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Determinants of financial inclusions: comparing high, middle, and low-income countries

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Abstract

The objective of this paper is to examine the determinants of financial inclusion in high, middle, and low-income countries. We use the World Bank's 2017 Global Financial Inclusion database and apply probit estimation for different measures of financial inclusion, including account, payment, saving, and borrowing. For the full sample, we find that being a man, more educated, richer, employed, and older to a certain age increases the likelihood of access to formal financial services. For the three country sub-groups, the impacts of education and income on the likelihood of saving and borrowing formally are highest in high-income countries and lowest in low-income countries but the ranking is reverted for formal account and payment. However, the magnitude of impacts increases with the level of education and income in each of country sub-groups for all measures formal financial inclusion. Our finding supports the view that substitution between formal and informal credit is based on income level in high-income and middle-income countries only.

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1 Introduction

Financial inclusion is defined as the process of providing affordable, convenient, and timely financial services to all members of society, especially the poor and vulnerable (Sinclair 2001, Sarma 2008). Although inclusive finance contributes significantly to economic growth, poverty, and income inequality reduction (Beck et al. 2007, Bruhn and Love 2014, Park and Mercado 2016), the empirical works related to the determinants of financial inclusion are relatively limited. One main reason is the lack of incomparable data on how people all over the world access and use financial services. Until recently, the inclusive finance variables used in research have mainly reflected the density level, such as the number of borrowers, savers, automated teller machines, bank branches per capita. In 2011, the World Bank launched the Global Financial Inclusion Database, which provides comparable indicators showing how adults age 15 and above from over 140 economies access and use formal, semi-formal, and informal financial services. Since then, several authors have taken advantage of this database to measure financial inclusion (Cámara and Tuesta 2014, Park and Mercado 2018), to examine the impacts of financial inclusion on socio-economic variables (Demirguc-Kunt et al. 2018, Park and Mercado 2018), and to identify determinants of financial inclusion (Anson et al. 2013, Fungáčová and Weill 2015, Zins and Weill 2016, Allen et al. 2016, Soumaré et al. 2016, Asuming et al. 2018).

Our paper contributes to the literature in the following ways. First, we study the determinants of financial inclusion for a larger sample of individuals from 144 countries. The recent papers by Fungáčová and Weill (2015), Park and Mercado (2016), Zins and Weill (2016), Soumaré et al. (2016), and Asuming et al. (2018) research on a smaller scale, focusing mostly on middle and low-income countries. While Fungáčová and Weill (2015) and Park and Mercado (2016) examine the determinants of financial inclusion in China and developing Asian countries respectively, the three latters focus on African countries.

Second, we use six measures of financial inclusions, including formal account, formal payment, formal and informal saving and borrowing. Previous research often ignores the payment and informal perspectives. For example, although Allen et al. (2016) examine both individual and country level determinants of inclusive finance for a large dataset, they focus on deposit account only. Soumaré et al. (2016) and Asuming et al. (2018) research on the determinants of financial inclusion, in term of account, saving, borrowing, and the frequency of account usage.

Third, we take into consideration the heterogeneity of determinants on financial inclusion among three country sub-groups, namely high-income, middle-income, and low-income. Kabakova and Plakesenkov (2018) argue that the financial inclusion of a country depends not just on the financial market, but also on the entire ecosystem, including economic, political (Demirguc-Kunt et al. 2008), social (Cull et al. 2014), and technological advance (Adner and Kapoor 2010). For example, people in the less developed social-demographical countries tend to use cash, save, and borrow informally instead of using financial services such as non-cash payment, formal saving and borrow. Demirguc-Kunt and Klapper (2013), Fungáčová and Weill (2016), and Allen et al. (2016) show that the economic development, proxied by the logarithm of GDP per capita, positively and significantly affects the variation of financial inclusion. They find the huge differences in the level of account penetration, saving and borrowing activities between high-income, middle-income, and low-income countries. Moreover, the geographical outreach of banks and other financial institutions as well as institutional quality can affect the access and usage of financial services (Cámara and Tuesta 2014, Amidzic et al. 2014, Madestam 2014, Allen et al. 2016). Thus, our main aim is to see whether individual characteristics affect financial inclusion differently between three country sub-groups based on the World Bank's income classification. These results help

policymakers in different countries figure out their own policies, which are suitable for each country group's situation. The rest of this paper is structured as follows. Section 2 describes the data and model specification. Section 3 presents and discusses the findings. Section 4 concludes the paper.

