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DETERMINANTS OF FINANCIAL INCLUSION IN MIDDLE–INCOME COUNTRIES

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ABSTRACT

This paper investigates main determents that may affect financial inclusion in sample of 21 middle–income countries. Two stages least squares and principal component techniques are employed for this sort of cross–sectional data for the year 2017 to determine key indicators that influence financial inclusion. Results show that to enhance financial inclusion in these countries a set of governmental policies should be applied.

Keywords: Financial Inclusion; Stabilization; Cross Sectional; Two Stages Least Squares; Principal Components

JEL classification: C3; C310; C380; E020; G290

1. INTRODUCTION

Financial inclusion is defined as "the access of all members – government , banks, private and social sector – of economy to a variety of useful and affordable financial products and services that meet their needs such as payments and transfers, savings, insurance and credit" (World Bank, 2016). This access facilitates the daily life of the users, and thus generates a better planning of their long–term objectives. Financial inclusion is also a key determinant for the reduction of extreme poverty by generating opportunities not only within the financial system, but also in other markets.

Financial inclusion helps directly in the reduction of inequality and indirectly to the quality of life and opportunities of the individuals. Thus, financial inclusion influences economic growth. Developed countries such as the United States and Canada have a robust financial system along with high rates of participants in financial institutions. In the United States, for example, 94% of people have a bank account and in Canada 98%, while in Middle East and North Africa only 47% of the population have bank accounts, and only about 43% if high income countries excluded. (World Bank, 2017). According to Graph 1, countries with greater financial depth

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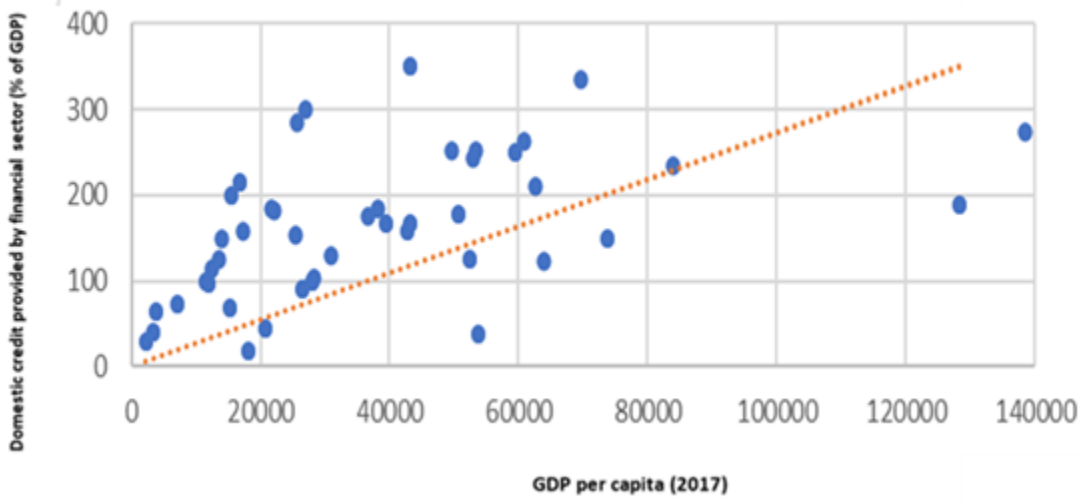
measured as domestic credit of the banking sector as a percentage of GDP, have higher per capita growth:

Fig. 1: Relationship between GDP per capita and financial deepening (2017)



For emerging countries presented in the graph, the low financial depth moves in parallel with the lower economic growth. This means that lower economic growth is correlated with lower levels of financial inclusion. It is also clear that developed countries with a very high financial depth, have stable economic growth.

Greater financial inclusion also supports macroeconomic policy in which it helps in increasing savings and investments, access to the financial system and its products is facilitated. There is no doubt that stable and consistent financial market strengthen goods and services market. As a result, agents have a greater opportunity to "give up present consumption for investment returns through savings, the possibility of accessing credits to obtain capital and education goods and the security that money provides through debit cards". Opportunities that will be reflected in greater growth (Bekerman & Chiara, 2017). For all the favorable consequences it is important to know and identify the role of socio-economic and financial variables on the degree of financial inclusion in a country.

