



DETERMINANTS OF FINANCIAL INCLUSION: COMPARATIVE STUDY OF ASIAN COUNTRIES



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ABSTRACT

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Using panel data of twenty Asian countries over a period of six years (2011-2016), this research investigated the key determinants of financial inclusion among Asian countries via the Random Effects Model (REM). Financial inclusion has been considered as enabler for seven of the seventeen sustainable development goals, which brings access to financial services to all and directly contributes to poverty reduction, capacity buildings and equality. The main findings are that: (i) the countries with stronger economic growth and higher income have a significantly higher financial inclusion index, as people have more resources/incomes and better chances to utilize financial services; (ii) the higher the literacy, the better the financial inclusion as people with higher literacy understand the pros and cons of financial services and providers, better knowledge of using financial services wisely; (iii) unemployment rates had a negative impact on the financial inclusion index; (iv) surprisingly differing from previous studies, inflation, population density, network and deposit interest rate were not statistically significantly correlated with financial inclusion.

Contribution/ Originality: This research investigated the key determinants of financial inclusion among Asian countries via REM. Four aspects relating to financial inclusion among Asian countries were deeply analyzed.

1. INTRODUCTION

Financial inclusion is becoming a priority for policymakers, regulators and development agencies globally, as it has been defined as an enabler for seven of seventeen sustainable development goals (Demirgüç-Kunt *et al.*, 2015; UNSGSA, 2016). The idea of promoting and developing financial inclusion was officially implemented in 2009, when the Queen of Netherlands became the *Special Advocate of United Nations Secretary-General* (UNSGSA, 2016). From that time, this matter was commonly known and developed to either propagandize or ameliorate financial services in order to foster universal access to the financial market.

Financial inclusion is opposite to financial exclusion, and is defined simply as all individuals or small and medium enterprises having ability to access the formal services in the financial market (Sarma, 2008; Demirgüç-Kunt *et al.*, 2015; Nanda and Kaur, 2016).

Inclusive finance boosts the development process as well as economic objectives by giving the unbanked and underbanked inclusive access to financial services – the key to growth, in gender equality, poverty alleviation, growth equality, etc. Different methods of measuring financial inclusion have been developed such as the Global Findex and the Financial Inclusion Index (FII) for understanding its key different aspects and comparing the levels of development among countries and regions (Sarma, 2008; Kumar, 2013; Onaolapo, 2015; Demirgüç -Kunt *et al.*, 2018).

Several studies were carried out analyzing and comparing the determinants of financial inclusion among regions (Sarma and Pais, 2011; Gupte *et al.*, 2012; Akudugu, 2013; Camara and Tuesta, 2014; Hassan, 2015; Naceur *et al.*, 2015; Park and Mercado, 2015; Evans and Adeoye, 2016; Soumaré *et al.*, 2016; Zins and Weill, 2016; Uddin *et al.*, 2017; Abel *et al.*, 2018; Neaime and Gaysset, 2018). However, most of previous studies focused on the determinants of inclusive finance in the developing countries of Asia, North Africa, Sub-Saharan Africa, South America region or in countries such as Bangladesh, India, China, Indonesia. The research gaps include: (i) very few studies on drivers of financial inclusion in both developed and developing Asian countries in multiple years, where financial inclusion was made a priority by governments for enhancing economic and social development; (ii) the different internal and external factors affecting financial inclusion in Asia compared to Africa or individual Asian countries were not clearly explained. This study analyzed the key determinants of inclusive finance in Asia region during the 2011 to 2016 period with panel data and proposed some recommendations for supporting the Asian region in improving financial inclusion.

2. LITERATURE REVIEW

2.1. Financial Inclusion

2.1.1. Financial Inclusion Concept

Financial inclusion is a new concept and became more popular in 2010, but its commonly accepted definition has not been totally agreed upon due to multidimensional and different approaches of financial inclusion in different countries (Okoye *et al.*, 2017; Tita and Aziakpono, 2017; Abel *et al.*, 2018; Neaime and Gaysset, 2018). According to Sarma (2008) inclusive finance involves the ability to approach the financial system, and that it is essential for all citizens in a country to utilize the formal financial system. In 2008, the Committee of Financial Inclusion announced that inclusive finance is a process ensuring that vulnerable sectors such as low-income economies can easily approach the financial market at an affordable cost. The world pays a lot of attention to this issue because it can bring many benefits to economic growth.

Demirgüç-Kunt *et al.* (2015;2018) argued that the absence of the financial system would cause emerging poverty traps as well as constrain economic development. In addition, financial inclusion is considered as a way to ensure a sustainable economy. From Sarma (2008) financial inclusion means that all segments of a population – even those with the lowest incomes – can access formal financial products and services. The financially excluded comprise both the unbanked and the underbanked. According to Demirgüç-Kunt *et al.* (2015) financial inclusion means that “individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way”.

2.1.2. Roles of Financial Inclusion for Economic Development

Financial inclusion is essential for the inclusive growth and sustainable development of any country. The most important part of financial inclusion is access to financial services for all, which contributes significantly to poverty reduction and equality and supports inclusive and sustainable development. Financial inclusion brings positive impacts such as increasing savings and investments, allowing individuals and enterprises to meet their needs of loans and payments and improving their capacities and productivity. Governments get their costs cut by delivering

the social security payments via bank accounts, thereby increasing transparency and the prevention of corruption and better governance (Levine, 2005; Chibba, 2009; Kumar, 2013; Okoye *et al.*, 2017; Tita and Aziakpono, 2017; Demirgüç-Kunt *et al.*, 2018; Neaime and Gaysset, 2018).