2 Data and model specification

2.1 Data

We utilize the World Bank's 2017 Global Financial Inclusion Database to evaluate the determinants of financial inclusion. This database is the most comprehensive data set on how over 150,000 adults from 144 economies save, borrow, make payments, and manage risk. The survey was carried out by Gallup In., as part of its Gallup World Poll, which collected answers from approximately 1,000 people in each economy, using random and representative samples. The target population is the entire civilian, non-institutionalized population age 15 and above.

In this paper, we focus on four main measures of financial inclusion, including account, payment, saving, and borrowing. To calculate account ownership, the widely used financial inclusion indicator, formal account, is employed. It reflects respondents who report having an account at a bank or another type of financial institution or report using a mobile money service in the past year.

We also take into consideration of both formal and informal saving and borrowing perspectives. Formal saving (borrowing) refers to respondents who report saving (borrowing) money at (from) a bank or another type of financial institution in the past year. On the other hand, informal saving refers to respondents who report saving money by using informal savings group/club or person outside the family. Informal borrowing refers to respondents who report borrowing from family, relatives, friends, or an informal savings group/club. In addition to variables that are often used in previous research, we are interested in payment activities. We define formal payment as an individual uses any of financial institution service, mobile phone, or money transfer service to send money, receive money, make regular payments, receive a salary, or financial support from the government. These six variables are dummies equal to one if the respondent responded yes to the surveyed question and zero otherwise. As the primary goal of this paper is to compare the determinants of financial inclusion for different groups of countries, we classify countries according to the World Bank income classification. Table 1 presents the main descriptive statistics for these variables for the global level and three groups of countries.

Table 1: Main indicators for financial inclusion: full and split samples

	Full sample			High-income			Middle-income			Low-income		
	Obs.	Mean	Std. dev	Obs.	Mean	Std. dev	Obs.	Mean	Std. dev	Obs.	Mean	Std. dev
Formal account	154,923	0.631	0.482	46,675	0.908	0.289	83,744	0.550	0.497	24,504	0.381	0.486
Formal payment	122,429	0.663	0.473	43,002	0.865	0.341	64,687	0.551	0.497	14,740	0.567	0.500
Formal saving	154,923	0.244	0.430	46,675	0.473	0.499	83,744	0.157	0.364	24,504	0.106	0.308
Formal borrowing	154,923	0.122	0.328	46,675	0.162	0.369	83,744	0.114	0.318	24,504	0.073	0.260
Informal saving	119,788	0.127	0.333	15,546	0.058	0.234	79,738	0.106	0.308	24,504	0.239	0.427
Informal borrowing	154,923	0.244	0.429	46,675	0.133	0.339	83,744	0.273	0.445	24,504	0.357	0.479

We observe that 63%, 66%, 24%, and 12% of worldwide respondents report having an account at a formal institution, making payment through financial institutions or likewise, saving at, and borrowing from formal sources, respectively. These figures of high-income countries (91%, 87%, 47%, and 16% respectively) are much higher in comparison with the world average, reflecting their higher socio-economic development. Although the level of financial inclusion in middle-income countries (55%, 55%, 16%, 11%) is relatively smaller

than the world average, it is still significantly better than the level in low-income countries (38%, 56%, 11%, 7%). In terms of informal finance, informal saving and borrowing in high-income countries (6% and 13%) are less popular than two other country groups as well as the world average (13% and 24%, respectively). The survey results show that 24% and 36% of respondents in low-income countries respectively saved and borrowed from informal sources. Informal finance declines as a country is more developed.