Until now, the literature about the determinants of financial inclusion is limited, so we have chosen to make a classification of variables that can explain financial inclusion, such as macroeconomic, geographic and population, technological advances, institutional and the financial structure. In this way, this study contributes, by degree, to the literature with additional evidence about the importance of financial inclusion and its determinants for middle–income countries.

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The hypothesis to be tested is the existence of a significant relationship between socioeconomic and financial variables and its grade of financial inclusion.

In the case of middle–income countries, the scale of the relationship would operate positively with a higher level of education, as well as with greater access to digital technologies. It should also consider higher levels of GDP growth per capita and lower levels of corruption.

To answer the previous hypothesis, an empirical study is employed via ordinary least squares. Data have collected from the Global Findex database. A twenty–one Global and Financial Development Indicators for middle income countries are classified by the World Bank, ten of them are regarded to the financial inclusion and other eleven variables determine financial, for the year 2017.

The rest of the paper is structured as follows. Section 2 discusses relevant literature review. Section 3 encompasses the model specification. Section 4 signifies the empirical results. Finally, section 5 handles concluding remarks.

2. LITERATURE REVIEW

Financial inclusion has become a vital issue for both economic and social agendas of countries due to its contribution to eliminate poverty and improve the efficacy of the economy. According to Honohan (2003) and Olloqui, Andrade, & Herrera et al (2015), a more developed financial sector allows for better distribution of income. Moreover, it improves the quality of life of the agents. In effect, the financial sector provides instruments that allow agents to have more order and control to meet their needs.

According to the International Monetary Fund (IMF), "the countries where the financial sector is more developed, the institutions are more solid, the macroeconomic policies are correct, the trade regime is more open, they are in a better position to benefit from the financial globalization and are much less likely to be affected by instability.

Nowadays, financial inclusion has a great concern for middle–income countries not only in economic prospect but also in social view owing to its major role in declining poverty. For Honohan and Olloqui (2003), Andrade, & Herrera et al (2015), a more developed financial sector allows the distribution of income to be better and hence the quality of life of the agents. In effect, the financial sector provides agents with a variety of instruments that satisfy their needs.

A clear example of developed financial systems that achieve a better distribution of income are; the United States and the United Kingdom. Both countries have "healthy financial system" which enables them to maintain their high economic development scores. There is no doubt that a

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developed financial system allows for better investment of capital towards a variety of productive activities, such as construction, industry, technology and other activities. That is, the financial system contributes to the progress of a society, offering solutions to meet the needs of housing, study, work, among others (Freeman, 2011), (Simonyan, 2017).

According to (Morales 2003; Blackburn et al., 2005) the countries where the financial sector is more developed, the institutions are more powerful, macroeconomic policies are right, the trade regime is more open, they are in a better position to benefit from the financial globalization and are much less likely to be affected by instability.

In contrast, in developing countries such as Middle East and North Africa (MENA) countries with moderate financial systems, there is need for more efforts to be done. Governmental agencies in their seek to improve financial inclusion they have to implement proper macroeconomic policies, such as: low and stable inflation, stable exchange rate, implementing technology and offer a better financial education so that agents can trust and use the financial system (IMF, 2017).

The most common financial instruments provided to agents are debt and equity, which are represented in savings accounts, credits, current accounts, futures, options, swaps and other contractual agreements. These instruments allow economic agents to acquire both of physical and human capital, as well as to make better decisions and implement strategies to manage financial risk and their income. (Olloqui, Andrade, & Herrera, 2015).

In relation to previous, financial inclusion reduces the levels of vulnerability of the poverty through two different channels: (i) the smoothing of consumption and the availability of tools to better deal with adverse income shocks suffered by households, and (ii) an increase in the value of capital, whether human (health, education) or physical production (WB, 2016), which is achieved due to the inclusion of people in the financial system and its products.

In addition to benefiting the poorest population, financial inclusion has a favorable effect on the quality of work by reducing informal activity (Millán & Jiménez, 2016), because the more formal work, the more access will be to the financial system. In fact, the greater demand for financial products facilitates and reduces the transaction costs of salary payments . Because of these services, vulnerable households faced with shocks of informal strategies, such as drop-by-drop credits, which can further deteriorate their quality of life (Morduch, 1994) y (Holzman, 2003). The opposite occurs in the presence of financial support.

