification of important variables. Primarily, the theoretical relevance forms the
basis of selection of variables for the construction of the index. However, the ultimate
screening requires the variables to qualify both on the basis of literary evidence and the
statistical significance. While considering the abovementioned criteria, we find a set of 14
variables, classified under 5 dimensions consistently been available for the whole study
period. Considering a relatively long period along with the measurement for a diverse group
of countries leaves us with only 14 variables from among the large set of data available.
Table 1 outlines the available set of variables that we propose to use for construction of the
IFI. Further, in the following section, we provide a theoretical foundation on the dimensions
that we suppose to use for building up of the index:

- *Service potential*: This dimension represents the ability of the financial system to
  serve its existing as well its prospective clients.

- *Availability*: It basically represents the degree to which services are made convenient
  to its intended clients.

- *Accessibility*: This dimension represents the degree to which the available services
  are being accessed by the targeted population.

Service potential	Accessibility	Availability	Efficiency	Stability
Bank Z-score *(BZ)*	Depth of credit information index *(CII)*	Branches of commercial banks per 1,000 km^2 *(BRAN_A)*	Bank return on assets (%, before tax) *(ROA)*	Strength of legal rights index *(LRI)*
Private credit by deposit money banks to GDP (%) *(PRIVY)*	Depositors with commercial banks (per 1,000 adults) *(DEPO)*	Automated Teller Machines (ATMs) per 1,000 km^2 *(ATM_A)*	Bank overhead costs to total assets (%) *(OCTA)*	
Deposit money banks assets to GDP (%) *(DMBAG)*	Number of commercial bank branches per 100,000 adults *(BRAN_P)*		Bank net interest margin (%) *(NIM)*	
Bank deposits to GDP (%) *(BDG)*	ATMs per 100,000 adults *(ATM_P)*			

Source: Presented by authors

Table 1.
List of variables
classified under
dimensions

- *Efficiency*: This dimension outlines how efficiently the financial system within an economy is operating.
- *Stability*: This dimension basically tries to depict how stable and viable the financial system is within an economy.

Selection of countries

With an intention to explore whether income status [measured in terms of gross national income (GNI) per capita on purchasing power parity (PPP) terms] has a forbearing on the degree of financial inclusion achieved, we consider countries classified under the different categories of income [such classification has drawn reference from the World Bank (2018) database].

Table 2 provides the number of countries classified under the different income groups for the continent of Asia and further outlines the number of countries where the data comes out to be available. Because of the less availability of countries from the "Lower" income group for the continent of Asia, we consider the countries from "Lower" and "Lower-Middle" income groups together and simultaneously with countries from "High" and "Upper-Middle" income groups together as part of our sample for the study and subsequently identify them as the group of countries from "High-income" and "Low-Income" strata, respectively.

Data sources

The Global Financial Development Database as an extensive data set of the financial systems covering almost 203 economies from 1960 onwards preserving 109 indicators with an aim to capture various aspects of financial institutions and markets has been earmarked to retrieve important information on service potential, accessibility, availability, efficiency and stability. To settle down with certain inconsistencies, we have also kept an eye over the parallel survey as put forward by the International Monetary Fund by the name Financial Access Survey adopted with an aim to monitor Target 8.10 of the 2030 Sustainable Development Goals. Furthermore, to explore some more vital information, The World Development Indicators as extended by The World Bank Group comprising almost 1,600 high quality and internationally comparable statistics for almost 220 economies extending back more than 50 years has also been imparted in our study as a source of data.

Study period

Projection of the degree of financial inclusion achieved around the globe and tracking the changes in attainment level over time requires a relatively long period of study to retain statistical integrity of results. However, because of unavailability of data on selected variables for construction of the index, we are restricted to a maximum period of five years starting from 2013 to 2017.

	High	Upper-middle	Lower-middle	Low	Total
Asia	12	16	14	6	48
Availability of data	5	9	10	2	26
Available (%)	41.67	56.25	71.43	33.33	54.17

Source: Presented by authors

Table 2.
Classification of Asian countries as per GNI per capita (PPP terms on constant international $)

Research methodology
While measuring the degree of achievement in terms of financial inclusion of a country, we consider the following set of statistical and devices of econometrics in our study. Further, to explore the significance of differences for drawing comparisons, we use two parametric and a non-parametric test (i.e. paired samples *t*-test, independent samples *t*-test and Wilcoxon signed-rank test).

- Weighted max-min approach of normalisation.
- Exploratory FA.
- The inverse of Euclidean distance.
- Parametric and non-parametric analyses to highlight the existence of significant differences.

The theoretical and empirical justifications as to why we were supposed to rely on the above-mentioned measures are detailed below in a phased manner.

Step I: weighted max–min approach. The measure of max–min as introduced by UNDP for the measurement of HDI variables stands among the prominent measures of normalisation used by most of the literatures (Sarma, 2008; Arora, 2010; Sarma and Pais, 2011; Chattopadhyay, 2011; Pal, 2011; Sarma, 2012; Rahman, 2012; Gupte *et al.*, 2012; Pal , 2013; Laha and Kuri, 2014; Chotia and Rao, 2014; Kaleeswaran and Meera, 2017; Saravanabhavan, 2018), which has also been used in the existing study.