The United Nations has confirmed that (i) financial inclusion has been identified as an enabler for seven of the seventeen sustainable development goals (1: no poverty; 2: zero hunger; 3: good health; 5: gender equality; 8: decent work and economic growth; 9: industry, innovation and infrastructure; and 10: reducing inequalities (UNSGSA, 2016); (ii) the and reaffirmed its commitment to implement the ; and (iii) the World Bank Group considers financial inclusion a key enabler to reduce extreme poverty and boost shared prosperity, and has put forward an ambitious global goal to reach Universal Financial Access (UFA) by 2020. Since 2010, more than 55 countries have made commitments to financial inclusion, and more than 30 have either launched or are developing a national strategy (Demirgüç-Kunt *et al.*, 2015).

2.1.3. Measurements of Financial Inclusion

Financial inclusion can be measured in various ways, depending on the aspects and focuses of different studies. Kempson *et al.* (2004) identified six components of financial exclusion (identity requirements, terms and conditions of bank accounts, levels of bank charges, physical access to bank branches, psychological and cultural influences and ease of use of banking services). Sarma (2008) introduced a comprehensive method to calculate the *Financial Inclusion Index* (FII) based on three dimensions: depth of access (proxy by number of bank accounts per 1000 population), availability (number of bank branches and number of ATMs per 1000 population), and usage (the extent and frequency of use by customers), which derived from the calculation method of the *Human Development Index*.

Several researchers such as Sarma and Pais (2008;2011); Sarma (2015); Sarma (2016); Kumar and Mishra (2009); Mehrotra *et al.* (2009); Kumar (2013) and Camara and Tuesta (2014) applied this approach to calculate the FII. Arora (2010) used Sarma (2008)'s approach, but included more variables in the outreach dimension, with geographic penetration, and also added the new dimension of ease and cost of transactions. Gupta *et al.* (2012) computed the FII by different approaches for the Reserve Bank of India, and concluded that each of the dimensions was critical, and that incorporating as many dimensions as possible would result in a more holistic financial inclusion. Karpowicz (2014) measured financial inclusion by three aspects of access, depth and efficiency, while Onalapo (2015) chose the three more specific measures: commercial bank branches amounts, deposits demand, and bank loans for rural areas. Okoye *et al.* (2017) considered financial inclusion as the combination of the loan to deposit ratio, financial deepening indicators, loans to rural areas, and branch network.

Among these indicators, the FII of Sarma and Pais (2008) are most popular and have been widely used in the studies in the literature review, and the formula of the dimension index is as follows:

$$Di = Wi \frac{Ai - mi}{Mi - mi}$$

In which:

Ai: Actual value of dimension ith.

Mi: the maximum value of dimension ith.

mi: the minimum value of dimension ith.

Wi: the weight of dimension ith.

The dimensions and their factors to calculate FII is summarized in Table 1:

Table-1. Applied dimensions of financial inclusion index.

Dimension	Representative	Weights
Available of banking services	Number of ATM (per 100,000 adults)	50%
	Number of commercial bank branches (per 100,000 adults)	50%
Bank penetration	Number of deposit account (per 1000 adults)	100%
Usage of banking systems	Outstanding deposits at commercial bank (% GDP)	50%
	Outstanding loans at commercial bank (% GDP)	50%

Source: Sarma and Pais (2008).

The FII will be calculated for each country from 2011 to 2016 based on the formula:

$$FII = 1 - \sqrt{\frac{(1 - Pi)^2 + (1 - Ai)^2 + (1 - Ui)^2}{3}}$$

According to Index theory, the FII level is divided into five levels as stated in Table 2.

Table-2. Levels of financial inclusion.

Value of FII (X)	Levels of financial inclusion
0	No financial inclusion
$0 < X \leq 0.3$	Low level
$0.3 < X \leq 0.6$	Medium level
$0.6 < X < 1$	High level
1	Comprehensive financial inclusion

Source: Sarma and Pais (2008).

2.2. Determinants of Financial Inclusion

The determinants of inclusive finance are various, with different classifications in different studies. The main determinants are defined either on individual characteristics only, or macro and meso (supporting/infrastructure) indicators, or the combinations of all, while some just focused on one or few selected variables.

Sarma and Pais (2011) defined three different sets of variables: socio-economic factors (including economic growth), physical infrastructure and the banking sector, but run separately with financial inclusion data of 49 countries. The key significant determinants were: the human development level, income, inequality, literacy, urbanization and physical infrastructure for connectivity and information. However, the health of the banking sector does not have a strong influence.

2.2.1. For Micro Determinants of Financial Inclusion, the Key Studies are

Akudugu (2013) analyzed the case of Western Africa – focusing on Ghana with primary data. Using the logit model with more individual explanatory variables, the significant determinants of individuals' financial inclusion were mainly: their ages, literacy levels, wealth class, distance to financial institutions, lack of documentation, lack of trust for formal financial institutions, money poverty and social networks as reflected in family relations.

Zins and Weill (2016) investigated the determinants of financial inclusion in Africa using the World Bank's Global Findex database on 37 African countries, with a focus on individual indicators. The study used the probit estimation method and found that financial inclusion was determined by individual characteristics such as gender, age and educational levels with a higher influence of education and income.

Soumaré et al. (2016) studied the factors determining financial inclusion in Central and West Africa, with the Global Financial Inclusion database. Determinants of financial inclusion focused on individual characteristics. Key findings were that: financial inclusions were driven by individual attributes (such as gender, education, age, income, residence area, employment status, marital status, household size and degree of trust in financial institutions). This result was similar in Central and West African countries. However, a few indicators were different. Gender was positively significant in Central Africa, but income was significant in West Africa.

