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# Financial inclusion and development in the least developed countries in Asia and Africa

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## Abstract

The purpose of this paper is to investigate the relationship between the financial inclusion index and development variables in the least developed countries in Asia and Africa by using annual data of 42 countries for the period 2000–2019. The pooled panel regression and panel data analysis technique are used to explore this relationship. The empirical finding indicates that economic growth leads to financial inclusion. Unemployment and literacy rates are among the factors contributing to financial inclusion, and it is observed that women are more vulnerable than men are to lack financial inclusion. In less developed countries, the economy relies heavily on agriculture, and people are less financially inclusive when they live in rural areas of these countries. Also, pay inequality reduces financial inclusion rates and has a negative impact on development. The low financial inclusion rate reduces the levels of development in these countries. The results of this study can lead to the development and empowerment of vulnerable groups in the studied countries. In order to improve the conditions for development, policymakers should consider policies that enhance literacy, eliminate gender inequality and increase pay equality.

**Keywords:** Financial inclusion, Gender, Economic development, Financing policy

**JEL Classification:** G21, J16, O16, O23, O50

## Introduction

Financial inclusion (FI) can be defined as the process ensuring that individuals, households and businesses in a community have adequate access to formal financial services and products such as transactions, credit cards, payments, savings and insurance, and that these are delivered in a sustainable way (Singh & Singh Kondan, 2011).

Over the last years, financial inclusion has become one of the most critical issues in the area of monetary policy. Various international conferences, including the conference that the United Nations sponsored in 2019, emphasised the need to provide an adequate level of financial inclusion in the least developed countries, without which individuals and companies are unable to fully participate in the national economy.

Growing evidence shows that inclusive financial markets reduce rates of poverty and inequality by allowing individuals and households to manage consumption and

payments, receive bank loans, have insurance coverage (Mader, 2018). Furthermore, financial inclusion promotes the birth of new innovative companies and the expansion of existing ones, creating jobs that contribute to national savings (Ajide, 2020). Finally, financial inclusion strengthens the economic empowerment and active participation in the financial system of youth, women and other groups of people previously excluded (Hendriks, 2019; Siddik, 2017). Agyemang-Badu et al. (2018), for example, reveal that financial inclusion reduces poverty and income inequality in Africa, and thus they recommend implementing policies and programs to strengthen the formal financial inclusion of the poor. In a recent study, Koomson et al. (2020) find evidence that an increase in financial inclusion reduce the poverty of Ghanaian households, especially of those headed by women, and prevent their exposure to future poverty.

It is against this background that governments and international bodies in Africa and Asia have started promoting financial inclusion. In particular, they adopted new mechanisms, strategies and policies aimed at achieving inclusive development and improve financial services to underserved individuals and companies (Chinoda & Kwenda, 2019; Gretta, 2017; Loukoianova et al., 2018).

In 2019 the African Development Bank (AfDB) launched the Africa Digital Financial Inclusion Facility (ADFI), an innovative financing facility designed to accelerate digital financial inclusion across Africa and ensure access to the formal economy to millions of Africans. Similarly, the Government of India developed a biometric ID system called “Aadhaar” made to increase access to formal financial services for consumers and reduces costs for providers (Banerjee, 2016).

Despite the efforts made, financial inclusion remains a key challenge in the Asian and African regions where the benefits of the digital age are not being shared equally and important access gaps persist between men and women, poorer and richer households and rural and urban populations (Demirgüç-Kunt et al., 2018). As a consequence, many countries in these regions register very high exclusion rates when compared to other countries (Abubakar et al., 2020; Le, Dang, et al., 2019). Nigeria, for example, still has a dismal position of 68% exclusion rate even after 4 years of the implementation of its strategy for financial inclusion of 2012. More than one billion people within developing Asia have no access to formal financial services, such as bank accounts (only 27% of adults have an account in a formal financial institution) (Le, Chuc, et al., 2019).