Olloqui, Andrade, y Herrera et al (2015) argue that the net effect on low–income families with greater access to financial services is higher than to those with less access and they have a better

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quality of life, even if the income levels do not increase. According to Smith (2001), access to the financial system can better support economic growth and reduce income inequality".

Baza and Sambasiva (2017) find that the major obstacles to financial inclusion in Ethiopia are the distance between the population's place of residence and the bank and the documents required by banks. Honohan and King (2012) conducted a study of several African countries and found that location in terms of urban and rural residence was a key factor for access to financial services. Avom and Bobo (2014) find that in the countries of the Community of Central African States (CAEMC), guarantees constitute a real constraint on access to credit for both small and medium-sized enterprises and low income. In addition, these authors point out that in the CAEMC, many important individuals do not have access to bank credit because they cannot meet the banks' requirements for collateral given the fact that they do not have access to bank credit. often assets that can be considered as security for a loan or otherwise if they have, they do not have the appropriate titles.

UNCTAD (2014) notes that, in the absence of adequate regulation, information asymmetry could lead to insufficient credit supply for a given population group or be a source of moral hazard. because of an overabundance of supply and over-indebtedness. According to Terpstra and Verbeet (2014), improving customer satisfaction is associated with costs that can potentially prevent access to financial services, especially for low–income people. They found a negative relationship between the cost of customer service and customer satisfaction. According to Zins and Weill (2016), the main determinants of financial inclusion are: the availability of bank information, income levels, financial infrastructure, and regulation of the financial sector.

Considering the demand factors for financial services, David et al. (2018) examined the determinants of financial inclusion in Nigeria using a time series of data from 1990 to 2016. They found a positive and significant relationship between financial inclusion and GDP per capita. lwodi and Muriu (2017) examined financial inclusion across sub-Saharan Africa using 2014 Global Findex data. They find that lower income levels are associated with lower levels of access to bank accounts. Ardic et. al, (2011) have shown that income, income inequality, telephone and internet use, and adult literacy are important factors for financial inclusion in a country.

In India, Chithra and Selvam (2013) found that income, population and literacy are significantly associated with financial inclusion. In Argentina, Tuesta et. al, (2015) found that income and education are all important factors for financial inclusion. Fungáčová and Weill (2015) argued that in China, education and higher incomes are associated with greater use of accounts and formal credit in the country.

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It is valid to say that although the high levels of inequality in the countries are partly due to the development of the financial system, studies have shown that if there is greater financial inclusion accompanied by effective government policies, inequality improvements can be made, especially those of growing countries. (García J. C., 2016).

Thus, it is vital to know the most influential determinants from the demand side (users) of the financial system, such as: age, level of education, geographical location, socio-economic condition, type of employment (formal or informal) and, from the supply side, the infrastructure and technology of financial products, service costs and incentives.

Additionally, it is important to consider other macroeconomic variables such as: the level of inequality and poverty, spending on education and health, corruption and transparency, GDP per capita, monetary policy and the impact of government plans aimed at spreading a financial inclusion within society. The spread of financial inclusion will result in a better quality of life for people and accelerate economic growth. The mentioned variables are supported by Nandru (2016) who find that variables of education and socioeconomic status are determinants of financial inclusion and access to mobile banking.

3. METHODOLOGY

To identify the determinants of financial inclusion in middle-income countries, a set of variables are used as measures of financial inclusion (see Table 1) as well as a set of determinants: socio-economic variables for the group of middle-income countries presented. The estimation method will be performed by ordinary least squares, since there is a cross-sectional analysis. The equation to evaluate is the following:

$$Y_i = a + \beta_k X_{ki} + \mu_i$$

Where Yi represents each of the indicators or proxies of the financial inclusion of the country i (as proxies of financial inclusion were used: percentage of accounts in a financial institution, number of ATMs per 100,000 adults, number of bank branches per 100,000 adults, percentage of loans taken from a financial institution, percentage of informal loans and to start, operate or expand a firm or business, percentage of savings in a financial institution, percentage savings for education and to start, operate or expand a firm or one business and last number of accounts in banks for every 1,000 adults).and X_{ki}, is the vector that includes each of socioeconomic characteristics (k).