Among alternative measurements comparison with the distance-from-average method suggests that UNDP's measure provides more independence to assume variation in the data set and in turn helps to reflect the same in the results. This helps the researcher to assign weights to variables according to their variability to get a data-driven consolidated picture of a dimension.

Using the inclusion sensitivity parameter (r) as put forward by Chakravarty and Pal (2013) to incorporate the disproportionate concept of MRS among the variables considered in measuring the achievement of a variable with a value lying between $0 < r < 1$, has also a number of demerits to discuss. Such a constant value of "r" assumes that data set, when plotted on a graph, will remain convex to origin and the convexity increases when the value of "r" approaches "0". The value of "r" might differ from variable to variable or it might be so that the data when plotted on a graph is not convex rather concave to the origin. Further, assuming that all variables follow convexity to origin uniformly when plotted on a graph may not fairly serve the objective of the study.

However, comparing the max–min approach with the distance to a reference point as has been introduced by Amidžić *et al.* (2014) leaves us with very little methodological difference. If we consider the maximum and minimum values from empirical observation for max–min approach, it becomes almost close to the method as prescribed by distance to a reference point having an upper bound of 1 and a lower bound of 0.

In addition to the max–min approach, we propose to use the Chebyshev's theorem that helps to clean the available data and avoid extreme values coming out of data cracking and decisively influencing the esteemed IFI.

Variables considered within the model, which are expected to imbibe a positive influence on the final achievement value are measured and further aggregated using formula (1), whereas those with a negative impact are handled using formula (2) for the study.

$$d_i = w_i \frac{Ai - mi}{Mi - mi} \qquad (1)$$

$$d_i = w_i \frac{Mi - Ai}{Mi - mi} \qquad (2)$$

Where;
w_i = weight attached to the dimension "i", $0 < w_i < 1$;
A_i = actual value of dimension "i";
m_i = lower limit on the value of dimension "i"; and
M_i = upper limit on the value of dimension "i".

The dimension index d_i, as computed by both the formula (1) and (2), measures the country's achievement in the ith dimension of financial inclusion. A weight (w_i) such that $0 < w_i < 1$ is attached to the dimension "i", indicating the relative importance of the dimension "i" in quantifying the inclusiveness of a financial system.

Step II: exploratory factor analysis
Using FA as a means of finding statistical significance of variables, identified from empirical literature, leads us to a strong logic as to why a particular variable should be considered in the study of financial inclusion achievement (Saravanabhavan, 2018; Amidžić *et al.*, 2014). A close review of alternatives reveals that the FA seems to be capable of recognizing the reflexes of variables in either direction, which the cluster analysis and multidimensional scaling are not competent of (Thompson, 1992).

Assigning an exogenous weight to variables ends up with an element of subjectivity, whereas using endogenous weight and assuming each variable is equally important within a sub-index leads us to the problem of perfect substitutability. Instead of assigning equal weight to each variable within a sub-index, we shall proceed in a way that puts a weight that is driven by empirical results (data-driven weights) and conforms to the practice of parametric assignment of weights. By squaring the factor loadings taken from the rotated component matrix (in case of Varimax as a rotational method) or structure matrix (in case of Direct Oblimin as a rotational method), we assign parametric weights to variables to have a statistically relevant consolidation of variables in to dimensions in construction of the inclusion index.

Step III: inverse of Euclidean distance
In the present study, consolidation of variables in to certain dimensions has been made using the weighted arithmetic mean where weights are derived simply by using FA (Amidžić *et al.*, 2014). But at a later stage, we use the distance from the ideal point (i.e. the inverse of Euclidean distance) assuming that each of the dimension contributes almost equally for attaining a particular degree of achievement in financial inclusion (Nathan *et al.*, 2008). Formula for measuring the IFI using inverse of Euclidean distance is provided below.

$$IFI_i = 1 - \frac{\sqrt{\sum (1 - di)^2}}{\sqrt{n}} \qquad (3)$$

Where, d_i refers to the achievements of the different dimensions considered under the study.

Depending on the relation a variable shares with the ultimate measure of financial inclusion, we may refer to either of the final model(s) detailed below.

$$IFI_t = 1 - \frac{\sqrt{\sum_1^n \left[1 - \left\{\sum_1^n wi \left(\frac{Ai-mi}{Mi-mi}\right)\right\}\right]^2}}{\sqrt{n}} \qquad (4)$$

where, variables hold a positive effect on the degree of financial inclusion achievements.Or

$$IFI_t = 1 - \frac{\sqrt{\sum_1^n \left[1 - \left\{\sum_1^n wi \left(\frac{Mi-Ai}{Mi-mi}\right)\right\}\right]^2}}{\sqrt{n}} \qquad (5)$$

where, variables hold a negative effect on the degree of financial inclusion achievements.