Financial exclusion remains a widespread obstacle. Conroy (2005) and Gloukoviezoff (2007) defined financial exclusion as the deprivation of access to the financial system for certain community groups. Governments such as the Indian one, have enacted laws to provide access to financial services for all and to provide appropriate credit to vulnerable groups in the lower-income quintiles. Nevertheless, some groups may still be denied access to financial services due to omnipresent factors such as social and ethnic discrimination. Last, populations in rural areas are be considered too costly for financial institutions.

Innovations in banking and financial systems are essential to increase the level of financial inclusion, enhance prosperity and reduce poverty in the least developed Asian and African countries.

The importance and need for inclusive financial systems in developing countries motivate our study. Using annual data from 42 least developed Asian and African countries

for the period 2000–2019, we investigate whether development leads to an all-inclusive financial system. In particular, this study aims to examine the relationship between financial inclusion and development by empirically identifying country-specific factors that are associated with the level of financial inclusion. For this purpose, following Sarma and Pais (2011) we calculate the financial inclusion index (FII) for each country analysed. Then, we use the pooled panel regression and panel data analysis technique to measure the relationship between the relevant variables and the financial inclusion index. Finally, we present the results of empirical analysis to determine country-specific factors associated with the level of financial inclusion. Overall, the results show that literacy, urbanisation, and unemployment are significantly associated with financial inclusion. Income inequality is another important factor.

The relationship between financial inclusion and development has been an ongoing debate in developing countries. However, this issue has been neglected in the least developed Asian and African countries where there is little or no evidence to support this relationship. This study adds to the existent literature on financial inclusion in different ways. First, it contributes to empirical evidence and to the understanding of the determinants of financial inclusion and its impact on economic growth focusing on the least developed countries in the Asian and African regions. Though a number of researchers have delved into issues related to development and financial inclusion, an essential gap exists in the literature regarding the least developed countries in these regions. Second, our analysis contributes to the literature on gender discrimination by analysing the impact of gender and related factors on financial inclusion and economic growth in the countries under study. Third, this study analyses all major relationships between variables using pooled panel regression and panel data analysis technique to properly process endogeneity associated with financial inclusion.

The rest of this study is organised as follows. “[Literature Review](#)” Section reviews the related literature on financial inclusion. “[Methods](#)” Section describes data, model and methodology. “[Results](#) and [Discussion](#)” Section presents and discusses the empirical results. “[Conclusions](#)” Section concludes the study.

## **Literature review**

### **Financial inclusion and development**

The research on this topic has defined financial inclusion and financial exclusion in various contexts, including inclusion or exclusion from social activities. According to Marshall’s (2004), Wilson’s (2012) and Buckland’s (2012) studies, financial exclusion is defined as a lack of access to financial services. Exclusion can happen in many forms and depends on circumstances such as geographical location, the cost of services and a lack of proper information and education about the benefits of financial services. Financial exclusion stems from a dearth of access to formal financial services for individuals or groups in a community for multiple, potentially discriminatory reasons (Sinclair, 2001).

A well-developed and appropriate financial system is essential for economic growth and it can serve as a means of attracting the investment needed to drive a country’s development.

Development, in turn, can increase the breadth of financial services and the financial system. Policymakers can facilitate financial services by making changes to existing laws.

An undeveloped financial system can be costly for individuals planning to use financial services (Beck & De La Torre, 2006), and the consequences of underdevelopment include financial exclusion of groups in society and reductions in economic growth. A less developed financial system offers lower-quality services to customers, puts into question the economic justification for investing in new businesses and deprives vulnerable groups, such as those from lower-income brackets, of economic benefits (Edwards, 2017; Servon & Kaestner, 2008).

Many studies have recently been published on financial inclusion in which the authors clearly define the importance of this subject. However, the crucial missing point is the standard measurement of the global index by scientists and policymakers for understanding the financial inclusion rate for each community or country. Different models have been used to measure the global index, but it is necessary that experts in this field reach a consensus on a model.

Developing countries are considering policies to create appropriate job opportunities, reduce gender discrimination and increase literacy. For example, Atkinson and Messy (2013) believe that methods and policies for a fiscal strategy can lead to reducing discrimination in the area of finance. This requires changes in policy structure at the financial level. The result of anti-discrimination policies can help vulnerable groups and promote economic development.