To obtain consistent estimators, the standard errors were calculated in a robust way correcting for heteroskedasticity with the White test.

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The dependent variables associated with financial inclusion can be understood as part of two different groups:

Usage: the variables that will allow to evaluate the reach and use of the financial services. (Cámara & Tuesta, 2014) For this model, the following were considered: percentage of accounts in a financial institution, percentage of borrowing from a financial institution, percentage of informal loans, percentage of savings in financial institutions, percentage of savings for education and to start, operate or expand a firm or business.

Access: which is defined as the possibility for people to use financial services. While greater access does not imply a higher level of financial inclusion, it can improve its use and meeting the needs of the population, which in one way or another promotes financial inclusion (Noelia House, 2014). To assess the extent of the use of formal financial services by individuals, the following variables were considered: number of ATMs per 100,000 adults, number of bank branches per 100,000 adults and number of bank accounts per 1,000 adults.

Table 1: Independent variables

Dependent variables or proxies of financial inclusion	Definition
financial institution Accounts (% years 15+)	The percentage of respondents who report having an account (by themselves or together with someone else) at a bank or another type of financial institution
ATMs (per 100,000 adults)	the total number of Automated teller machines (ATMs) per 100,000 adults in the reporting country. Calculated as (ATM number) * 100,000 / adult population in the reporting country
Commercial bank branches (per 100,000 adults)	Commercial bank branches are retail locations of resident commercial banks and other resident banks that function as commercial banks that provide financial services to customers and are physically separated from the main office but not organized as legally separated subsidiaries.
Borrowing from a financial institution (% age 15+)	The percentage of respondents who report borrowing any money from a bank or another type of financial institution in the past 12 months

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Borrowing from a private informal lender (% age 15+)	The percentage of respondents who report borrowing any money from a private informal lender in the past 12 months
Borrowing to start, operate, or expand a firm or business (% age 15+)	The percentage of respondents who report borrowing any money to start, operate, or expand a firm or business in the past 12 months (% age 15+)
Saving at a financial institution, (% age 15+)	The percentage of respondents who report saving or setting aside any money at a bank or another type of financial institution in the past 12 months.
Saving for education or school fees (% age 15+)	The percentage of respondents who report saving or setting aside any money in the past 12 months for education or school fee.
Saving to start, operate, or expand a firm or business (% age 15+)	The percentage of respondents who report saving or setting aside any money in the past 12 months to start, operate, or expand a firm or business.
Bank Accounts Per 1000 Adults	The number of accounts of people who deposit money in a financial institution. It is calculated for each country as: 1,000 * reported the number of depositors / adult population in the reporting country.

On the other hand, the literature has identified potential variables that affect the financial system. This model will consider the dependent variables such as the macroeconomic, institutional, banking and financial and geographical and population sectors (Yontcheva, (2015).

- ***Macroeconomic variables:*** In this group, the following variables were included: per capita GDP growth, the inflation rate and the unemployment rate. It is expected that higher income will associate with more financial services, while a lower rate of unemployment favors the growth of the financial sector. For these variables, the one-year lag is used to address endogeneity problems.

- ***Institutional variables:*** This category includes: political stability, control of corruption and the quality Institutional arrangements. It is expected that a better institutional framework will reduce

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the inequality gap and thereby increase the social, economic and political quality that will be reflected in greater financial inclusion.

- ***banking and financial sector Variables***: For this group, the interest rate spreads is included.

- ***Geographical and population variables***: This group contains the GINI index and the rural population. The rural population is expected to have a negative influence on access to financial services. Therefore, high poverty rates are usually associated with lower income groups within rural areas and less financial inclusion.

Since financial inclusion is unobserved which cannot be measured in a direct way. We assume that behind a set of correlated variables, we can define an underlying latent structure that can be identified with a latent variable as is in the financial inclusion. To identify the main components of financial capacity, a statistical procedure was applied to simultaneously quantify categorical variables while reducing the dimensionality of the data. This so-called Principal Component Analysis (PCA) procedure reduces the original set of variables to a smaller set of uncorrelated variables (the main components), which aim to explain the variance of the data as much as possible. The PCA method obtains a unique indicator (or score) for each component. Scores range from 0 (lowest score) to 100 (highest score). We apply two-stage principal components approach to estimate the degree of financial inclusion.