For the Zimbabwean case, [Abel et al. \(2018\)](#) used the logit model with 4000 observations from the Fin Scope Consumer Survey 2014. Determinants were focused on individual characteristics only. The main findings were that: (i) Age, education, financial literacy, income, and internet connectivity were positively related to financial inclusion. (ii) The documentation required to open bank accounts and the distance to the nearest access point hindered financial inclusion.

2.2.2. Macro Determinants of Financial Inclusions are discussed in the Following Papers

[Kumar \(2013\)](#) defined the determinants of financial inclusion with endogenous variables (bank deposit and credit account per capita, branch network) and exogenous variables (population density, income per capita, deposit ratio, credit ratio), within India in 29 major states and union territories over the period from 1995 to 2008. The panel fixed effects and dynamic panel generalized methods of moments (GMM) methodologies were applied. The main findings were that the branch network had an unambiguous beneficial impact, while the proportion of factories and employee base turned out to be significant determinants of penetration indicators; regions tended to maintain their respective level of banking activity, with no support for closing the gap.

[Siddik et al. \(2016\)](#) studied the determinants of financial inclusion in Bangladesh with a multi-dimensional index. Key factors positively contributing to financial inclusion were: socio-geographic variables (rural population, household size, literacy rate); supporting variables (infrastructure), and the bank factors (deposit penetration).

Inspired by [Honohan \(2008\)](#); [Park and Mercado \(2015\)](#) assessed various macroeconomic factors (and country-specific factors affecting the degree of financial inclusion for 37 selected developing Asian economies, and the impact of financial inclusion, along with other control variables, on poverty and income inequality. The main findings were that: (i) Per capita income, rule of law, and population size increased financial inclusion; while age dependency ratio lowered financial inclusion. (ii) Financial inclusion lowered poverty and income inequality in developing Asia.

In addition, [Evans and Adeoye \(2016\)](#) focused more on macro determinants of financial inclusion such as GDP per capita, deposit interest rates, inflation, money supply, internet use, using the data of fifteen African countries from 2005 to 2014. The study employed the dynamic panel data approach to establish the determinants of financial inclusion. The study found that financial inclusion was driven by per capita income, broad money as a percentage of GDP, literacy rate, internet access and presence of Islamic banking activities.

[Uddin et al. \(2017\)](#) used the random effects and dynamic panel models to analyze the determinants of financial inclusions in Bangladesh over the period from 2005 to 2014 with eighteen conventional and seven Islamic banks. The indicators were divided into three groups: bank variables, country variables, and human factors. The study found that: on the supply side, the size of a bank, its efficiency, and the interest rate it charges has a direct impact on financial inclusion. On the demand side, the literacy rate was positively and age dependency ratio was negatively related to financial inclusion. In addition to that, quantile regression analysis found that bank size had a significant impact on both deposit collection and loans & advances disbursement of a bank.

[Neaime and Gaysset \(2018\)](#) used GMM and GLS econometric models and data from eight MENA countries over the period from 2002 to 2015 to assess the impact of financial inclusion on income inequality, poverty, and financial stability. Financial inclusion had no effects on poverty but contributed positively to financial stability, whereas population, inflation, and trade openness were all found to significantly increase poverty.

[Ho and Phan \(2018\)](#) used data from 22 transition economies over the period from 2005 to 2015, with two-stage least squares model to investigate the impact of financial inclusion on income inequality and found out that this relationship was negative. Therefore, to reduce inequality, improving inclusive finance, particularly in rural areas, is essential.

[Nguyen \(2019\)](#) examined the impact of financial inclusion on monetary policy in Vietnam in the period from 2004 to 2015 by OLS and GLS models and confirmed the negative relationship. Financial inclusion transmits to more successful monetary policy, making efficient financial intermediation and balances, contributing to a stable

and sustainable economy. Therefore, financial inclusion would enable monetary policy to extend its reach to the financially excluded and aid policy makers in making better predictions of movements in inflation.

2.2.3. Study of other Separate Indicators

Capuano and Ramsay (2011) just focused on how financial literacy affected the financial decision making of consumers with 24 surveys in eleven developed countries.

Kpodar and Mihasonirina (2011) estimated the impact of ITC on economic growth, of which financial inclusion was positively affected by ITC development, then indirectly influenced economic growth, with a case study of 44 African countries between 1988 and 2007.

Regarding Islamic banking, Hassan (2015) reviewed the conventional model and suggested the application of the Islamic solidarity principle in providing Islamic microfinance services for financial inclusion of the poor. Similarly, Naceur *et al.* (2015) and Majeed (2017) also confirmed that Islamic banking was an effective avenue for financial inclusion in Muslim countries.

In this study, three aspects of macro factors, meso facts and micro factors were used. *Macro factors* which determine financial inclusion levels include: economic growth, literacy, unemployment, inflation, population density and income. Meso factors include networks, and micro factors (from financial service providers) include the interest rate, domestic credit to private sector, geography, and if the financial service provider is the Islamic bank or not. The determinants, their relationships with the FII, and key previous studies are summarized in the Table 3.

Table-3. Expected sign and references of determinants of inclusive finance.