Researchers employed different econometric techniques to measure financial inclusion with different databases. For example, Grohmann et al. (2018) and Wang and Guan (2017) used data from different countries and showed that formal financial services were more inclusive of families headed by men. Researchers have been trying to measure the inclusion index using different techniques so that they can compare across countries. Sarma and Pais (2011) have estimated the financial inclusion index by using World Bank data and applied an econometric approach to combine data to create a financial inclusion index. Just as we used this method in our study, other researchers (e.g., Dienillah et al., 2018) have used Sarma's method to calculate the financial inclusion index. Wang and Guan (2017) used this method to estimate the rate of financial inclusion in more than eighty countries, allowing for a comparison of the results between developed and developing countries.

Sarma (2012), in another study, used data from the World Bank database named the Global Financial Inclusion (Global Findex), to demonstrate the positive and significant relationship between development and financial inclusion. The study revealed a close relationship between the Human Development Index and the financial inclusion index; Sarma compared social factors such as income, literacy and urbanization to prove that the development of the financial and banking sectors is directly related to financial inclusion.

Demirgüç-Kunt and Klapper (2013) show that income and education are two crucial variables for accessing financial services. Kairiza et al., (2017) also confirms this and proposes a positive and significant relationship between financial inclusion and variables such as literacy, population and income. Furthermore, Kumar (2012) showed that poverty had fallen sharply in Indian cities where customers were provided greater access to financial and banking services. Park and Mercado (2015) similarly illustrate that changes in the regulation of the financial system led to a decrease in inequality and promote

banking and financial stability. Jabir et al. (2017) reveal that financial inclusion dramatically reduced poverty among low-income households in sub-Saharan African countries by providing net wealth and greater social benefits.

In their study, Adeola and Evans (2017) prove how financial inclusion, in terms of financial access and financial usage, can help to drive economic diversification in Nigeria. According to the authors, financial inclusion can help Nigeria to build shared prosperity and abolish extreme poverty. Kim et al. (2018) find that financial inclusion has a positive effect on economic growth in the Organization of Islamic Cooperation (OIC) countries.

Using firm-level data from 79 emerging and developing countries, Chauvet and Jacolin (2017) analyse the impact of financial inclusion and bank competition on firm performance. The authors reveal that financial inclusion has a positive impact on firm growth, especially when bank markets are less concentrated. They also find that more competitive banks favour firm growth only when the levels of financial inclusion are high.

Le, Chuc, et al. (2019) investigate the impact of financial inclusion on financial efficiency and sustainability across 31 Asian countries. The authors reveal a negative impact of financial inclusion on financial efficiency but a positive impact on financial sustainability.

Based on a sample of 62 countries over the period from 2001 to 2012, Rizwan and Bruneau (2019) investigate the role of information and communication technologies (ICT) in extending financial inclusion and reducing poverty and income inequality. According to the authors' results, ICTs boost financial inclusion, accelerate the economic growth and reduce poverty and inequality.

In a recent study, Ajide (2020) reveals that financial inclusion also has a significant and positive effect on entrepreneurship in Africa.

Abubakar et al. (2020) identify financial inclusion as one of the growth-enhancing factors for developing countries and state that an inclusion faster than the rate of population growth would produce a better financial inclusion index and truly accelerated the economic growth of Nigeria. Using a sample of 53 developing countries between 2004 and 2017, Ouechtati (2020) empirically examines the effect of financial inclusion on poverty and income inequality. The author finds evidence that financial inclusion contributes to reducing poverty and income inequality by increasing the availability of credit and access to deposit accounts at commercial banks. Omar and Inaba (2020) find similar results in 116 developing countries in Asian, African, and Latin American and the Caribbean regions.

This research forms the core of the field of measuring financial inclusion and its relationship to development-related variables. Few prior studies examined the relationship between development and financial inclusion, but the above studies provide a broad view of relevant results and methodologies. Consistent with the previous literature review and its findings, this paper attempts to investigate financial inclusion and economic development in the selected countries through the use of development variables and to find the relationship between financial inclusion and income inequality.