In the first stage, we estimate the two sub-indices: usage, and access, which defined financial inclusion. In the second stage, we estimate the dimension weights and the overall financial inclusion index by using the dimensions as explanatory variables. If it is assumed that financial inclusion latent variable is determined as follows:

$$FI_i = \propto_1 Y_i^u + \propto_2 Y_i^a + e_i \qquad (2)$$

Where Y_i^u and Y_i^a denote to usage and access dimensions respectively, and i denotes to the country.

PCA consists of two stages. The first aims to estimate the dimensions or the latent endogenous variables, that is Y_i^u and Y_i^a in the following equations:

$$Y_i^u = \beta_1 Bank\&inst.account_i + \beta_2 Saving(edu., business)_i + \beta_3 Borrowing(financil\ instit., private)_i + u_i \qquad (3)$$

$$Y_i^a = \propto_1 ATM_i + \propto_2 Branches_i + \in_i \qquad (4)$$

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To estimate these endogenous variables, they are estimated jointly with unknown parameters β and α. It assumed Rp is the correlation matrix of p indicators for each dimension. Moreover, λj (j = 1,…..p) represents j^{th} eigenvalue. Where j refers to the number of principal components. Consequently, each dimension indicator can be estimated using the following weighted average:

$$Y_i^u = \frac{\sum_{j,k=1}^{p} \lambda_j^u P_{ki}^u}{\sum_{j=1}^{p} \lambda_j^u} \qquad (5)$$

$$Y_i^a = \frac{\sum_{j,k=1}^{p} \lambda_j^a P_{ki}^a}{\sum_{j=1}^{p} \lambda_j^a} \qquad (6)$$

where $P_k = X\lambda_j$. λ_j represents the variance of the kth principal component (weights) and X is the indicators matrix. The second step of principal component analysis is estimating the overall financial inclusion index by substituting equations (5) and (6) in equation (2). And therefore, the financial inclusion index is as follows:

$$FI_i^u = \frac{\sum_{j=1}^{p} \lambda_j^u P_{ki}^u}{\sum_{j=1}^{p} \lambda_j^a} \qquad (7)$$

The highest weight, λ1, is attached to the first principal component, the second highest weight, λ2, is attached to the second principal component and so on.

4. RESULTS

To estimate the determinants of financial inclusion in middle–income countries, the following indicators are used as proxies: the percentage of accounts in financial institutions per country, the number of ATMs for every 100,000 adults, number of branches per 100,000 adults, the number of bank accounts per 1,000 adults, the percentage of loans provided by financial institutions, the percentage of informal loans to start, operate or expand a business, and finally the percentage of savings within financial institutions, savings for education, savings to start, and finally operate or expand a business.

On the other hand, the set of determinants to be explored can be characterized as Alter and Yontcheva (2015) did. They categorize them in three groups as follows: macroeconomic variables, which include GDP growth per capita, inflation, the percentage of rural population, the unemployment rate and the GINI index; the second group corresponds to the institutional variables which includes: indicators of political stability (range between 0 and 100), corruption control, interest rate spreads (measured as the difference between long run and short run interest rates on debt instruments), and the final group represents geographical location of the country as dummies in which it takes the value of 1 if the country is located in Africa. To correct the

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heteroscedasticity problem White method robust standard error is applied in which the null hypothesis is homoscedasticity.

Percentage of accounts in financial institutions

Table 2 shows the relationship between financial inclusion as a dependent variable and other variables in model. Results show that the corruption control is statistically significant variable. It has also a positive relationship with the accounts in financial institutions. This relationship clarifies that greater corruption control, the more trust in financial institutions accompanied with greater use of the products of the financial system.

In addition, the rural population variable is also significant, which has a negative relationship with accounts in financial institutions, suggesting that an increase in the percentage of the rural population is related to fewer products of the financial system.

