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Do better formal institutions promote financial inclusion?

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Do Better Formal Institutions Promote Financial Inclusion?

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Abstract

This paper investigates the impact of formal institutions on financial inclusion. Our main argument is that the level of financial inclusion is jointly determined by the supply and demand of financial services, both of which are positively influenced by institutional quality. On the supply side, strong institutions strengthen rule of law, investor rights protection and contract enforceability, which incentivize financial institutions to offer more financial services. On the demand side, strong institutions reinforce people's trust on financial institutions and increases their willingness to make use of financial services. Results from cross-country regressions suggest a positive relationship between formal institutions and financial inclusion. This finding is robust to different measures for institutions and model specifications. Further, we find that the positive impact of formal institutions on financial inclusion is weakened as the degree of existing barriers to finance increases.

Key words: formal institutions, financial inclusion, financial barriers

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1. Introduction

A financial system is inclusive, if it offers financial products and services not only to those who have already accessed the financial system, but also those who were previously excluded from formal finance. Thus, financial inclusion captures the extent to which a financial system has developed to allow more individuals to access the financial system and use financial resources. By improving financial inclusion, those who largely live outside the mainstream financial system are able to finance prospective economic opportunities and improve their well-being. Therefore, financial inclusion is especially important for the disadvantaged groups and imposes an impact on economic growth, poverty and income inequality (Beck, Levine and Loayza, 2000; Beck, Demirgüç-Kunt and Levine, 2007).

Nevertheless, empirical evidence on what factors explain cross-country variations in financial inclusion is still scant, because country-level data on financial inclusion has not been accessible until recently. This paper aims to explore these questions using the latest release of the Global Findex Database (2017), which provides us with comprehensive information on how people make use of financial products and services across the globe.[1] Specifically, we revisit the law and finance literature and investigate whether formal institutions have a positive impact on financial inclusion with respect to use of formal account, savings, borrowing, and digital payments. A country is said to have a higher level of financial inclusion, if the percentage of adults who have used the above-mentioned financial products is higher.

Results from our cross-country regressions show that a country's legal tradition has a strong explanatory power on financial inclusion. In line with Levine, Loayza and Beck (2000), we find that countries with an English common law tradition have a higher level of financial inclusion, while financial inclusion is lower in French civil law countries. Moreover, our results suggest a strong positive relationship between formal institutions and financial inclusion. This finding is robust to different measures for institutions and model specifications. Further, we find that the impact of formal institutions on financial inclusion is conditional on the degree of financial barriers.[2] The positive impact of formal institutions on financial inclusion is weakened when the degree of barriers is high.

This paper is related to the literature on financial access, which captures the extent to which individuals have access to financial infrastructure, such as bank branches and ATM machines.[3] While having access to finance is a prerequisite for financial inclusion, it should be clearly distinguished from use of finance.

[1] Although the latest Global Findex Database (2017) provides with cross-country observations on financial inclusion in 2011, 2014 and 2017, the data remains highly unbalanced. For example, financial inclusion with respect to the use of digital payments and indicators of financial barriers do not exist in the 2011 and 2014 release. However, as we will explain later, the prevailing level of financial barriers is a very important determinant of financial inclusion and should be controlled for in the regression analysis. Therefore, we do not conduct rigorous statistical analysis in a panel setting in this study. Nevertheless, to explore the determinants of financial inclusion using panel data is definitely a direction for future research.

[2] As we will discuss later, financial barriers from the supply side include high transaction costs, physical barriers to financial infrastructure, requirement of documentation and collateral. On de demand side, financial barriers include financial illiteracy, lack of trust on financial institutions, lack of economic opportunities, and low income.

[3] See Claessens (2006) for an overview of this literature.

Access mainly captures the supply of a financial system, while use captures the ultimate uptake of financial services, which is a combined outcome of both the supply and demand of financial services. Hence, a high level of financial access does not necessarily imply a high level of financial usage. People who have access to financial resources may still choose not using finance due to various demand-side barriers, such as financial illiteracy, a lack of trust on financial institutions, and a low level of income.[4] Since the goal of financial inclusion is to allow more individuals, especially the poor, to improve their well-being by making use of financial resources, research on financial inclusion should also go beyond financial access. We provide the first empirical study at the country level that investigates the impact of formal institutions on the uptake of financial services.

This paper is also related to the literature on formal institutions and financial development.[5] While the literature has established a positive impact of formal institutions on financial development, it remains unclear whether the impact of formal institutions operates on the intensive or the extensive margin, i.e. whether strong institutions promote financial development, because more financial services have been offered to those who have already accessed the financial system, or because more formerly-excluded individuals have started to make use of financial services. This is a relevant research question, because it may well be possible that a financial system becomes large in size, but without being inclusive.[6] That is why many countries and international organizations have put promoting financial inclusion as one of their development goals.[7] Motivated by this, we explicitly examine whether formal institutions promote financial inclusion in this chapter. To the best of our knowledge, we are among the first to empirically test the theory of law and finance with a focus on financial inclusion.