Hence, we address the following research questions: First, what are the crucial factors that affect the level of financial inclusion in least developed countries? Second, does financial inclusion reduce unemployment and income inequality in least developed

countries? Third, does financial inclusion increase literacy and rural population growth in least developed countries? Fourth, are there any conditions under which financial inclusion can play a more effective role in reducing inequality in wealth distribution and increasing the GDP in least developed countries?

This research differs from other studies in econometric techniques and case studies.

## Methods

### Data

This study uses data collected from the following databases: The World Bank, the International Labour Organization (ILO), the International Monetary Fund (IMF) and the United Nations. The data sequence comprises annual data from 2000 to the end of 2019. We focused on the variables used in Sarma and Pais (2011), e.g., GDP, literacy rates, unemployment rates and Gini coefficients. We then used Stata to analyse the data. The panel analysis was used to determine the relationship between financial inclusion and development in the selected countries.<sup>1</sup>

In line with the literature studied, we focused on important variables including GDP, literacy rate, the literacy rate for men, literacy rate for women, unemployment rate for men, unemployment rate for women, Gini coefficients as well as financial inclusion index. We created the financial inclusion index through the variables used in Sarma and Pais (2011).

The financial inclusion index for each country is calculated through a principal component analysis (PCA), using the relevant variables such as access to banking services, the number of bank branches, access to credit through the formal financial system and allocated credit to the private sector through the banking system. The choice of a PCA is advantageous for the creation of the index because this methodology creates a cumulative relationship between the variables (Naik, 2017), which establishes the representative index of financial inclusion. We estimated the total variance clarified by the principal components for each country. We also selected the value of the eigenvalue where it was calculated to be more than one; we removed other components with a value of less than one, establishing the preliminary eigenvalues linked with appropriate components, and then computed the financial inclusion.

Meanwhile, we took the eigenvalue greater than 1; we cut only the principal components lower than 1, and the components clarified the precise percentage of the entire difference restricted in all variables. The other components are not reflected, and subsequently, their marginal evidence is moderately unimportant. These principles were then used as the bulks to calculate the PCA. For occurrence, the first principal component. The financial inclusion index built on the original eigenvalues related to relevant components; we computed the financial inclusion index for each country separately from the complex module.

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<sup>1</sup> Least developed countries in Asia: Afghanistan, Bangladesh, Bhutan, Cambodia, East Timor, Lao PDR, Myanmar, Nepal and Yemen. Least developed countries in Africa: Angola, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Tanzania, Togo, Uganda and Zambia. We excluded Somalia from our sample due to the lack of data in our database.

**Table 1** Descriptive statistics

Variable	Obs	Mean	Std. Dev
GDP	820	4.88	6.196761
POP	820	2.49	0.9005274
UNEMM	820	5.95	5.69916.26
UNEMF	820	7.1	7.461748
GINI	820	47.63	12.77725
LITF	820	44.59	23.11662
LITM	820	62.89	20.91172
LITT	820	53.43	21.4136
FII	820	- 2.69e-091.710561	

*GDP* Gross Domestic Product, *POP* Population growth, *UNEMM* Unemployment rate of men (ILO estimation), *UNEMF* Unemployment rate of Women (ILO estimation), *GINI* Gini coefficient, *LITF* Literacy rate of women, *LITM* Literacy rate of men, *LITT* Total literacy rate and *FII* Financial inclusion index

Table 1 provides descriptive statistics for all used variables. We used the literacy variable to explain the relationship between financial inclusion and literacy, which Trudell (2009) reports is one of the most important factors in development. The table below shows that the average literacy rate in men is much higher than in women, and more than half of the population is illiterate. Another variable is economic growth, which is one of the important variables for this concept (Litchfield, 1999). The population growth is high in less developed countries, and the impact of population growth on the level of per capita production depends on the pattern of population growth and on institutional plans (Simon, 2019). There are some studies on financial inclusion and income inequality: Abdulkarim and Ali (2019), for example, show that income inequality has a profound impact on financial inclusion. As income inequality increases, the degree of financial inclusion decreases, and this impedes development. The table below shows that the average inequality in less developed countries is higher than the global average. In the data used, the average unemployment rate for men is lower than for women, and the average financial inclusion index is close to zero.