Step IV: parametric and non-parametric tests for analyses
As the data fulfils the prerequisite assumptions regarding normality for both the *t*-tests (using Shapiro–Wilk test) and also the equality of variances for independent samples *t*-test (using Levene's *F*-test), we rely on the parametric tests for testing the constructs, as it provides more stiff conclusions than that of the non-parametric ones. However, because of the violation of some prescribed assumptions regarding normality, we in parallel use the Wilcoxon signed-rank test for snipping out the significance of change over time.

Analysis and findings
So far as the part of analysis is concerned, we decompose the whole discussion into two parts. Where the first would deal with the measurement of the inclusion index and the latter will focus on identification of significant differences for the constructs established.

Measuring the index of financial inclusion
Projecting the degree of financial inclusion achieved by a single number involves a complex process to carry out. As the value of inclusion is affected by a large range of diverse variables, it becomes quite critical to portray all of the significant variables and that too in an appropriate manner (Freudenberg, 2003). However, to materialise the complicacies, we consider a sequential approach so that significant problems on projection of a single value minimises to a greater extent. For the sample countries considered in the study, we analyse the inclusion achievements on the basis of the two sub-points detailed below.

Result of exploratory factor analysis. As a prerequisite of performing FA, we test the correlation among the variables of interest using multivariate tests of the covariance matrix for the sample data and intend to find whether the matrix so constructed is diagonal. Further, we add a spherical restriction using the Bartlett's spherical test, which basically asserts on whether the covariance matrix significantly differs from an identity matrix (Amidžić *et al.*, 2014). Based on the results, we conclude that the data set considered in this study satisfies the required conditions for the use of FA.

Principal component analysis (PCA) as a means of performing the FA drives to find out the relevance of each variable in constructing the inclusion index where factor loadings obtained from the model has been squared to arrive at statistical weights for each of the variables so confined. Considering a condition of reporting with Eigen values of 1 or more, PCA suggests a number of dimensions (5) consistently found for the whole period of study

which altogether converges with theory when variables consistently load on the dimension which has been theoretically assigned to them.

Result of the weighted max–min approach and the inverse of Euclidean distance. Depending on the relation that the variable holds with the final value of the index, we prefer to use either equation (1) or equation (2) to normalise the available set of variables. Further, we use equation (3) to consolidate the normalised values of different variables considered in the study. The columns (2nd, 3rd, 4th, 5th and 6th) in the respective Tables 3-7 provide the result of weighted max–min approach whereas the last column (i.e. 7th) represents the IFI, calculated using the inverse of the Euclidean distance method.

Index of financial inclusion positions at a glance. Considering a simple average of the inclusion achieved throughout the whole study period (7th column of Table 8), the study finds that South Korea takes the lead with a value of 0.587, and is followed by the countries both from the eastern and north western part of the continent. In parallel, comparison among the nations based on the variations reported over time shows that South Korea holds a relatively stable position over the years than its competitors from the top order of IFI rankings. However, considering the performance of Jordon in terms of IFI achievements turns out to be relatively poor. With an average achievement score of 0.199 compared to South Korea (the leader), it reflects large variations over time. Among others, India with an inclusion index value of 0.395 places itself 8th in terms of overall ranking considering the

Country name	Service potential	Accessibility	Availability	Efficiency	Stability	IFI
Afghanistan	0.27	0.00	0.00	0.29	0.75	0.21
Armenia	0.43	0.75	0.08	0.34	0.50	0.38
Azerbaijan	0.34	0.55	0.04	0.45	0.17	0.29
Bangladesh	0.46	0.02	0.24	0.50	0.42	0.30
Bhutan	0.37	0.64	0.01	0.46	0.33	0.33
Brunei Darussalam	0.46	0.68	0.06	0.45	1.00	0.44
Cambodia	0.54	0.51	0.02	0.36	0.83	0.39
Georgia	0.49	0.77	0.06	0.32	0.75	0.41
India	0.45	0.62	0.17	0.32	0.67	0.41
Indonesia	0.41	0.66	0.08	0.32	0.50	0.36
Japan	0.86	0.71	0.52	0.56	0.42	0.58
Jordan	0.37	0.53	0.04	0.45	0.00	0.25
Korea, Rep.	0.78	0.98	0.79	0.48	0.42	0.63
Lebanon	0.73	0.55	0.40	0.48	0.17	0.43
Malaysia	0.65	0.72	0.04	0.57	0.58	0.46
Maldives	0.37	0.46	0.66	0.51	0.17	0.41
Mongolia	0.40	0.72	0.00	0.28	0.75	0.36
Myanmar	0.43	0.01	0.01	0.38	0.17	0.18
Nepal	0.42	0.02	0.05	0.51	0.83	0.30
Pakistan	0.38	0.59	0.05	0.45	0.17	0.30
Philippines	0.42	0.61	0.10	0.39	0.08	0.29
Saudi Arabia	0.39	0.75	0.01	0.53	0.08	0.30
Thailand	0.78	0.73	0.12	0.44	0.58	0.47
Turkey	0.51	0.68	0.08	0.40	0.33	0.37
United Arab Emirates	0.51	0.75	0.08	0.53	0.17	0.36
Vietnam	0.62	0.61	0.06	0.41	0.67	0.43