Table 2: determinants of percentage of accounts, number of ATM, and comm. Bank branches

variables	Percentage of accounts in financial institutions		Number of ATMs per 1,000 adults		Commercial bank branches (per 100,000 adults)	
	Coef.	P value	Coef.	P value	Coef.	P value
GDP growth per capita	0.74224	0.516	113.01498	0.078	112.83531	0.419
inflation	0.10432	0.569	-10.18635	0.714	-9.05214	0.615
Rural population	-0.39670	0.006	-117.35556	0.015	-18.60594	0.271
Unemployment rate	-0.14781	0.677	-94.31974	0.252	5.48528	0.409
Gini Index	-0.00068	0.632	-.0112027	0.825	-0.16759	0.524
Political Stability	0.00118	0.495	-0.43713	0.124	-0.32863	0.325
Control of Corruption	0.04792	0.035	0.178092	0.001	0.51983	0.271
interest rate Spreads	0.61529	0.367	196.13976	0.021	4.27643	0.478
Africa	0.21257	0.058	-13.68117	0.132	8.28639	0.535
Asia	0.20542	0.028	13.98186	0.537	-0.13246	0.543

Although the interest rate spread is insignificant, the relationship is counter–intuitive and opposite to projected results. This is may be due to the higher interest rate spreads the higher the cost for obtaining financial products.

Moreover, regions coefficients, a positive relation of each of them is observed with respect to the accounts in financial institutions in a country. The results are in line with expectations, since

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according to the literature, developing countries are continuously implementing policies and developing programs to encourage the use of the financial system.

- **Number of ATMs per 1,000 adults**

Table 2 also displays the number of ATMs as financial inclusion variable. Estimated results show how GDP growth per capita of the previous year has a positive relationship with ATMs. Results suggest that an increase in GDP growth per capita causes an increase in the number ATMs per 100,000 population.

Conversely, estimated result shows a negative relationship between the rural population and the number of ATMs. Suggesting that an increase of the rural population will decrease the number of ATMs holders.

In addition, the corruption control variable has a positive relationship, as expected. By having an increase of 1 point in the control of corruption leads to an increase by 0.005 in number of ATMs.

The location dummy variable indicates that countries that located in Asia have been able to increase the number of ATMs. This result may arise from (1) the number of populations, and (2) those countries reached to satisfactory level of financial growth.

- **Commercial bank branches (per 100,000 adults)**

Results obtained also from table (2) shows that the chosen variables (including interest rate spread and region variables) are statistically insignificant with respect to commercial bank branches.

- **Number of bank accounts (per 100,000 adults):**

Results presented in table (3) show that there is a significant relationship between inflation and number of bank accounts. However, the sign is unexpected, since that high rates of inflation adversely affect financial development. On the other hand, the rural population shows a negative relationship with the number of bank account. Therefore, an increase in the rural population leads to a decrease in the number of bank accounts.

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Table 3: the determinants of number of bank account

variables	Number of bank accounts (per 100,000 adults):	
	Coef.	P value
GDP growth per capita	15.18211	0.795
inflation	76.32416	0.000
Rural population	-98.21965	0.035
Unemployment rate	42.59325	0.743
Gini Index	-2.13245	0.521
Political Stability	-4.98236	0.173
Control of Corruption	3.24421	0.110
interest rate Spreads	23.82534	0.834
Africa	-61.62594	0.467
Asia	51.81826	0.162
Europe	142.87362	0.378

- **Borrowing from a financial institution (% age 15+)**

Table (4) results show that the GINI index in the previous period has a negative relationship with the percentage of loans borrowing from a financial institution. This result is consistent with the study of Kempson (2006) who observed that income inequality is negatively related with borrowing from financial institution as indicator of financial inclusion. Moreover, the coefficient of the unemployment rate shows a positive relationship with borrowing from financial institutions, although it is not intuitive, the ratio was statistically significant at 10%, where an increase in the unemployment rate by 1 unit leads to increase the loans by 0.176 units.

The last variable that has an impact on borrowing from financial institutions is the location dummy variable. As presented in table (4), the results show that people who live in African countries does not prefer or cannot access to financial institution to make loans.

- **Borrowing from a private informal lender**

Table 4 also shows that no proposed variables are significant for loans from informal lenders.