2.2 Model specification

We perform probit estimations to explain the determinants of financial inclusion using the following equation:

$$fi_i = \alpha + \beta * gender_i + \gamma * age_i + \delta * education_i + \epsilon * employment_i + \theta * income + \varepsilon_i \quad (1)$$

where fi denotes one of six indicators of financial inclusion and i is the index for individuals. We follow Fungáčová and Weill (2015), Zins and Weill (2016), Soumaré et al. (2016), and Asuming et al. (2018) to choose five explanatory variables: gender, age, education, income, and employment.

Gender is a dummy variable, which is equal to one if the individual is a man and zero otherwise. Based on the existing literature on the determinants of financial inclusion, we expect that male are more likely to be financially included than female. Demirguc-Kunt et al. (2013) find that cross-country legal discrimination against women and gender norms may explain the variation of women's access to finance.

Education level is reflected by two dummy variables equal to one if the individual has secondary education and completed tertiary education or more. Education is expected to have a positive impact on the likelihood of using the financial services. However, the impact of education on financial inclusion between country sub-groups might not be the same due to the differences in quality and content coverage of education. For example, the financial literacy level is essential for the improvement of financial inclusion (Karakurum-Ozdemir et al. 2019) but is very limited in low-income countries (OECD 2013).

For income, we use four dummy variables (second 20%, third 20%, fourth 20%, and richest 20%) equal to one if the individual's income belongs to the corresponding quintile. The omitted dummy variable is for the poorest 20%. Overall, the probability of using financial services is assumed to increase with the individual's income level. However, we expect that initially, people in low-income countries are more likely to use basic financial services such as account ownership or non-cash payment. When income increases to a certain amount (for example, to the middle-income countries' level), they choose to save and borrow from financial institutions more often. In contrast, in countries with a higher income level, it is easier for people to access and use all type financial services. On the other hand, in high- and middle-income countries, the likelihood of informal borrowing tends to decrease as income increases. However, in low-income countries, this tendency might not happen or only happen at the richest income quintile due to the low level of income, banking outreach, and institutional quality. In other words, the substitution effect between informal and formal borrowing may not occur similarly for all countries.

The variable employment is equal to one if an individual is in the workforce or zero otherwise. Employed people are expected to have more demand for the use of and more easily access to financial services. To consider the possible non-linear relationship between age and financial inclusion, we use both individual's age and its squared. Elderly people may have less demand for or even be reluctant to use financial services. All these explanatory variables are provided in the survey dataset and their descriptive statistics are reported in Table 2.

Table 2: Descriptive statistics: full and split sample

	Full sample			High-income			Middle-income			Low-income		
Variable	Obs.	Mean	Std. dev	Obs.	Mean	Std. dev	Obs.	Mean	Std. dev	Obs.	Mean	Std. dev
Gender	154,923	0.460	0.498	46,675	0.482	0.500	83,744	0.443	0.497	24,504	0.480	0.500
Age	154,472	41.842	17.912	46,468	47.734	18.297	83,616	40.831	17.347	24,388	34.083	15.259
Secondary education	154,913	0.488	0.500	46,675	0.570	0.495	83,744	0.483	0.500	24,504	0.351	0.477
Tertiary education	154,913	0.162	0.369	46,675	0.290	0.454	83,744	0.125	0.331	24,504	0.045	0.208
Employment	153,923	0.627	0.484	46,675	0.644	0.479	83,744	0.596	0.491	24,504	0.698	0.459
Income-second 20%	153,923	0.180	0.384	46,675	0.183	0.387	83,744	0.180	0.384	24,504	0.174	0.379
Income-third 20%	153,923	0.193	0.394	46,675	0.197	0.398	83,744	0.193	0.394	24,504	0.185	0.388
Income-fourth 20%	153,923	0.210	0.408	46,675	0.214	0.410	83,744	0.208	0.406	24,504	0.210	0.408
Income-richest 20%	153,923	0.247	0.431	46,675	0.243	0.429	83,744	0.244	0.429	24,504	0.265	0.441