Table 3.
IFI for 2017

Source: Presented by authors

Country name	Service potential	Accessibility	Availability	Efficiency	Stability	IFI
Afghanistan	0.103	0.000	0.000	0.549	0.900	0.223
Armenia	0.320	0.564	0.131	0.445	0.600	0.387
Azerbaijan	0.253	0.379	0.070	0.228	0.200	0.220
Bangladesh	0.343	0.083	0.359	0.338	0.500	0.311
Bhutan	0.303	0.396	0.012	0.693	0.400	0.325
Brunei Darussalam	0.393	0.543	0.100	0.416	0.500	0.371
Cambodia	0.463	0.258	0.025	0.663	1.000	0.383
Georgia	0.366	0.671	0.090	0.714	0.900	0.465
India	0.383	0.406	0.250	0.319	0.600	0.380
Indonesia	0.279	0.427	0.136	0.657	0.600	0.388
Japan	0.854	0.791	0.780	0.173	0.500	0.542
Jordan	0.477	0.156	0.058	0.440	0.000	0.202
Korea, Rep.	0.851	0.802	0.774	0.254	0.500	0.571
Lebanon	0.814	0.430	0.614	0.380	0.200	0.446
Malaysia	0.750	0.472	0.068	0.326	0.700	0.408
Maldives	0.261	0.331	0.901	0.998	0.200	0.427
Mongolia	0.346	0.712	0.002	0.254	0.500	0.320
Myanmar	0.260	0.015	0.007	0.268	0.200	0.142
Nepal	0.455	0.096	0.062	0.562	0.600	0.315
Pakistan	0.235	0.302	0.079	0.507	0.200	0.251
Philippines	0.337	0.109	0.155	0.408	0.100	0.212
Saudi Arabia	0.365	0.456	0.011	0.425	0.100	0.249
Thailand	0.738	0.532	0.208	0.389	0.300	0.404
Turkey	0.423	0.599	0.125	0.482	0.200	0.342
United Arab Emirates	0.558	0.443	0.143	0.423	0.200	0.335
Vietnam	0.596	0.301	0.102	0.340	0.700	0.370

Source: Authors' calculation

Table 4.
IFI for 2016

mean values of IFI over the study period and becomes the 2nd country from the South Asian Association for Regional Cooperation (SAARC) group to cross the bar of 0.363 (2nd quartile).

Analysis of coefficient of variation (CV) for the sample countries computed on mean IFI values over 2013-2017 reveals that majority of the countries from the East and South east region occupies top order positions. Countries such as Bhutan (1st), Indonesia (2nd) and India (3rd) are supposed to be the most stable economies in terms of mean IFI values during 2013-2017. However, the environment of inclusion is found to be quite susceptible in terms of volatility for countries such as Myanmar (23rd), Azerbaijan (24th), Philippines (25th) and Jordan (26th) (Table 9).

Analysis of mean IFI values for the group of countries classified on the basis of GNI per capita (PPP terms on constant international $) in the above table clearly shows a positive association with income. While moving from the countries with lower income to the countries with high income, an improvement in the degree of average IFI has been observed, which is further confirmed using inferential statistics in the next part of the study.

Average value of IFI for the whole study period reveals that with highest value within the income group classified, South Korea, Georgia, India and Nepal takes the lead. While simultaneously focussing on the CV shows that among the abovementioned four countries, only India (3rd), Nepal (6th) and South Korea (7th) hold a good amount of stability considering mean IFI values for the study period.

Country name	Service potential	Accessibility	Availability	Efficiency	Stability	IFI
Afghanistan	0.157	0.000	0.000	0.356	0.900	0.208
Armenia	0.345	0.539	0.151	0.395	0.400	0.354
Azerbaijan	0.323	0.363	0.085	0.264	0.200	0.241
Bangladesh	0.371	0.078	0.398	0.365	0.500	0.328
Bhutan	0.282	0.360	0.012	0.728	0.400	0.317
Brunei Darussalam	0.384	0.511	0.119	0.484	0.400	0.364
Cambodia	0.435	0.198	0.024	0.669	1.000	0.364
Georgia	0.371	0.632	0.101	0.675	0.900	0.460
India	0.398	0.366	0.269	0.380	0.600	0.393
Indonesia	0.318	0.409	0.154	0.554	0.500	0.371
Japan	0.839	0.817	0.844	0.338	0.500	0.607
Jordan	0.426	0.302	0.063	0.461	0.000	0.228
Korea, Rep.	0.823	0.791	0.809	0.304	0.500	0.589
Lebanon	0.783	0.418	0.696	0.421	0.200	0.461
Malaysia	0.741	0.420	0.080	0.410	0.700	0.419
Maldives	0.295	0.290	0.911	0.880	0.200	0.423
Mongolia	0.349	0.669	0.002	0.382	0.500	0.343
Myanmar	0.296	0.013	0.007	0.319	0.200	0.156
Nepal	0.397	0.085	0.065	0.567	0.600	0.304
Pakistan	0.261	0.163	0.086	0.533	0.200	0.233
Philippines	0.345	0.106	0.168	0.430	0.100	0.218
Saudi Arabia	0.361	0.431	0.012	0.490	0.100	0.255
Thailand	0.741	0.488	0.235	0.426	0.300	0.411
Turkey	0.434	0.573	0.146	0.453	0.200	0.341
United Arab Emirates	0.494	0.425	0.162	0.525	0.200	0.344
Vietnam	0.537	0.273	0.113	0.396	0.700	0.370