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Table 4: determinants of borrowing from financial Institutions, private informal lender, and to start, operate, or expand firm

variables	Borrowing from a financial institution (% age 15+)		Borrowing from private informal lender		Borrowing to start, operate, or expand a firm or business	
	Coef.	P value	Coef.	P value	Coef.	P value
GDP growth per capita	0.53564	0.505	0.18762	0.763	0.28701	0.318
inflation	0.54352	0.645	0.39122	0.318	0.12024	0.002
Rural population	-0.02534	0.722	-0.00126	0.513	0.10028	0.037
Unemployment rate	0.32646	0.003	0.12651	0.205	0.02765	0,002
Gini Index	-0.00725	0.017	0.01766	0.417	0.00274	0.912
Political Stability	0.00233	0.193	-0.00127	0.117	-0.01626	0.318
Control of Corruption	0.17008	0.382	0.00276	0.220	0.02438	0.217
interest rate Spreads	0.17539	0.419	0.18723	0.219	-0.02845	0.201
Africa	-0.28176	0.002	-0.19371	0.708	0.21634	0.735
Asia	-0.28786	0.812	-0.02227	0.311	-0.19283	0.418

- **Borrowing to start, operate, or expand a firm or business**

From estimated results in table 4, it is observed that the rural population shows a positive relationship, and it agrees with the expected sign, so the increase in the rural population leads to increasing the percentage of loans to start a business or a firm. For inflation, the variable is significant and has a positive relationship with loans to operate, start or expand a business or firm. the unemployment rate has a positive and significant relationship with loans, the result obtained is counter–intuitive, since it suggests that in the presence of the higher unemployment, the loans to start a new firm increase.

Table 5: determinants of saving at a financial institution, saving for education, and saving to start a firm

variables	Saving at a financial institution		Saving for education or school fees		Saving to start, operate, or expand a firm or business	
	Coef.	P value	Coef.	P value	Coef.	P value
GDP growth per capita	0.11256	0.127	1.10286	0.275	0.73532	0.572
inflation	-0.12655	0.717	0.27467	0.018	-0.18387	0.023
Rural population	-0.02852	0.021	0.01255	0.476	-0.65464	0.027

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Unemployment rate	-0.21831	0.003	-0.19830	0.387	0.43543	0.001
Gini Index	0.01224	0.872	0.017546	0.036	0.03734	0.000
Political Stability	0.00127	0.001	0.01542	0.002	0.08474	0.008
Control of Corruption	-0.12274	0.275	0.03263	0.212	-0.04844	0.289
interest rate Spreads	0.10032	0.372	-0.21874	0.723	-0.28764	0.230
Africa	-0.00368	0.873	0.03653	0.234	0.02575	0.231
Asia	-0.02635	0.217	0.01202	0.002	-0.21003	0.324

- **Saving at a financial institution**

In Table 5, we use the percentage of savings in a financial institution as a financial inclusion indicator. Results show that inflation (although it is in significant) shows a negative sign since higher inflation should decrease savings since inflation pressures reduces purchasing power.

In addition, unemployment rate shows a negative and significant relationship, since availability for unemployed people to saving is negligible. The political stability variable is one of the determinants of saving at financial institutions. There is no doubt that political stability has an impact on financial inclusion and estimated results support this in which the coefficient of political stability is positive and significant.

- **Saving for education or school fees**

Results in table 5 show that, the variables affect school fees are inflation, GINI index, the political stability, and the dummy variable of location are significant. the rest of the proposed variables are insignificant. the inflation rate shows a positive relationship with the percentage of savings, which is not in agreement with what is expected, therefore, if the inflation increases, the percentages of savings for education will rise. The possible interpretation is the hedging from people to save for education as the tool for paying more in the future for education if prices go up.

In addition, the GINI index rate shows a positive relationship, which is in line with what is expected, where by increasing the equity of income distribution, savings for education increases. Also, political stability has a significant impact on saving because it gives people hope to plan for their children future.

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Finally, Asian countries have a positive and significant relationship, which is expected, because individuals need to save for education because there is no complete coverage for education from the governmental side.

- **Saving to start, operate, or expand a firm or business**

In Table 5, we use the percentage of savings to start, operate or expand a business or firm as financial inclusion variable. The results show that inflation rate and rural population have negative significant impact on savings to start business. This is because both of inflation and the rural population reduce or not have the ability to save. on the other hand, the variables GINI index and political stability show a positive and significant relationship on savings. The variable of unemployment has a significant but not expected sign.