3 Results

Table 3 presents the estimation results of the full sample. For formal financial inclusion, we find that almost all individual characteristics have a significant effect on formal financial inclusion. Gender influences financial inclusion strongly as being a man significantly increases the probability of having an account, saving at, and borrowing from a financial institution. In contrast, we do not find a significant gender gap in which people use formal service to make payment. The fact that the coefficients of variable age and age_squared are significantly positive and negative respectively confirms the non-linear relationship between age and financial inclusion. There exists a certain threshold, above which the marginal effect of age on the probability of using financial services changes from positive to negative. The possible explanations come from the reluctance and less demand for financial services of aged people or they are not favorable customers of financial institutions. We find that education level positively associates with account ownership as well as saving and borrowing activities at financial institutions. Both coefficients of secondary and tertiary education variables are positive and statistically significant, with the magnitude of the latter is higher. If an individual is in the workforce, the probability of using formal financial services increases significantly. We find that the coefficients of all income quintile variables are positive and statistically significant. Moreover, their effect's magnitude increases with income level. It means that greater income positively associates with higher financial inclusion. Overall, our results are consistent with earlier findings (Fungáčová and Weill 2015, Zins and Weill 2016, Soumaré et al. 2016, and Asuming et al. 2018).

Table 3: Determinants of financial inclusion: full sample

	Formal account	Formal saving	Formal borrowing	Formal payment	Informal saving	Informal borrowing
Male	0.032***	0.013***	0.007*	0.008	-0.026***	0.010***
	(0.007)	(0.004)	(0.003)	(0.007)	(0.006)	(0.004)
Age	0.010***	0.006***	0.011***	0.003**	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age_squared	-0.000***	-0.000***	-0.000***	-0.000	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary education	0.250***	0.169***	0.053***	0.220***	-0.024**	-0.046***
	(0.018)	(0.016)	(0.010)	(0.015)	(0.011)	(0.010)
Tertiary education	0.451***	0.296***	0.091***	0.383***	-0.065***	-0.102***
	(0.021)	(0.022)	(0.012)	(0.018)	(0.016)	(0.015)
Employment	0.110***	0.092***	0.062***	0.077***	0.067***	0.067***
	(0.013)	(0.008)	(0.005)	(0.009)	(0.009)	(0.008)
Income-second 20%	0.027***	0.036***	0.011***	0.023***	0.024***	-0.006
	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.006)
Income-third 20%	0.042***	0.066***	0.017***	0.041***	0.039***	-0.011
	(0.006)	(0.007)	(0.004)	(0.006)	(0.004)	(0.007)
Income-fourth 20%	0.064***	0.087***	0.023***	0.060***	0.057***	-0.010
	(0.008)	(0.009)	(0.005)	(0.008)	(0.006)	(0.009)
Income-richest 20%	0.107***	0.131***	0.029***	0.088***	0.078***	-0.015
	(0.011)	(0.010)	(0.006)	(0.010)	(0.007)	(0.010)
Pseudo R-squared	0.158	0.112	0.056	0.092	0.0386	0.0372
Log likelihood	-84,921.63	-75,826.96	-53,880.24	-70191.97	-43,283.24	-81,967.50
Observations	153,000	153,000	153,000	121173	119,000	153,000

***, **, * indicate significance at the 1%, 5%, 10% levels, respectively. Estimated marginal effects are presented and standard errors are in parentheses.

For informal financial inclusion, we find that gender affects differently on the probability of making informal saving and obtaining informal credit. Specifically, being a man increases the likelihood of taking out an informal loan. In contrast, being a man decreases the likelihood of making an informal deposit. We find that both age and employment status have a similar relationship with informal financial inclusion as in the case of formal financial inclusion. A well-educated individual relies less on informal financial services to make saving and take out a loan. While richer people incline to save informally, we find no significant link between income and informal borrowing. In full sample, we do not find any evidence supporting the view that the substitution between formal and informal credit is based on income level. We can dig deeper into this finding by splitting the full sample into three country sub-groups.