Source: Authors' calculation

Table 5.
IFI for 2015

Financial inclusion of selected countries: a comparative analysis
Paired samples *t*-test and the Wilcoxon signed-rank test has been used to test significant degree of changes in IFI values over time, whereas the study uses the independent samples *t*-test for testing significant differences between the income groups.

Primarily satisfying the conditions of normality for both the *t*-tests and homogeneity of variance for independent samples *t*-test leads us to a robust statistical frame for relying on such parametric analyses. However, because of violating the conditions of normality for some constructs where comparison on the basis of time was sought, the study uses the non-parametric alternative (i.e. Wilcoxon signed-rank test) for detecting the significance of difference.

Comparisons over time. Paired samples *t*-test appears among the prominent parametric tests to diagnose serious fluctuations of the IFI values over time.

However, to perform such analysis, one needs to satisfy at least the condition of normality, which means the difference in paired values should approximately form close to a normal distribution. Using the values of skewness and kurtosis duly scaled by their respective standard errors (finding out the *z*-values whether they lie within the range of ± 1.96 or not) (Posten, 1984) and with the help of Shapiro–Wilk test (Shapiro and Wilk, 1965), the study finds the data for the year 2014-2015 and 2016-2017 to be approximately normally distributed, whereas for the year 2013-2014 and 2015-2016, the distribution is found to be non-normally distributed. A review for the tests of normality can be viewed from Table 10

Country name	Service potential	Accessibility	Availability	Efficiency	Stability	IFI
Afghanistan	0.420	0.000	0.000	0.253	0.900	0.238
Armenia	0.523	0.539	0.152	0.343	0.400	0.375
Azerbaijan	0.477	0.397	0.086	0.427	0.200	0.301
Bangladesh	0.561	0.061	0.383	0.392	0.500	0.356
Bhutan	0.276	0.371	0.012	0.703	0.400	0.315
Brunei Darussalam	0.547	0.484	0.121	0.487	0.400	0.389
Cambodia	0.512	0.217	0.021	0.534	1.000	0.363
Georgia	0.553	0.621	0.105	0.575	0.900	0.483
India	0.476	0.389	0.255	0.308	0.600	0.393
Indonesia	0.553	0.408	0.152	0.506	0.400	0.388
Japan	0.748	0.760	0.863	0.230	0.500	0.557
Jordan	0.239	0.122	0.064	0.360	0.000	0.147
Korea, Rep.	0.756	0.860	0.822	0.240	0.500	0.567
Lebanon	0.529	0.417	0.698	0.316	0.200	0.407
Malaysia	0.638	0.486	0.082	0.383	0.700	0.415
Maldives	0.505	0.314	0.901	0.880	0.200	0.475
Mongolia	0.415	0.577	0.002	0.355	0.500	0.340
Myanmar	0.583	0.007	0.007	0.284	0.200	0.188
Nepal	0.414	0.063	0.063	0.458	0.600	0.285
Pakistan	0.453	0.161	0.081	0.432	0.200	0.250
Philippines	0.443	0.084	0.162	0.334	0.100	0.212
Saudi Arabia	0.416	0.467	0.011	0.427	0.100	0.260
Thailand	0.768	0.507	0.235	0.368	0.300	0.405
Turkey	0.580	0.610	0.145	0.389	0.200	0.356
United Arab Emirates	0.388	0.446	0.161	0.447	0.200	0.317
Vietnam	0.528	0.289	0.112	0.278	0.700	0.348

Source: Authors' calculation

Table 6.
IFI for 2014

below, suggesting the use of Wilcoxon signed-rank test as a non-parametric alterative to the dependent samples t-test for 2013-2014 and 2015-2016 (Table 11).

Result of Table 10 above shows that the movement of the mean IFI values as documented in Table 8 can safely be assigned to the randomness contained within the data set with $t(25) = 0.180$ and $p = 0.859$ for the year 2014-2015. Whereas, results for the year 2016-2017 shows significant change [$t(25) = -3.682$, ($p = 0.001$)], with a relatively smaller effect size of 0.246.

Further, considering the change in mean IFI value to be non-significant for the year 2014-2015, we hold back to continue with the study of effect size (Hedges and Olkin, 1985; Cumming, 2012).