- **PCA Results**

From first step of principal component analysis, the latent variables that represent the financial inclusion: usage and access are estimated through computing the weights for the causal variables.

Table 6 results show that (in upper panel), for the usage indicator, the indicator of savings has the highest weight (0.44), followed by having accounts and borrowing, at 0.29 and 0.27 respectively. This is a good result for an index because there is no dominant indicator and the weights are not evenly distributed.

For the usage indicator (the results introduced in lower panel of table 6), the number of ATM per 100,000 adults has the highest weight (0.51), followed by number of commercial banks branches per 100,000 adults (0.44).

Table 6: Principal component analysis

Usage				
Variables	PC1	PC2	PC3	Norm. weight
Accounts	0.5192	0.3959	-0.5749	0.29
Saving	0.4459	-0.7394	0.1064	0.44
Borrwoing	0.5369	-0.2312	0.6102	0.27
Eigenvalue	1.9677	0.4854	0.1569	
Access				
Variables	PC1	PC2	PC3	Norm. weight
ATMs per 100,000	0.4530	0.0321	-	0.51
Branches per 100,000	0.3955	0.0597	-	0.44
Eigenvalue	2.1794	0.6998	-	

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In second step of PCA, we compute the weights of sub – indecis (usage and access) in the overall index of financial inclusion. The results presented in table 7 shows the composition of the principal components and the normalized weights for each sub-index. Results show that principal components analysis give access index the highest weight (0.57), followed by usage index with weight of 0.43. Thus, these results reveals that the access index is the most important dimension which explain the financial inclusion index. People in developing countries has lack access to financial services or institutions. Improving access to financial services become a global and national public policy concern (Gardeva and Rhyne, 2012).

As shown in table 2, economic growth, political stability, and urban population are important variables that can improve access to financial services.

Table 7: Financial inclusion index

Variables	PC1	PC2	Norm. weight
usage	0.5024	0.5009	0.43
access	0.4731	0.6961	0.57
Eigenvalue	1.9844	0.4225	

5. CONCLUSION

The aim of this study is to examine the determinants that affect the degree of financial inclusion in a middle-income country. To perform the study, a cross–sectional sample of 21 countries is used for the year 2017. Main variables used in the study are; the percentage of accounts in financial institutions, the number of ATMs per 100,000 adults, the number of banks branches per 100,000 adults, and the number of bank accounts per 1,000 as financial inclusion proxies. Borrowing from a financial institution, Borrowing from a private informal lender and finally Borrowing to start, operate, or expand a firm or business are employed as determinants variables for GDP growth per capita, inflation, rural population, unemployment rate, GINI index, political stability, control of corruption and the spreads of interest rates.

Results suggest that corruption control in illustrated countries raises the number of new bank accounts and the number of usage ATMs. For rural population, it is negatively related to the both variables and positively to the borrowing to start, operate, or expand a firm or business. The spread favors only the presence of ATMs in the countries. Finally, being in Asia is related to larger bank accounts and the percentage of loans in financial institutions compared with Africa. Regarding determinants of savings variables, it is observed that, the greater the rural population, the fewer the savings in financial institutions as well as saving to start business.

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Moreover, to construct a financial inclusion index, two stage principal components analysis has employed. The index measures the importance of usage and access to financial services. The results show that the usage sub-indices is the most important variables for measuring financial inclusion. This mean that the access to financial services is more important than the number of users. But we should be careful about this result because access is a necessary but not a sufficient condition for using financial services.

Therefore, the government should apply public policies enhance financial inclusion via new financial and transactional products and services such as bank branches, mobile banking, etc. Together with public policies, financial culture should spead across people via information campains to achieve social and financial inclusion of excluded sectors. Policies should also aim at the elimination of core problems such as corruption, inequality and excluded groups. Forthcoming paper will measure the performance of banking sector for a sample of middle – income countries via stochastic frontier analysis.

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Appendix 1: List of countries sample

Algeria	Malaysia
Belarus	Morocco
Bulgaria	Nigeria
China	Romania
Egypt	Russian Federation
Gabon	South Africa
Ghana	Swaziland
Iran	Thailand
India	Tunisia
Indonesia	Turkey
Jordan	