Table 4: Determinants of formal account and payment: split sample

	Formal account			Formal payment		
	High-income	Middle-income	Low-income	High-income	Middle-income	Low-income
Male	0.016**	0.037***	0.040***	0.008	-0.001	0.043***
	(0.007)	(0.011)	(0.013)	(0.007)	(0.011)	(0.016)
Age	0.007***	0.011***	0.010***	0.005***	0.001	0.003
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)
Age_squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary education	0.086***	0.173***	0.215***	0.112***	0.169***	0.175***
	(0.019)	(0.029)	(0.022)	(0.019)	(0.019)	(0.023)
Tertiary education	0.158***	0.378***	0.301***	0.198***	0.322***	0.219***
	(0.036)	(0.032)	(0.047)	(0.036)	(0.023)	(0.055)
Employment	0.053***	0.130***	0.129***	0.059***	0.073***	0.045**
	(0.010)	(0.019)	(0.016)	(0.010)	(0.013)	(0.021)
Income-second 20%	0.008***	0.039***	0.055***	0.018***	0.028***	0.046***
	(0.005)	(0.007)	(0.013)	(0.007)	(0.008)	(0.016)
Income-third 20%	0.017***	0.072***	0.071***	0.036***	0.058***	0.066***
	(0.006)	(0.008)	(0.014)	(0.007)	(0.008)	(0.018)
Income-fourth 20%	0.029***	0.107***	0.118***	0.043***	0.096***	0.107***
	(0.007)	(0.010)	(0.016)	(0.009)	(0.011)	(0.019)
Income-richest 20%	0.048***	0.172***	0.208***	0.060***	0.147***	0.163***
	(0.010)	(0.013)	(0.021)	(0.013)	(0.012)	(0.015)
Pseudo R-squared	0.134	0.105	0.105	0.086	0.063	0.052
Log likelihood	-12,349.38	-50847.23	-14,504.58	-15442.35	-41,030.23	-9520.42
Observations	46,458	82,616	24,388	42,810	63,683	14680

***, **, * indicate significance at the 1%, 5%, 10% levels, respectively. Estimated marginal effects are presented and standard errors are in parentheses.

We investigate the heterogeneous impacts of individual characteristics on formal financial inclusion by country income levels, namely high-income, middle-income, and low-income countries. Table 4 shows the results for formal account and payment of three country sub-groups. The first three columns concern the factors affecting the formal account. We observe that the impacts of gender, secondary education, and income on the probability of having a formal account are highest for individuals in low-income countries. In contrast, the impacts of age, tertiary education, and employment on the probability of having a formal account are highest for individuals in middle-income. For formal payment, we find that gender does not significantly influence on the probability of choosing formal financial services to make payment in high-income and middle-income countries. Moreover, age only associates with the use of formal financial services in high-income countries. The likelihood of owning formal account and making payment through financial institutions increases with income level and is higher in the low-income country group than in two other country sub-groups.

The first three columns of Table 5 present the estimation results for formal saving. There exists no gender gap in formal saving in high-income and low-income countries. An individual in high-income countries has the highest probability to save formally when they move from the poorest quintile to higher income quintile. For formal borrowing, there is no significant difference between a man and woman in taking out a loan in middle-income and

low-income countries. The differences in the effect of two education variables among three sub-groups are similar to those in the case of formal saving as the lowest impact belongs to low-income countries and increases gradually with the socio-economic development level. Moving from the poorest to the second 20% and the third 20% income quintile does not significantly change the probability to obtain formal credit in low-income countries. Only when moving to the fourth 20% and the richest 20% income quintile significantly change the likelihood of taking out a formal loan. It means that for an individual in low-income countries, to save at or borrow from financial institutions, they have to reach a certain higher income.

The results of Table 4 and 5 show that effect of education on basic formal financial services, formal account and payment, is highest in middle- and low-income countries. In contrast, the effect of education on more advanced formal financial services, saving and borrowing, is highest in high-income countries. Similarly, the effect of income on the probability of owning an account and making payment through financial institutions is highest in low-income countries, then lower in middle-income, and lowest in high-income countries. The ranking of income's effect on the probability of borrowing and saving formally is reverted with the highest impact belongs to high-income countries and the lowest impact belongs to low-income countries.