While contemplating on the significance of differences over time, where the distribution of the difference between pairs turns out to be non-normal (Table 11), we find that the change in 2014 and 2016 over 2013 and 2015, respectively, turns out to be non-significant, where we may conclude that even with mean values of IFI, the countries from Asia are facing a downturn and that they are not statistically severe to that extent.

Comparison between the income groups. Independent samples t-test has been used to explore the significance of difference existing between the income groups (Table 12), so far as the achievements in terms of mean IFI values are concerned.

With the satisfactory results of normality [obtaining z-values for both the skewness and kurtosis falling within a range of ± 1.96 (Schmider *et al.*, 2010) and further accepting the null hypothesis of Shapiro–Wilk test (Shapiro and Wilk, 1965)] and in parallel accepting the null

Country name	Service potential	Accessibility	Availability	Efficiency	Stability	IFI
Afghanistan	0.346	0.000	0.000	0.376	0.900	0.248
Armenia	0.468	0.518	0.152	0.480	0.400	0.389
Azerbaijan	0.420	0.152	0.087	0.415	0.200	0.242
Bangladesh	0.519	0.063	0.379	0.442	0.500	0.359
Bhutan	0.283	0.354	0.012	0.764	0.400	0.318
Brunei Darussalam	0.480	0.531	0.137	0.508	0.400	0.394
Cambodia	0.455	0.203	0.018	0.582	1.000	0.356
Georgia	0.496	0.611	0.113	0.639	0.900	0.484
India	0.472	0.366	0.228	0.378	0.600	0.396
Indonesia	0.501	0.397	0.148	0.528	0.400	0.380
Japan	0.833	0.777	0.869	0.257	0.500	0.576
Jordan	0.304	0.133	0.066	0.439	0.000	0.173
Korea, Rep.	0.719	0.857	0.842	0.289	0.500	0.581
Lebanon	0.609	0.429	0.715	0.346	0.200	0.429
Malaysia	0.707	0.497	0.090	0.419	0.700	0.436
Maldives	0.464	0.314	0.876	0.852	0.200	0.464
Mongolia	0.417	0.572	0.002	0.424	0.500	0.352
Myanmar	0.489	0.004	0.005	0.253	0.200	0.170
Nepal	0.424	0.063	0.063	0.492	0.600	0.292
Pakistan	0.424	0.158	0.080	0.397	0.200	0.240
Philippines	0.422	0.087	0.162	0.377	0.100	0.217
Saudi Arabia	0.395	0.460	0.011	0.440	0.100	0.257
Thailand	0.775	0.502	0.240	0.396	0.300	0.412
Turkey	0.548	0.585	0.149	0.435	0.200	0.358
United Arab Emirates	0.414	0.399	0.169	0.453	0.200	0.317
Vietnam	0.536	0.280	0.116	0.336	0.700	0.360

Source: Authors' calculation

Table 7.
IFI for 2013

hypothesis of the Levene's F-test [F (1, 24) = 1.071, p = 0.311] lead us to a strong background of performing the independent samples t-test. Result of the independent samples t-test further reveals that the mean values of IFI achieved for the countries classified under the high-income and low-income group differs significantly ($p < 0.05$), with a vibrant effect size of 0.918; contending that the income certainly have an impact on the degree of financial inclusion achieved for a particular economy under consideration.

Summary and conclusion

While focussing on many of the persistent criticisms of some similar indices measuring the degree of financial inclusion, the study instigates certain modifications on the measurement and computes IFI for 26 nations belonging from the continent of Asia for a period 2013-2017. Lack of an adequate weighting scheme for variables and dimensions and in addition the inability of certain aggregators to capture imperfect substitutability between dimensions forms the basis of this study. Using the exploratory FA, and subsequently the inverse of Euclidean distance, the study builds up an IFI, where South Korea from the continent in study finds place at the top throughout the study period so far as the values of mean IFI's are concerned. Among other nations, India with an average IFI score of 0.395 stands 8th among the countries from the Asian continent and 2nd in terms of position among the SAARC group. But astoundingly, it is observed that even standing at the 8th position in terms of overall ranking, India manages to hold the 3rd position so far as the values of CV of