### Model

With Sarma and Pais (2011) research in mind and in order to analyse and determine the relationship between financial inclusion and development in the least developed countries in Asia and Africa, we applied the following models:

Model 1:

$$FII_{it} = \alpha + \beta_1 GDP_{it} + \beta_2 LIT_{it} + \beta_3 RURP_{it} + \beta_4 UNEMM_{it} + \beta_5 UNEMF_{it} + \beta_6 GINC_{it} + \tau_t + \varepsilon_{it}$$

Model 2:

$$GDP_{it} = \alpha + \beta_1 FII_{it} + \beta_2 LIT_{it} + \beta_3 RURP_{it} + \beta_4 UNEMM_{it} + \beta_5 UNEMF_{it} + \beta_6 GINC_{it} + \tau_t + \varepsilon_{it}$$

*FII* represents the financial inclusion index in the period *t*, *GDP<sub>it</sub>* represents the GDP, *RURP* represents the total population in the rural area, *UNEM* represents the unemployment rate, *GINC* represents the Gini coefficients, *LIT* represents literacy and  $\varepsilon_i$  represents the error term.

The error term is included in the model to characterize the unobserved time aspects that are different between countries but fixed within countries over time.

As mentioned previously, observations from the literature have illustrated that inclusive policies lead economic to development. We employed the pooled panel regression and panel data analysis technique to examine the impact of our hypothesis during the chosen period (2000–2019) in the selected countries. Later, we run the panel data analysis technique to approve our results from the pooled panel regression. Panel data analysis has advantages such as including more degrees of freedom than single cross-section or time-series and more sample variability than cross-sectional data. Additionally, it has a great capacity for capturing the complexity of variables interacting with each other (Biørn, 2016).

We assumed that there is an effect between variables in the selected countries, so we wanted to use the panel data analysis technique. In this technique, there is either a fixed-effect or a random effect between the independent variables and the dependent variable. The fixed effects model produces a constant estimate, but in contrast, the Hausman test determines an appropriate model. Panel data makes it possible to analyse the series of times and different countries. Therefore, estimating panel data increases estimation efficiency by analysing a large number of data, increasing the degree of freedom and reducing the collinearity between variables. Another advantage of this technique is that it allows for the analysis of data by using many variables at the same time in a time series and selected countries (Petersen, 2004).

## Results and discussion

We first used pooled panel regression to find the relationship between the financial inclusion index and the underlying economic and social variables to better understand development. The indicators that we tried to identify include the following: economic growth, literacy rates, unemployment rates, income inequality (Gini coefficient) and rural population growth.

Table 2 represents the results of the pooled panel regression, which show that GDP has a direct and significant relationship with the financial inclusion index. This means that, by increasing gross domestic product, the financial sector provides more financial services to more individuals and groups in society. The results indicate a significant relationship between the financial inclusion index and literacy rates and educational attainment, and there was a clear, negative relationship between the index and rural populations. The Gini coefficient shows that increasing equality in wealth distribution can promote financial inclusion.

Table 3 shows the results of the main panel, specifically, the results of fixed effects and the consequences of random effects. The first column shows the main variables. As detailed in the methodology section, we used a PCA to create the financial inclusion index. The results of the random effects model indicate an increase in the financial inclusion of GDP. The results of the fixed effects are also similar. In empirical analyses, it is essential to choose between random and fixed effects (Bartels, 2008), and to do so, we employed the Hausman test, with the results suggesting that a fixed effects estimator was most appropriate.