The remainder of the chapter proceeds as follows. In Section 2, we review the literature. In Section 3, we discuss the methodology used in our empirical analysis and provide a description of the data set. Section 4 discusses the estimation results. The chapter concludes in Section 5.

2. Formal institutions, financial inclusion and the role of financial barriers

Financial inclusion captures the degree to which formal finance, such as bank accounts, savings, credit and payment services, is accessible to individuals, and the degree to which these financial services are

[4] For example, the Global Findex Database (2017) shows that while financial access, measured by formal account ownership, has increased to 69% in 2017 globally, only 38% of the account owners have saved formally.
[5] See Fergusson (2006) for an overview of this literature.
[6] For example, both the United Kingdom and the United States have a large financial system. However, in the UK 1.7 million adults still do not have a formal account. In the US, 109 million adults are non-prime; 53 million adults are "credit invisibles", i.e. they do not have any credit history from credit reporting companies; and there has been a total of 143 billion dollar credit reduction to the non-prime since 2008. Source: the House of Lords Select Committee on Financial Exclusion (2017), available at: https://publications.parliament.uk/pa/ld201617/ldselect/ldfinexcl/132/13202.htm; the Centre for the New Middle Class, Elevate, available at: https://www.elevate.com/who-we-help.html.
[7] For example, the leaders of the G20 nations have initiated the Financial Inclusion Action Plan, which aims at strengthening financial inclusion practices. See https://www.gpfi.org/.

being used. Thus, financial inclusion can be described from two dimensions: access to finance and use of finance. Specifically, access to finance refers to the outreach of financial infrastructure, such as bank branches and ATM machines, which capture the supply of financial services. Use of finance refers to the uptake of financial products and services, which is a combined outcome of both demand and supply of a financial system. As we have noted earlier, this paper looks at financial inclusion from the use dimension. A higher level of financial inclusion means a higher uptake of financial services.

Beck and De La Torre (2007) develop a theoretical model to explain the uptake of financial services.[8] To begin with, they define the *potential* demand and supply of payment and savings services. "Potential" means that the demand and supply are affected by the price of payment and savings services only, with no regard of other influential factors. Potential demand captures individuals' willingness to pay for the financial services at any given price, while potential supply captures the payment and savings services financial institutions are willing to offer at any given price that maximizes their profits. Potential demand and supply jointly determine the potential uptake of payment and savings services. However, the *actual* demand and supply may deviate from the potential demand and supply of payment and savings services. For example, the actual demand may be lower than the potential demand at any given price due to self-exclusion (which, as we will discuss later, arises from demand-side barriers, such as insufficient income, financial illiteracy, or a lack of trust on financial institutions). The actual supply may also be lower than the potential supply at any given price (for example, due to a lack of financial infrastructure). Consequently, the actual observed uptake of payment and savings services will be lower than the potential level.

Beck and De La Torre (2007) apply the same analytical framework to lending services by first defining the potential demand and potential supply of credit. Potential demand for credit represents individuals' willingness to borrow, while potential supply of credit reflects the willingness of financial institutions to offer credit services, both of which are assumed to be dependent on the lending rate only. However, the actual demand for credit may be lower than the potential demand at any given lending rate, due to self-exclusion that arises, for example, from cultural or religious reasons. The actual supply of credit may also be lower than the potential supply at any given lending rate due to the presence of asymmetric information (which we will discuss later). As a result, the actual, observed uptake of lending services will be less than the potential level.

The impact of formal institutions on financial inclusion can be illustrated by a shift of actual demand or supply curve in the model. Improvement in formal institutions, such as regulatory quality and control of corruption, may reinforce people's trust that financial institutions will responsibly keep their savings, and that making and receiving payments via financial institutions is safe and efficient. In this case, a higher level of trust generates additional demand for savings and payment services at any given price,

[8] See Figure A.3 and Figure A.4 for a graphical representation of this model developed by Beck and De La Torre (2007).

leading to increased uptake of these services. As to lending services, the law and finance theory suggests that strong legal institutions strengthen rule of law, investor rights protection and contract enforceability, which incentivizes financial institutions to offer more lending services, especially to individuals who were previously viewed as disqualified for credit under a weak institutional environment. Consequently, increased supply of credit, featured by an outward shift of the potential supply curve, leads to a higher level of uptake of lending services.

While, at any given price and lending rate, improved institutions shift the actual demand for savings and payment services and the actual supply of lending services outward, leading to an increased uptake that is closer to the potential level, actual demand and actual supply may, at the same time, be dragged by the presence of various demand-side and supply-side constraints.

On the *supply* side, the literature suggests that transaction costs and asymmetric information are the two main barriers to financial access.[9] First, transaction costs arise, because financial institutions developing, maintaining, and providing products and services generate costs. Take savings and payment services for example. At the client level, opening a savings account, offering deposits and withdrawals services, and processing payment requests incur costs. At the institution level, maintaining existing accounts, setting up new ATM machines or service points, and introducing innovative operating system also incur costs. Hence, high transaction costs will discourage financial institutions to offer services to potential clients, who lives in remote areas, and whose value of transaction is too small for financial institutions to stay profitable. In both cases, high transaction costs limit the supply of financial services.