Country name	IFI 2013	IFI 2014	IFI 2015	IFI 2016	IFI 2017	Average IFI	SD	CV	Rank		Empirical analysis
Bhutan	0.318	0.315	0.317	0.325	0.329	0.321	0.006	0.018	1		
Indonesia	0.380	0.388	0.371	0.388	0.365	0.378	0.010	0.027	2		
India	0.396	0.393	0.393	0.380	0.415	0.395	0.013	0.032	3		
Turkey	0.358	0.356	0.341	0.342	0.367	0.353	0.011	0.032	4		
Armenia	0.389	0.375	0.354	0.387	0.381	0.377	0.014	0.037	5		63
Nepal	0.292	0.285	0.304	0.315	0.299	0.299	0.011	0.038	6		
Korea, Rep.	0.581	0.567	0.589	0.571	0.626	0.587	0.024	0.040	7		
Cambodia	0.356	0.363	0.364	0.383	0.392	0.372	0.015	0.041	8		
Japan	0.576	0.557	0.607	0.542	0.584	0.573	0.025	0.044	9		
Malaysia	0.436	0.415	0.419	0.408	0.457	0.427	0.020	0.046	10		
Lebanon	0.429	0.407	0.461	0.446	0.434	0.435	0.020	0.046	11		
Mongolia	0.352	0.340	0.343	0.320	0.365	0.344	0.016	0.048	12		
United Arab Emirates	0.317	0.317	0.344	0.335	0.358	0.334	0.018	0.053	13		
Maldives	0.464	0.475	0.423	0.427	0.410	0.440	0.028	0.064	14		
Georgia	0.484	0.483	0.460	0.465	0.411	0.461	0.030	0.065	15		
Brunei Darussalam	0.394	0.389	0.364	0.371	0.435	0.391	0.028	0.071	16		
Thailand	0.412	0.405	0.411	0.404	0.475	0.421	0.030	0.071	17		
Saudi Arabia	0.257	0.260	0.255	0.249	0.297	0.264	0.019	0.072	18		
Afghanistan	0.248	0.238	0.208	0.223	0.213	0.226	0.017	0.075	19		
Bangladesh	0.359	0.356	0.328	0.311	0.304	0.332	0.025	0.076	20		
Vietnam	0.360	0.348	0.370	0.370	0.426	0.375	0.030	0.081	21		
Pakistan	0.240	0.250	0.233	0.251	0.301	0.255	0.027	0.104	22		
Myanmar	0.170	0.188	0.156	0.142	0.178	0.167	0.018	0.109	23		
Azerbaijan	0.242	0.301	0.241	0.220	0.287	0.258	0.034	0.132	24		
Philippines	0.217	0.212	0.218	0.212	0.292	0.230	0.035	0.150	25		
Jordan	0.173	0.147	0.228	0.202	0.246	0.199	0.040	0.201	26		Table 8.
Mean	0.354	0.351	0.350	0.346	0.371						IFI scores for the study period

Source: Authors' calculation

IFI values are concerned. Further, consistent rankings are found for a number of studies with little variation because of the time effect as well as on the ground of methodological differences (Park and Mercado, 2015; Arora, 2010; Sarma, 2012).

Additionally, while exploring the significance of change taking place over time, the study reveals a declining trend (although not significant) for mean IFI values of all countries taken together from the continent of Asia for 2013-2016. The concentration of such deceleration amplifies especially during the period 2015-2016 for the classification considered. Notwithstanding the trend, mean values for 2017 takes a leap that also turns out to be statistically significant with a moderate effect size of 0.246 especially for those countries finding place at the bottom of the mean IFI rankings for the study period. Considering Cambodia, Pakistan and Philippines, the study finds that except in the depth of credit information index out of four variables under the dimension of accessibility, there has been a consistent rise. Azerbaijan is found to be in the developing state considering all variables under the dimension of efficiency for 2016-2017; whereas considering Myanmar, we observe a substantial growth in terms of its service potential. A further analysis of the efficiency dimension for Azerbaijan shows a spectacular growth in return on assets (146.84%) and net interest margin (23.63%) with a fall of 26.1% in overhead cost to total assets ratio as evidenced by data collected for 2016-2017. Among others, India manages to grow at a rate of 9.2% in terms of mean IFI scores during 2016-2017, withholding an improvement in all

Country name	IFI_2013	IFI_2014	IFI_2015	IFI_2016	IFI_2017	Average IFI
Korea, Rep.	0.581	0.567	0.589	0.571	0.630	0.588
Japan	0.576	0.557	0.607	0.542	0.580	0.572
Brunei Darussalam	0.394	0.389	0.364	0.371	0.440	0.392
United Arab Emirates	0.317	0.317	0.344	0.335	0.360	0.335
Saudi Arabia	0.257	0.260	0.255	0.249	0.300	0.264
High	*0.425*	*0.418*	*0.432*	*0.414*	*0.462*	*0.430*
Georgia	0.484	0.483	0.460	0.465	0.410	0.460
Maldives	0.464	0.475	0.423	0.427	0.410	0.440
Lebanon	0.429	0.407	0.461	0.446	0.430	0.435
Malaysia	0.436	0.415	0.419	0.408	0.460	0.428
Thailand	0.412	0.405	0.411	0.404	0.470	0.420
Armenia	0.389	0.375	0.354	0.387	0.380	0.377
Turkey	0.358	0.356	0.341	0.342	0.370	0.353
Azerbaijan	0.242	0.301	0.241	0.220	0.290	0.259
Jordan	0.173	0.147	0.228	0.202	0.250	0.200
Upper-middle	*0.376*	*0.374*	*0.371*	*0.367*	*0.386*	*0.375*
India	0.396	0.393	0.393	0.380	0.410	0.394
Indonesia	0.380	0.388	0.371	0.388	0.360	0.377
Cambodia	0.356	0.363	0.364	0.383	0.390	0.371
Vietnam	0.360	0.348	0.370	0.370	0.430	0.376
Mongolia	0.352	0.340	0.343	0.320	0.360	0.343
Bangladesh	0.359	0.356	0.328	0.311	0.300	0.331
Bhutan	0.318	0.315	0.317	0.325	0.330	0.321
Pakistan	0.240	0.250	0.233	0.251	0.300	0.255
Philippines	0.217	0.212	0.218	0.212	0.290	0.230
Myanmar	0.170	0.188	0.156	0.142	0.180	0.167
Lower-middle	*0.315*	*0.315*	*0.309*	*0.308*	*0.335*	*0.316*
Nepal	0.292	0.285	0.304	0.315	0.300	0.299
Afghanistan	0.248	0.238	0.208	0.223	0.210	0.225
Lower	*0.270*	*0.262*	*0.256*	*0.269*	*0.255*	*0.262*