Table 5: Determinants of formal saving and borrowing: split sample

	Formal saving			Formal borrowing		
	High-income	Middle-income	Low-income	High-income	Middle-income	Low-income
Male	0.016	0.013**	0.008	0.028***	-0.002	0.000
	(0.010)	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)
Age	0.010***	0.002**	0.005***	0.012***	0.010***	0.006***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Age_squared	-0.000***	-0.000*	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary education	0.165***	0.060***	0.057***	0.051***	0.035***	0.029***
	(0.025)	(0.013)	(0.010)	(0.010)	(0.015)	(0.009)
Tertiary education	0.294***	0.134***	0.094***	0.079***	0.076***	0.038***
	(0.035)	(0.018)	(0.016)	(0.013)	(0.017)	(0.013)
Employment	0.098***	0.073***	0.069***	0.076***	0.063***	0.033***
	(0.011)	(0.009)	(0.011)	(0.008)	(0.006)	(0.007)
Income-second 20%	0.063***	0.030***	0.014	0.017**	0.013***	0.000
	(0.010)	(0.008)	(0.010)	(0.007)	(0.005)	(0.008)
Income-third 20%	0.120***	0.062***	0.035***	0.033***	0.015***	0.011
	(0.013)	(0.010)	(0.012)	(0.008)	(0.006)	(0.008)
Income-fourth 20%	0.145***	0.093***	0.062***	0.032***	0.024***	0.026***
	(0.014)	(0.013)	(0.013)	(0.009)	(0.007)	(0.008)
Income-richest 20%	0.200***	0.149***	0.116***	0.040***	0.031***	0.037***
	(0.017)	(0.013)	(0.021)	(0.010)	(0.008)	(0.010)
Pseudo R-squared	0.072	0.079	0.090	0.055	0.050	0.035
Log likelihood	-29,817.50	-33,152.74	-7,530.57	-19,486.37	-27,933.12	-6,169.088
Observations	46,458	82,616	24,388	46,458	82,616	24,388

***, **, * indicate significance at the 1%, 5%, 10% levels, respectively. Estimated marginal effects are presented and standard errors are in parentheses.

Table 6 examines the factors affecting informal saving and borrowing in three country sub-groups. In high-income countries, gender and age do not influence the probability of making an informal saving. Only when moving to the third 20% and the richest income quintile, the probability of an individual in high-income countries to make informal saving increases significantly. In middle-income countries, the likelihood of saving informally is decreased if an individual is a man with tertiary education or higher. We do not find any significant effects of education level in the case of low-income countries. This result about the impact of education is similar when considering informal borrowing in middle-income and low-income countries. In contrast, if an individual in high-income countries completes tertiary education or more, the probability of taking out an informal loan decreases significantly. It means that higher education proves effective in restricting the use of informal borrowing only in high-income countries with advanced education quality. The reason why

education has no significant impact on the probability of saving and borrowing informally can be the lack (or low level) of financial literacy in education program in low-income countries or other country-level characteristics.

Notably, the impacts of income on informal borrowing are different between the three country sub-groups. While becoming richer in high-income countries reduces the probability of taking out an informal loan, the opposite direction is found in low-income countries. In middle-income countries, the lower likelihood of borrowing formally exits only when an individual belongs to the richest income quintile. These findings together with the findings in determinants of formal borrowing support the view that substitution between formal and informal credit is based on income level in high- and middle-income countries. Specifically, richer people in two country sub-groups choose to borrow more from a formal institution and restrict the use of informal credit. In contrast, in low-income countries, since only people in the two highest income quintile has a higher probability of taking out a formal loan, people have to rely more on informal sources. This observation can be attributed to not only the economic development, measured by income per capita, but also the banking outreach or other country-level determinants such as institutional quality, technological advances, and political factors[1].