Variables	Indicators	Expected signs	References
Economic growth	GDP annual growth rate or GDP per capita growth rate	+	Sarma and Pais (2011); Park and Mercado (2015); Evans and Adeoye (2016); Okoye <i>et al.</i> (2017); Uddin <i>et al.</i> (2017); Neaime and Gaysset (2018).
Literacy	Primary completion rate	+	Sarma and Pais (2011); Capuano and Ramsay (2011); Akudugu (2013); Park and Mercado (2015); Evans and Adeoye (2016); Uddin <i>et al.</i> (2017); Demirgüç - Kunt <i>et al.</i> (2018).
Unemployment	Unemployment rate	-	Evans and Adeoye (2016); Uddin <i>et al.</i> (2017).
Inflation	Inflation rate (Consumer price index)	-	Park and Mercado (2015); Evans and Adeoye (2016); Uddin <i>et al.</i> (2017); Neaime and Gaysset (2018).
Population density	Population density	+	Kumar (2013); Evans and Adeoye (2016); Uddin <i>et al.</i> (2017); Neaime and Gaysset (2018).
Income	Wage and salary of workers	+	Sarma and Pais (2011); Zins and Weill (2016); Evans and Adeoye (2016); Abel <i>et al.</i> (2018).
Network	Individuals using internet	+	Evans and Adeoye (2016); Abel <i>et al.</i> (2018).
Interest rate	Deposit interest rate	+/-	Kumar (2013); Evans and Adeoye (2016).
Domestic credit to private sector	Proportion of domestic outstanding loans to private sector/total outstanding loans	+/-	Kumar (2013); Evans and Adeoye (2016).
Geography	1= urban area; 0 = rural/remote areas	Dummy variable	Sarma and Pais (2011); Abel <i>et al.</i> (2018).
Islamic banking	1= Yes, 0=No	Dummy variable	Hassan (2015); Naceur <i>et al.</i> (2015); Evans and Adeoye (2016); Majeed (2017).

3. RESEARCH METHODOLOGY

3.1. Data Collection

In this paper, twenty out of 48 Asia countries were chosen for analysis, including both developing and less developed countries, as listed in Table 5, which can represent a diverse Asia in term of development status. These countries also experienced no shocking effects or crises during the study period.

The data of financial inclusion and determinant factors were collected from the database of World Bank Global Financial Development, the Global Findex of World Bank and the Annual Financial Access Surveys carried out by International Monetary Fund (IMF) annually, over the period from 2011 to 2016. Data were cross checked among different sources to confirm their accuracy. The total sample size was 120, with panel data for horizontal comparison.

3.2. Methodology

To examine the determinants of financial inclusion in this paper, the following model was chosen, inspired by the literature review as summarized in Table 3.

$$FI(i,t) = \beta_0 + \beta_1 (GDPG_{i,t}) + \beta_2 (PCR_{i,t}) + \beta_3 (UNEM_{i,t}) + \beta_4 (INF_{i,t}) + \beta_5 (POPdensity_{i,t}) + \beta_6 (INC_{i,t}) + \beta_7 (INTERNET_{i,t}) + \beta_8 (DIR_{i,t}) + \epsilon$$

In which: β_0 : intercept; $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$: estimated coefficients; ϵ : error term.

3.2.1. Dependent Variables

In this paper, the calculation method for FII of Sarma and Pais (2008) was used, with the simplicity of three variables instead of five as the original model: *Number of commercial bank branches* (per 100,000 adults), *Number of deposit account* (per 1000 adults) and *Outstanding deposits at commercial bank* (%GDP). This calculation allowed us to keep the key indicators, while dealing with data missing from the sample.

Table-4. Some characteristics of determinants of inclusive finance.

Variables	Measurements	Coded	Unit	Hypotheses
Macro factors				
Economic growth	Gross domestic products growth	GDPG	Annual percentage	H1: Economic growth impacts on FI have positive correlation
Literacy	Primary completion rate	PCR	Percentage of relevant age group	H2: Primary completion and FI have positive relationship
Unemployment	Unemployment rate	UNEMP	Percentage of total labor force	H3: Unemployment and FI have negative relationship
Inflation	Inflation rate (Consumer price)	INF	Annual percentage	H4: Inflation and FI have negative relationship
Population density	Population density	POPdensity	People per square kilometers of land area	H5: Population density and FI have positive relationship
Income	Wage and salary of worker	INC	Percentage of total employment	H6: Income of workers and FI have positive relationship
Meso factor				
Network	Individuals using internet	INTERNET	Percentage of population	H7: Number of people using internet and FI have positive relationship
Micro factor (from financial service provider)				
Interest rate	Deposit interest rate	DIR	Percentage	H8: The higher the deposit interest rates, the higher the FI

3.2.2. Independent Variables

For selecting the independent variables basing on literature review in Table 4, some variables were omitted due to the data inconsistency in the sample. These were the characteristics of explanatory variables and the expected sign and relationship of each variable to financial inclusion index.

4. RESULTS AND DISCUSSION

4.1. Overview of Financial Inclusion Worldwide

Financial inclusiveness plays an important role in either the financial market or in reducing poverty and inequality incidence. Demirgüç -Kunt *et al.* (2018) reported that there are about two billion people worldwide who do not use formal financial services while there are about 200 to 250 small and medium enterprises taking part in the financial market with difficulty whose activities are effected by the higher cost and riskier methods in order to save, borrow and ensure their assets. In high-income countries, only 11% of adults do not have formal account while 76% do not in the developing economies. Figure 1 shows the reality of financial inclusion globally in 2017. There was a significant improvement in the context of financial inclusion globally.