Source: Authors' calculation

Table 9.
IFI scores for the study period (classification based on income groups)

	Tests of normality			Analysis of significance	
				Paired samples	
Period of study	Skewness (*z*-value)	Kurtosis (*z*-value)	Shapiro–Wilk (Sig.)	*t*-test (2-tailed)	Hedges *g*
2013-2014	−4.493	7.900	0.001	Not applicable	Not applicable
2014-2015	−1.314	0.777	0.495	0.180 (0.859)	Not required
2015-2016	1.882	3.011	0.134	1.125 (0.271)	Not required
2016-2017	0.962	−0.804	0.196	−3.682 (0.001)	0.246

Note: () The values in parenthesis represent the *p*-values
Source: Authors' calculation

Table 10.
Result of dependent samples *t*-test (comparison over time)

dimensions considered except for the dimension of availability where it registers a fall. The driving force behind India's growth trajectory being the upswing as reported by the depositors per 1,000 adults (9.11%), branches of commercial banks per 100,000 population (4.73%) and automated teller machines per 100,000 adults (3.97%) under the dimension of accessibility (growing at an overall rate of 52.71%) and banks z-score (−9.13%) under the dimension of service potential (growing at an overall rate of 17.49%). An assessment of variables in terms of growth considering the dimension of accessibility shows a more prominent gearing from the demand side and further with a declining banks z-score and enhanced legal protection to creditors as measured by the strength of legal rights index (11.67%) validates the soundness of inclusion initiatives taken on behalf of the Government of India. Existence of a comprehensive regulation (although not suffocating the operations) enhances the strength of legal rights and simultaneously reduces the distance to default (bank z-score) and thereby becomes the sole reason of such a decent trajectory from India's part. Similar fluctuations in mean IFI values over time for the countries considered can also be evidenced by some of the earlier studies conducted in this regard (Amidžić *et al.*, 2014; Rahman, 2012).

In contrast, comparison between the high-income and low-income group of countries reveal a significant difference throughout the period of study. The highest ranked countries in terms of IFI achievements shows an increased presence from the high and upper-middle income groups over time (Amidžić *et al.*, 2014; Park and Mercado, 2015). Although, the reason behind high achievement in terms of the dimension of efficiency for the low-income group remains unclear; however, empirical findings extend evidence on such phenomena (Demirguc-Kunt and Levine, 2008).

Although considering financial inclusion as a policy priority by majority of the countries throughout the globe, the initiative taken on targeting the same somehow seems unstable. The erratic move in IFI over time is not only the result of supply side deficiencies but also an equal effect from the demand side. On a similar note differences between countries in terms

	Test of assumption Is the distribution symmetric?	Results No. of ranks positive/ (negative)	Analysis of significance Result of Wilcoxon signed-rank test (2-tailed)	Measure of effect size (PS_dep)
2013-2014	Yes	8 (18)	−1.689 (0.091)	Not required
2015-2016	Yes	12 (14)	−0.978 (0.328)	Not required

Note: () The values in parenthesis represent the *p*-values
Source: Authors' calculation

Table 11.
Result of Wilcoxon signed-rank test (comparison over time)

	Skewness (*z*-value)	Kurtosis (*z*-value)	Shapiro–Wilk (Sig.)	Levene's F-test	Mean SD	Independent s amples *t* (2-tailed)	Hedges *g*
High	0.11	−0.081	0.755	1.071 (0.311)	0.395 0.11	2.334 (0.028)	0.918
Low	−1.022	−0.559	0.289		0.307 0.073		

Note: () The values in parenthesis represent the *p*-values
Source: Authors' calculation

Table 12.
Result of independent samples *t*-test (comparison between the income groups)

of achievement in their mean IFI values based on their income status also validates the nexus between income and extension of the provision of finance established long ago.

With almost 14 variables, the study tries to portray a comprehensive view of the existing phenomena on financial inclusion. Considering 2013-2017 as the period of study, it also takes the responsibility of projecting the trend. However, an assessment of the environment in terms of the degree of financial inclusiveness gets distorted to some extent because of the unavailability of intended variables and especially the issue exaggerates while sketching the trend in this regard. Sophistication in methodology can further refine the measure leading to a more vibrant presentation of the existent phenomena and drive off the limitations inherited in the present study.

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