Table 6: Determinants of informal saving and borrowing: split sample

	Informal saving			Informal borrowing		
	High-income	Middle-income	Low-income	High-income	Middle-income	Low-income
Male	0.005	-0.021***	-0.078***	0.009*	0.013**	-0.003
	(0.005)	(0.006)	(0.016)	(0.005)	(0.005)	(0.009)
Age	0.001	0.003***	0.007***	-0.003***	0.005***	0.006***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Age_squared	-0.000	-0.000***	-0.000***	-0.000	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary education	0.018*	0.005	0.014	-0.004	0.000	0.002
	(0.010)	(0.010)	(0.020)	(0.008)	(0.013)	(0.020)
Tertiary education	0.026**	-0.025*	-0.042	-0.024***	-0.016	-0.025
	(0.013)	(0.013)	(0.048)	(0.008)	(0.016)	(0.039)
Employment	0.017***	0.045***	0.137***	0.022***	0.073***	0.144***
	(0.005)	(0.008)	(0.021)	(0.006)	(0.009)	(0.016)
Income-second 20%	0.013	0.018***	0.037***	-0.022***	-0.009	0.037***
	(0.009)	(0.004)	(0.009)	(0.007)	(0.008)	(0.013)
Income-third 20%	0.017**	0.031***	0.058***	-0.040***	-0.012	0.034***
	(0.007)	(0.005)	(0.008)	(0.006)	(0.011)	(0.013)
Income-fourth 20%	0.013	0.050***	0.075***	-0.051***	-0.017	0.052***
	(0.010)	(0.007)	(0.012)	(0.008)	(0.013)	(0.014)
Income-richest 20%	0.021**	0.067***	0.090***	-0.066***	-0.036**	0.051***
	(0.010)	(0.008)	(0.011)	(0.009)	(0.015)	(0.017)
Pseudo R-squared	0.020	0.032	0.034	0.061	0.021	0.021
Log likelihood	-3366.53	-25585.24	-12974.83	-17097.81	-47286.34	-15568.24
Observations	15,532	78,615	24,388	46,458	82,615	24,388

***, **, * indicate significance at the 1%, 5%, 10% levels, respectively. Estimated marginal effects are presented and standard errors are in parentheses.

4 Conclusions

In this paper, we examine the determinants of financial inclusion based on a sample of over 150,000 individuals from 144 countries. For the full sample, the probit regression reveals that being a man, more educated, richer, employed, and older to a certain age increases the likelihood of access to formal financial services. Moreover, higher education level negatively associates with the use of informal services. These findings urge policymakers to implement policies targeting women, less educated, unemployed, and young people. We do not find any evidence supporting the view that the substitution between formal and informal credit is based on income level.

[1] See Kabakova and Plaksenkov (2018) for a detailed discussion of socio-economic factors and Allen et al. (2016) for the effect of country level variables on the use of bank accounts.

The main question is whether there exists any difference in determinants of financial inclusions between three country sub-groups. There are several notable findings.

First, the impacts of gender, secondary education, and income on the probability of using basic financial services, such as having a formal account and making payment through financial institutions, are highest in low-income countries, and then come to middle-income and high-income countries. Thus, policies targeting female, increasing schooling completion rate, and raising income level should be the priority in low-income countries to increase basic inclusive finance.

Second, the impact of education and income on the likelihood of saving and borrowing formally is highest in high-income countries and lowest in low-income countries. It should be noted that the magnitude of impact increases with the level of education and income in each country sub-group for all four measures of formal financial inclusion. The governments and financial institutions in low-income countries should tailor policies that target the less educated and the poor to increase financial inclusion because they are the groups most excluded from the financial sectors.

Third, a higher income level reduces the likelihood of taking out an informal loan only when a country moves from low to higher income level. Our findings support the view that substitution between formal and informal credit is based on income level only in high-income countries and partly in middle-income countries. Moreover, higher education level proves effective in restricting the use of informal credit in high-income countries only. To limit the practice of informal borrowing and encourage the practice of formal borrowing, which is popular in low-income countries, policymakers cannot wait until their countries reach a higher social-economic development level. They should design policies that increase the probability that an individual borrow formally on both demand side (through financial literacy in school, for example) and supply side (through low-cost financial products, documentation requirement simplification, digital technology applications in the banking sector, and innovative business models (World Bank 2015, 2018)). Then, encouraging higher schooling completion and raising income to a higher stage are two effective ways they can take into implementation.

In the area of future research, deeper analysis is needed to better understand the determinants of different type of formal payment, informal borrowing and saving practices (between friends, relatives and savings clubs, private lenders) or on the barriers to formal finance. Moreover, future research can continue examining the determinants of financial inclusion while take into consideration of other socio-economic factors such as religion, institutional quality, and technology advances.

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