**Table 2** Results of independent's variables coefficients by using the pooled regression

	IFI—Model 1	Robustness check by country—Model 1	Sign Predicted		GDP—Model 2	Robustness check by country—Model 2	Sign predicted
Ingdp	0.66** (0.11)	0.67** (0.17)	+	IFI	0.07** (0.01)	0.08** (0.03)	+
LITT	− 0.00256 (0.01)	− 0.00241 (0.01)	+	LITT	0.01** (0.01)	0.02** (0.01)	+
Popt	− 0.01** (0.01)	0.00** (0.00)	+	Popt	0.01** (0.00)	0.02** (0.01)	+
UNEM	− 0.04** (0.02)	− 0.05** (0.03)	−	UNEM	− 0.28** (0.19)	− 0.29** (0.21)	−
UNEMF	− 0.03** (0.01)	− 0.04** (0.01)	−	UNEMF	− 0.14** (0.08)	− 0.16** (0.11)	−
GINI	− 0.004 (0.02)	− 0.003 (0.01)	+	GINI	− 0.01** (0.02)	0.00 (0.01)	+
Prob > F	0.00				0.00		
R2	0.04				0.21		

GDP Gross Domestic Product, POP Rural Population growth, UNEM Unemployment rate, GINI Gini coefficient, LITF Literacy rate of women, LITM Literacy rate of men, LITT: Total literacy rate and FII Financial inclusion index

\*\*Significant at level 5%

**Table 3** Results of independent's variables coefficients by using the panel regression

Model 1: FE	Robustness Check—Model 1: FE	Sign Predicted—Model 1: FE	Model 1: RE	Model 2: FE	Robustness Check—Model 2: FE	Sign Predicted—Model 2: FE	Model 2: RE
	IFI				GDP		
Ingdp	2.31** (0.3)	2.35** (0.71)	+	0.65** (0.11)			
IFI					0.23** (0.16)	0.25** (0.19)	+
LITT	0.26** (0.14)	0.27** (0.15)	+	0.21* (0.12)	0.12** (0.08)	0.14** (0.1)	+
LITM	0.14** (0.07)	0.15** (0.09)	+	0.1* (0.06)	0.11** (0.05)	0.13** (0.07)	+
LITF	0.12* (0.06)	0.15** (0.08)	+	0.11* (0.05)	0.07** (0.03)	0.09** (0.05)	+
Popt	− 0.12** (0.01)	− 0.10** (0.07)	+	− 0.1** (0.00)	0.04** (0.02)	0.07** (0.05)	+
UNEM	− 0.01 (0.08)	− 0.02 (0.09)	−	− 0.08* (0.04)	− 0.05** (0.03)	− 0.06** (0.04)	−
UNEMF	− 0.11** (0.05)	− 0.14** (0.07)	−	− 0.03 (0.03)	− 0.02** (0.01)	− 0.04** (0.02)	−
GINI	− 0.003 (0.01)	− 0.002 (0.01)	+	− 0.01** (0.02)	− 0.04** (0.02)	− 0.03** (0.02)	+
Prob > F	0			0			
HAUSMAN				0	0		

GDP Gross Domestic Product, POP Rural Population growth, UNEM Unemployment rate of men (ILO estimation), UNEMF Unemployment rate of Women (ILO estimation), GINI Gini coefficient, LITF Literacy rate of women, LITM Literacy rate of men, LITT Total literacy rate and FII Financial inclusion index

\*Significant at level 10%

\*\*Significant at level 5%

The results show that financial inclusion can increase rapidly as GDP increases, also, GDP growth can increase the level of financial inclusion. For example, by increasing only one percent of GDP, we can see an increase of more than two times in the financial inclusion index. However, the results show that applying the inclusive policy can

increase economic growth. These results corroborate the results of previous studies that demonstrated a significant relationship between these variables. As observed in the panel regression, these two variables have a positive and meaningful relationship with each other. We run the robustness check to control coefficient estimates' behaviour when adding country (Neumayer & Plümper, 2017). Our findings show that the coefficients do not change much.