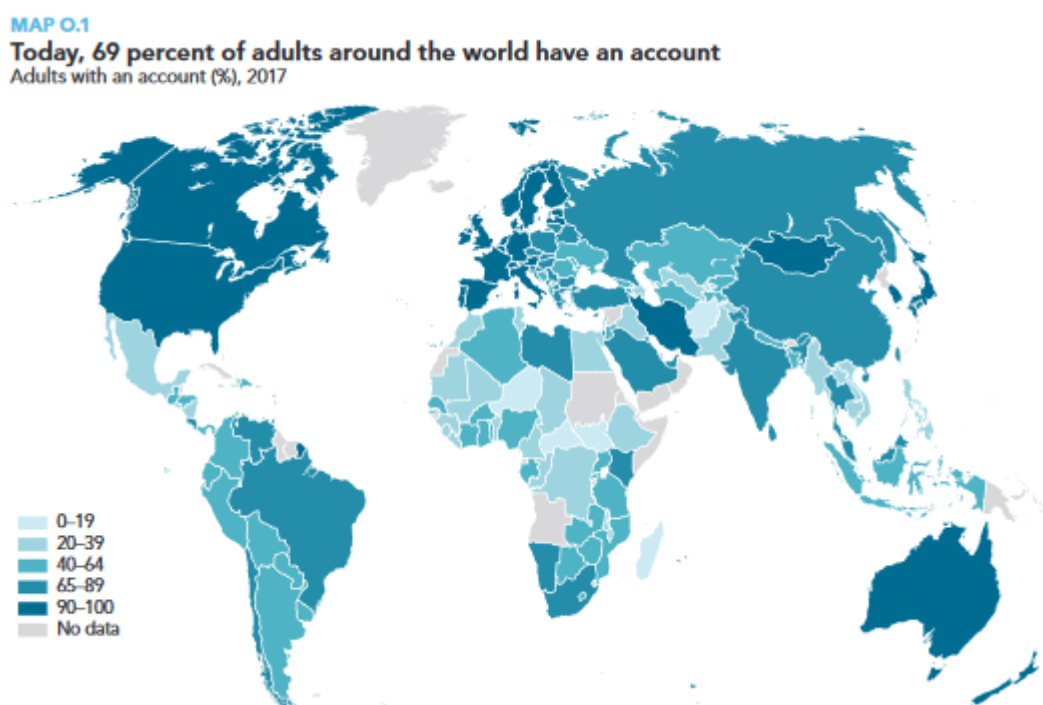


Figure-1. Percentage of adults having accounts globally in 2017.

Source: Demirgüç -Kunt *et al.* (2018).

The excluded group focused on some regions such as East and Southern-East Asia, Africa, etc. The first time the *Global Findex database* (GFD) provided more inclusion information was in 2011, which related to the usage and the approach of both formal and informal financial services. Every three years, the dataset is updated. According to Demirgüç-Kunt *et al.* (2015) there was a fall on average by 17% percentage points in the number of adults who do not have accounts among the poorest 40% of households in each developing country from 2011 to 2014, however, there are still a large number of people in the world who do not have accounts. It was a good sign when there was an increase in the number of adults using financial services by 515 million adults globally from 2014 to 2017 (Demirgüç -Kunt *et al.*, 2018). From 2011 to 2017, the number of adults accessing financial services increased significantly from 51% in 2011 to 62% in 2014, and 69% in 2017. In high-income economies, 94% of adults had an account; while in developing economies only 63 % did, which showed the wide variation in account ownership among individual economies as presented in Figure 1.

Demirgüç -Kunt *et al.* (2018) also reported that there were around 1.7 billion people who did not access the financial markets up to 2017, which were mainly in some emerging countries in Asia such as China, India, Bangladesh, Vietnam and Indonesia.



Figure-2. Number of adults lacking accounts.

Source: Global Findex database (Demirgüç -Kunt *et al.*, 2018).

Note: Data are not displayed for economies where the share of adults without an account is 5 percent or less.

However, the development level of financial inclusion in Asia is very different among developed and developing countries. As stated in Figure 3, Japan and the Republic of Korea had a very high percentage of FII (with 72 & 60% respectively), while many developing Asian countries had a low FII such as Vietnam, Philippines, Myanmar (23, 11 and 1% respectively).

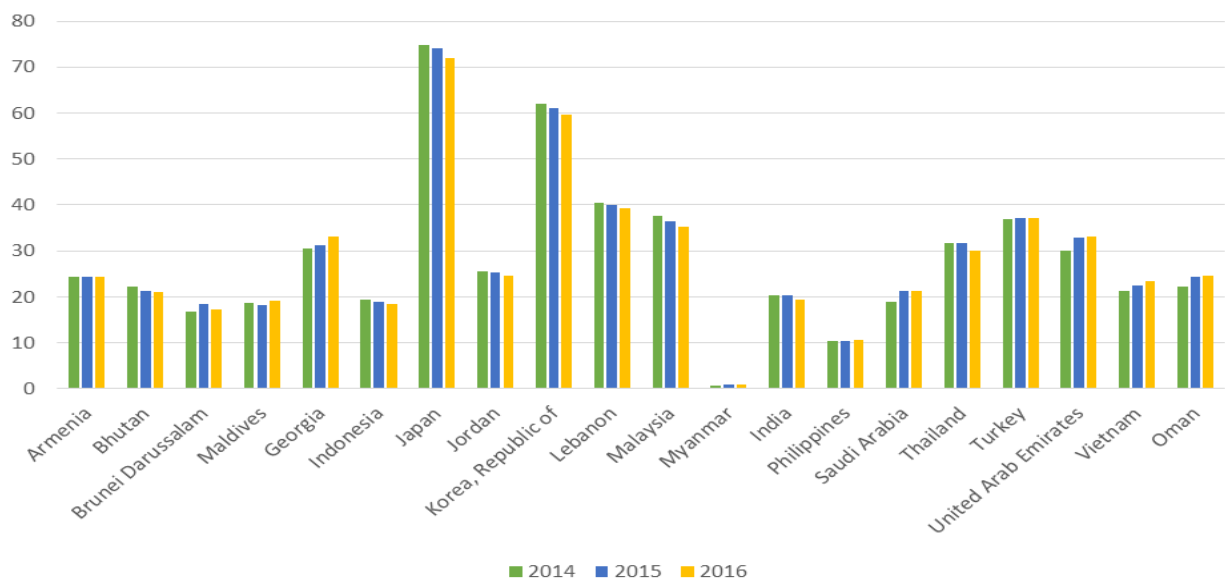


Figure-3. Financial inclusion index in Asian countries.

4.2. Regression Analysis Results

4.2.1. Descriptive Statistics

The summarized statistical data of both independent and dependent variables among twenty countries is presented in Table 5. Low standard deviation among variables means that the data of variables were not significantly various.

Table-5. FII's rank of selected countries.

Countries	FII	Rank	Countries	FII	Rank
Armenia	24.4502283	11	Malaysia	35.3659681	5
Bhutan	21.0233547	14	Myanmar	1.00407861	20
Brunei Darussalam	17.3740509	18	India	19.3519958	15
Maldives	19.1623347	16	Philippines	10.5553811	19
Georgia	33.056003	6	Saudi Arabia	21.2429469	13
Indonesia	18.5171252	17	Thailand	30.1015524	8
Japan	71.8698934	1	Turkey	37.0925758	4
Jordan	24.6410672	9	United Arab Emirates	33.0240905	7
Korea, Republic of	59.6399321	2	Vietnam	23.5043249	12
Lebanon	39.3654709	3	Oman	24.6058284	10

The range of FII is from 0.0048 to 0.7648 with the standard deviation, about 0.163. This index represents the differentiation of the financial development of different countries. The different ranking of FII among sample countries also shows the diversified picture of Asian countries in terms of supporting financial inclusion for development.

By checking the correlation among variables and the VIF, it was confirmed that the chosen model had no multicollinearity, and the hypotheses of relationship between dependent variable and independent variables were as proposed.

Table-6. Correlation matrix of variables.

	FII	GDPG	GDPCG	DIR	INC	POPDensity	INF	INTERNET	PCR	UNEM
FII	1.0000									
DGPG	-0.3225	1.0000								
GDPPCG	0.1420	0.8056	1.0000							
DIR	0.1827	0.3374	0.3713	1.0000						
INC	0.2536	-0.3760	-0.5247	-0.4619	1.0000					
POPDensity	0.1451	0.0457	-0.0087	-0.1036	0.0393	1.0000				
INF	0.2582	0.4512	0.3538	0.5176	-0.4483	0.0567	1.0000			
INTERNET	0.6186	-0.4417	-0.4015	-0.3949	0.7454	0.0946	-0.5703	1.0000		
PCR	0.0514	-0.0576	0.2467	-0.0500	0.0318	-0.3516	-0.1473	0.1604	1.0000	
UNEM	0.1586	-0.1015	-0.2171	0.3883	0.1851	-0.3104	-0.1340	0.0349	0.1194	1.0000

4.2.2. Result of the Regression Analysis

Among the three methods for panel data (Pool Ordinary Least Squared (POLS), Fixed Effect Model (FEM) and Random Effect Model (REM)), the choice of the most relevant method for this study was determined by the Hausman and Breusch-Pagan Lagrange Multiplier test results.

Table-7. The results of Breusch and Pagan Lagrangian multiplier test for random effects.

$$FII_{[ncountries,t]} = Xb + u_{[ncountries]} + e_{[ncountries,t]}$$

Estimated results

	Var	Sd = sqrt (Var)
FII	.024742	.157296
e	.0001927	.0138813
u	.0151553	.1231069

Test: Var (u) = 0
 chibar2 (01) = 130.55
 Prob > chibar2 = 0.0000

Firstly, *Breusch-Pagan Lagrange Multiplier* tested two models Pool OLS and REM (in Table 7). The result of the p-value shown below is 0.0000 (lower than 0.05, a p-value statistic), so H_0 (Pooled OLS model should be chosen) was rejected. The more appropriate model was REM.

Table-8. The result of Hausman test.

Test: Ho	: difference in coefficients not systematic
Chi2 (9)	= (b-B)' [(V_b-V_B)^(-1)] (b-B)
	= 1.20
	Prob>chi2 = 0.9988
	(V_b-V_B is not positive definite)

The second test reflected the choice between FEM and REM. H_0 as well as FEM would be correct if p-value lower than 0.05 (in Table 8). As can be concluded, REM was the most concordant with the panel data model. The research was estimated by REM to make the results more reliable. Besides, the natural problem of REM reflects non-systematic. It can be referred that the difference of financial inclusion caused their each countries' conditions.

In addition, there were three extra models with the dependent variables in three dimensions to calculate the FII. Each dimension was considered as a representative variable of financial inclusion to look for a new angle of the distinct impact of determinants on inclusive finance.

The adjusted R-squared of all four models showed that the regression models were acceptable in explaining the determinants of the FII and each of its component for Asian countries.