The results in Table 3 also show that the variable literacy rate is significant. The factor of literacy on financial inclusion for women is lower than for men; this shows that women in the studied countries are less financially inclusive than men. Table 3 indicates that the total literacy has a coefficient equal to 0.26. A 1% increase in the literacy variable can thus lead to a 26% increase in the financial inclusion index. The literacy coefficient is only 14% for men and 12% for women; this proves once more that women in less developed countries in Asia and Africa experience less financial inclusion than men do. The results suggest that the development of education needs to increase equally for men and women, the results of Panel B confirm that gender equality in education can increase economic growth. The unemployment rate is another variable that supports this conclusion, with the increase in the unemployment rate for men who less financial exclusive than women. Women were found to more likely experience financial exclusion when losing their jobs; this may be due to a variety of reasons, including racial discrimination. All the above patterns prove that gender is essential in the financial inclusion index. The same as results for pooled panel regression, we run the robustness check and the coefficients do not change much.

Our estimations also identified that increase in rural population size reduces financial inclusion. Because people living outside cities have less access to financial institutions, this poses a problem in the studied countries, where agriculture is an important pillar of the economy and where more financial inclusion is essential for agricultural development. Finally, as expected, an increase in the Gini coefficient will lead to a rise in the pay gap, and this will lead to a decrease in financial inclusion.

## Conclusions

Despite the progress made in recent years around the world, financial inclusion is still a critical issue. About 1.7 billion adults do not have an account with a formal financial institution or a mobile money provider (Demirgüç-Kunt et al., 2018). Most of the financially excluded population is in developing countries.

The vulnerable groups in society are more likely to be excluded from the financial system (Carbo et al., 2005; McKillop and Wilson, 2007; Wilson, 2012), and the financial deprivation is higher in rural areas. The fair distribution of wealth in society has a direct relationship with financial inclusion, and research shows that a low degree of financial inclusion leads to social exclusion and, consequently, to less development.

This study empirically examines the relationship between financial inclusion and development by identifying country-specific factors that are associated with the level of financial inclusion in 42 least developed Asian and African countries for the period 2000–2019. A pooled panel regression and a panel data analysis technique are used to measure the relationship between the relevant variables and the financial inclusion

index (FII). Also, we performed robustness check by country for pooled panel regression and panel data analysis.

The analysis of this study shows that the increase in GDP is a prominent indicator of financial inclusion. Inequality in wealth distribution can lead to financial exclusion and naturally affect economic growth. The literature in this field identifies a positive correlation between financial inclusion and human development (Thorat, 2006), and as the results of this study show, economic growth is indeed an essential factor in increasing financial inclusion.

Increased educational attainment leads to greater access to financial services, and the results show that gender-based discrimination affects less developed countries. Among the studied variables, as pay inequality and low access to financial services rise, financial inclusion decreases. The introduction of incentives to improve literacy, eliminate gender inequality and increase pay equity will enhance the conditions of development.

Finally, these findings emphasise that financial inclusion is, in fact, a reflection of the widespread involvement of all different groups in the society, the equal distribution of wealth, and the increasing level of literacy in all different groups of society.

Overall, the empirical findings of this research can be of particular interest for policymakers and other regulators to define impactful policies promoting financial inclusion in the least developed countries in Asia and Africa by ensuring the establishment of the right financial services and tools and the removal of cultural and economic barriers. Least developed countries can empower youth, women and other vulnerable groups traditionally marginalised by changing their financial policies and designing new incentives to increase financial participation.

Furthermore, this research contributes to providing statistical and economical validity to the Africa Digital Financial Inclusion Facility (ADFI), launched in 2019 by the African Development Bank (AfDB) and aimed at accelerating digital financial inclusion across Africa and ensure access to the formal economy to millions of Africans.

Going forward, future studies could expand the experimental setting of our study by including other socio-economic and cultural factors, and investigate whether our results continue to hold in different contexts, particularly in developing countries.

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#### **Authors' contributions**

Study conception and design (AFC and AK); Acquisition of data (AFC and AK); Analysis and interpretation of data (AFC and AK); Drafting of manuscript (AFC and AK); Critical revision (AG and SM); Project administration and supervision (SM). All authors read and approved the final manuscript.

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#### **Availability of data and materials**

The datasets generated and/or analysed during the current study are available in the Global Findex database.

#### **Declarations**

##### **Competing interests**

The authors declare that they have no conflict of interest.

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