There were five significant independent variables while three variables were insignificant in model (1). At 1% level of significance, the GDP growth rate had a positive relationship with the FII while the number of people using the internet impacted negatively on the FII. Three variables were significant in two asterisks level, meaning that the p-value was in the range of 0.01 to 0.05. They were the workers' salaries, the primary completion rate and the unemployment rate. Comparing the four models, model (4) had the highest number of significant variable (six out of eight). The least number of significant variables was two, illustrated in the model (2). The FII was represented for the overall financial inclusion scale while three other dependent variables only reflected particular aspects of inclusive finance. The explanatory variables had diverse effects on each factor.

The results of the adjusted R-square and F tests confirmed that these models were statistically acceptable. The signals and values of coefficients showed that: the inflation rate and deposit interest rate were insignificant among all four models. The remaining variables could be explained in at least one of the models. The GDP growth rate impacted positively on the FII and outstanding deposit in the commercial banks. However, the relationship between the GDP growth rate and deposit accounts and commercial bank branches was negative.

Table-9. The regression results of determinants of financial inclusion.

Independent variables	FII (Financial inclusion index)	DAC (Number of deposit account per 1000 adults)	BCB (Number of commercial bank branches per 100,000 adults)	ODB (% of outstanding deposits at commercial bank/GDP)
	1	2	3	4
GDPG	0.4309* (0.072)	-446.0454*** (0.000)	-1.915813*** (0.000)	5.607228** (0.03)
GDPPCG	-0.59655 (0.194)	382.9594*** (0.000)	.9749684** (0.037)	-10.05676*** (0.000)
DIR	0.0272 (0.878)	-1.080255 (0.983)	-0.0414328 (0.874)	0.6774129 (0.622)
INC	0.2133** (0.032)	-0.7214018 (0.942)	-0.0905595* (0.068)	-1.136968*** (0.000)
POP density	-0.0043 (0.565)	0.4326268 (0.250)	0.0018614 (0.392)	-0.019165* (0.096)
INF	-0.0020 (0.983)	81.23455 (0.126)	0.0130739 (0.961)	-0.5227969 (0.707)
INTERNET	-0.0211* (0.083)	52.77816*** (0.000)	0.1291764** (0.012)	1.591156*** (0.000)
PCR	0.1187** (0.012)	-11.90314 (0.543)	-0.0736805 (0.452)	-2.264941*** (0.000)
UNEM	-0.4516** (0.035)	-18.17998* (0.062)	0.751393 (0.120)	-3.252323*** (0.001)
_Constant	0.0882 (0.379)	1047.762 (0.601)	23.82368 (0.019)	314.0328 (0.000)
Adjusted R-square	0.3335	0.5071	0.4387	0.5926

Note:

+ Number of observation: 120; Number of groups: 20.

+ *: significant level at 10%; **: significant level at 5%; ***: significant level at 1%.

4.2.3. Discussions of the Result

The summary of the expected and actual signs of the relationships between the financial inclusion index and its determinants is presented in Table 10 below:

Table-10. The comparison of actual and expected signs of FII with significant variables.

Variables	GDPG	PCR	UNEM	INC
Coefficient (p-value)	0.1282** (0.031)	0.0770* (0.055)	-0.6460*** (0.001)	0.2079** (0.018)
Expected sign	+	+	-	+
Actual sign	+	+	-	+
Statistically significant level	5%	10%	1%	5%

Therefore, the key findings of the regressions summarized in Table 10 were:

First of all, hypothesis 1 of “economic growth impact positively on financial inclusion index” was accepted, with the significance level of 5%. The results were consistent with Sarma and Pais (2011); Park and Mercado (2015); Evans and Adeoye (2016); Okoye *et al.* (2017); Uddin *et al.* (2017); Neaime and Gaysset (2018). Economic growth creates more opportunities for people to use financial services better, as individuals and enterprises have more income, expenses and payment. For the government, their aim is to increase economic growth. It is necessary to find suitable strategies to carry out to achieve the objectives in the long timeframes. When more people and enterprises have access to the financial market, the GDP annual growth rate increases, and then the government has the ability to address the problems they could not address before. Household and firms contribute a large part in developing economic growth.

The government continues extending the position of financial services for sub-standard objects. Government spending will be used to invest more financial technology, reduce poverty, etc. Financial inclusion and economic growth have a good relationship in supporting each other.

GDP growth and outstanding deposits, which is denoted by the usage of financial services have the same direction. When the financial market meliorates and grows, there is greater awareness of financial services. As firms and households noticed the benefit from using financial services they start accessing them more. However, the GDP growth rate impacts negatively on deposit accounts and commercial bank branches. The cost to maintain a bank branch is quite high and when bank branches increase dramatically to a high level, it will depend on whether the bank has sufficient capital and profits to handle these costs. If they cannot tackle it, it will directly cause economic stagnation.

Second, hypothesis two that the “primary completion rate impact positively on FII” was also accepted with significant level of 10%. [Sarma and Pais \(2011\)](#); [Capuano and Ramsay \(2011\)](#); [Akudugu \(2013\)](#); [Park and Mercado \(2015\)](#); [Evans and Adeoye \(2016\)](#); [Uddin et al. \(2017\)](#) all noted that higher levels of education creates advantages for financial inclusion. Primary completion rate refers to the level of basic knowledge people have, which means they can read and write well. The information of financial services is constantly updated on many different websites. It draws more literate people closer to financial service providers and allows them to have different choices. Completion of primary school is a small factor compared to adult literacy. When people have a certain educational background with degrees, it will have much more impact on financial inclusion.

It is easy to notice that this rate cannot explain the respond variable in model (2), (3). There is no basis to interpret the change of the completion for primary school variable's effect on deposit accounts or bank density.

Third, the actual and expected sign of unemployment rate were the same when considering the relationship with FII, with a significance level of 5% (hypothesis 3 was accepted). An unemployment rate decrease means the number of employees increase. In the process of modernization, most enterprises associated with financial intermediaries such as banks to pay salary through cards and accounts. It creates opportunities for people to access the formal account at banks. The supply sides diversify various activities in accordance with the different conditions and demands. If individuals have a career with a stable income, they will come up with ideas to save money at financial institutions with interest rates or invest to make more money. As can be seen in model (2), the unemployment rate and deposit accounts at commercial bank have opposite trends. That could be evidence to support employee action. These actions help them to protect and enhance the value of their assets. It is a good sign that they pay more attention to financial services. The lower the unemployment rate, the higher level of FII. [Evans and Adeoye \(2016\)](#) and [Uddin et al. \(2017\)](#) all agreed with this result.

Fourth, income improvement is a gateway leading to better financial inclusion, which means hypothesis 6 was accepted for Asian countries with a significance level of 1% (hypothesis 6 was accepted). The higher income, the more chances that a worker can access financial inclusion. In the studies of [Sarma and Pais \(2011\)](#); [Zins and Weill \(2016\)](#); [Evans and Adeoye \(2016\)](#); [Abel et al. \(2018\)](#) they all agreed that income is highly and positively correlated with reducing financial exclusion. In this study, the higher the average wages of workers, the higher financial inclusion index of the country. Of course, income can be measured by different factors, but average wage is one acceptable proxy. When people have higher income, they have more capacity to save, buy insurance, pay online and use other formal financial services.

Fifth, some factors which may be very positively related to financial inclusion include inflation, population density, network and deposit interest rate, geography, Islamic banking. However, they were not statistically significantly correlated with financial inclusion for the case of these twenty Asian countries. Therefore, hypotheses 4, 5, 7,8 were rejected. The main reasons for these differences in Asian countries may be (i) due to the lower level of financial literacy, financial infrastructure, and financial inclusion. Therefore, clients still do not use many online services and do not pay much attention to deposit interest rates, opportunity and operational costs. They focused

more on accessibility to rather than pricing of formal financial services; (ii) inflation in these countries were insignificant enough to not affect people's lives, including the access to and use of financial services; (iii) network, particularly internet connection and the use of smart phones in Asia seems to be better than in other parts of the world. This was also consistent with the results of Demirgüç -Kunt *et al.* (2018).

5. RECOMMENDATIONS

In the literature review, twelve components which may influence inclusive finance, such as economic growth, literacy, unemployment, inflation, gender gap, population density, income, network, interest rate, domestic credit to private sector, geography and Islamic banks were included.

However, in the context of twenty Asian countries, only four components were significant, which were the GDP growth rate, incomes, the unemployment rate and the rate of primary education completion. Therefore, the following recommendations were proposed to promote financial inclusion in Asia for contributing to sustainable development.

5.1. Recommendations for Formal Financial Service Providers

Among the FII components, the number of adults having a bank account is the key. Therefore, financial institutions should focus on payment services, in addition to others such as savings, credit, insurance. The diversification of financial products also allows financial institutions to get economies of scale and economies of scope.

The insignificant relations of network to the FII implied that clients still did not use many internet transactions to financial services, although the trend is increasing. Financial institutions should increase access to clients, especially the convenient and less costly branches such as QR code, mobile banking, POS, retail sale agents, telecommunication agents. Utilization of fintech for financial inclusion is better than just a few channels. Financial institutions can also develop or cooperate with fintech firms, or with existing financial providers in the low income and rural or remote areas such as microfinance institutions, financial cooperatives.

The deposit interest rate also has no relationship with the FII. Therefore, the higher deposit interest rates do not attract potential clients if they do not use any other services from formal financial institutions before. In addition, depositors pay more attention to other aspects such as liquidity, safety. Therefore, formal financial institutions do not necessarily use the deposit interest rates as one of their key competing tools.

5.2. For Policymakers

Policymakers are important in supporting the field of inclusive finance at either the national or international level. All statistically significant independent variables in the models were from macro levels, which are strongly influenced by policy makers. Therefore, to boost financial inclusion in an effective way, policy makers should create an enabling environment to (i) increase economic growth; (ii) improve literacy, especially the primary educational level for promoting wiser use of financial services; (iii) increase the income level of people, especially the wage and salaries of workers – one of underbanked or unbanked groups; and (iv) reduce the unemployment rates.

All countries should try to reach and foster the process of inclusive finance. According to Mehrotra *et al.* (2009) there are over 90 countries taking part in the *alliance for financial inclusion* (AFI) and making commitments to achieve targets related to a decrease in financial exclusive scale. In addition, they can mobilize funds from UNCDF (2016) to supply technic and risky capital for the new under-served financial services.

In Asia, the financial inclusion of some emerging countries like Myanmar, Bangladesh, Cambodia, etc. develop slowly. They require help from UNCDF for national roadmaps and suitable strategies to extend the inclusive financial range. In addition, UNCDF (2019) points out some approaches in term of regulations. Firstly, supervisors are to protect customers via safe services related to transparency. It increases the trust of customers, which is a

good sign that people will use other financial products. In addition, regulation is necessary to eliminate financial system and ensure the safety of financial development, which leads to inclusive finance. However, the regulation is considered a good framework when it appropriately balances risk management and customer protection.

The limitations of this paper were that (i) not all Asian countries were included in the study; (ii) the measurement of the FII with three dimensions was simplified with other dimensions not yet covered; and (iii) the detailed analysis of each of the twenty Asian countries was beyond the scope of this study.

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