Second, asymmetric information impedes access to credit.[10] Since financial institutions are not able to perfectly identify the credibility of potential borrowers, i.e. their risk of default, they tend to include a high-risk premium in the lending rate. However, charging a high lending rate may not effectively reduce credit risk. For one thing, a high lending rate may attract riskier borrowers, while the potentially "safe" borrowers are deterred away by the high cost of borrowing and fail to get credit, i.e. the adverse selection problem. For another, charging a high interest may incentivize borrowers, after getting credit, to deviate from what they have agreed with financial institutions and take more risk in their investments in pursuit of a higher return, i.e. the moral hazard problem. Consequently, financial institutions have to either set up additional requirements before they offer lending services, such as collateral and documentation, or

[9] Following the theories on the role of transaction costs in credit rationing (Stiglitz and Weiss, 1981) and financial development (Levine, 1997 and 2005), we interpret transaction costs as a supply-side factor of financial access. However, we acknowledge that transaction costs may also operate on the demand side. Since transaction costs ultimately translate into the price of financial services, high transaction costs weaken the affordability of getting serviced and reduce the demand for finance. Nevertheless, this negative demand-side effect of transaction cost on financial inclusion can be compensated for by a higher income level of individuals, which we later consider as a demand-side determinant of financial inclusion.

[10] Compared with lending services, the problem of information asymmetry is less pronounced in the provision of savings and payment services because they do not involve clients' debt repayment obligations.

they simply refuse to offer lending services in the first place. In both cases, information frictions lead to an insufficient supply of credit.

On the *demand* side, the literature suggests that financial illiteracy, a lack of trust on financial institutions, and insufficient income are the main demand-side barriers to formal finance.[11] First, good knowledge of finance allows individuals to better understand financial contracts and use financial resources to meet the need of their business or personal development. Therefore, improved financial literacy is expected to trigger additional demand for financial services. At the micro-level, Van Rooij, Lusardi and Alessi (2011) find that financial literacy is positively associated with stock market participation in the Netherlands. Drexler, Fisher and Schoar (2014) implement an impact analysis in the Dominican Republic. They find that financial training improves micro-entrepreneurs' financial practices, especially the less skillful ones. Berry, Kalan and Pradhan (2018) implement a randomized experiment in Ghana. They find that financial education raises children's savings at primary and junior high schools. At the country level, Grohmann, Klühs and Menkhoff (2018) show that financial literacy has a positive influence on financial inclusion with respect to account ownership, debit card ownership, use of formal savings and use of debit card.

Second, trust on financial institutions represents the degree to which individuals believe that financial institutions are reliable.[12] If the level of trust is low, individuals are less willing to use financial services. A typical example is the demand for savings products. Individuals are less likely to save if they do not trust that financial institutions will keep their savings safely, and that they can always get their savings back when necessary. On the contrary, a higher level of trust will incentivize individuals to use services provided by financial institutions. Guiso, Sapienza and Zingales (2004) show that in Italy a high level of social trust is associated with more stock investments and use of checks. This relationship is more significant among low-educated people, who are not able to read and understand financial contracts.

Third, it is expected that economic development increases the demand for finance. At the country level, economic development generates additional economic opportunities, which need the financial system to support. At the individual level, a higher level of income, as a result of economic development, means that financial services will become increasingly affordable, especially to those who were previously excluded from formal finance due to price impediments. As illustrated by Peachey and Roe (2004), the substantial increase in bank account ownership in most industrial countries in the past two decades can be attributed to the improvement of income and living standard, accompanied by more women entering

[11] According to Lusardi and Mitchell (2014, p.6) financial literacy refers to "people's ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions".
[12] Here, trust is viewed from the perspective of individuals as their assessment on how trustful financial institutions are. However, we acknowledge that trust can also be described from the perspective of financial institutions as the degree to which financial institutions trust the credibility of potential clients. By this definition, trust should be viewed as a supply-side factor. Financial institutions are more willing to offer lending services, if the trust between lenders and borrowers is strong that the expectation that contractual obligations can be fulfilled is high.

the labor force. On the contrary, weak economic development limits the need for finance and ultimately leads to a low level of financial usage.

The above discussion suggests that both supply-side and demand-side barriers impose a direct, negative impact on financial inclusion. Next to the direct impact, financial barriers also affect financial inclusion indirectly by dragging the positive impact of formal institutions on financial inclusion. The intuition is that even though improved institutions reinforce individuals' trust on financial institutions (such that they are more willing to save) and ameliorate asymmetric information problems (such that financial institutions are more willing to lend), its positive impact on promoting financial inclusion will still be weakened, for example, by the fact that potential clients are not sufficiently well-informed to make financial decisions due to a lack of financial knowledge, or that financial services are too costly for potential clients to afford due to high transaction costs, or that there is a lack of economic opportunities that create the need for finance.

Therefore, we derive the following hypothesis:

H1: There is a positive association between formal institutions and financial inclusion with respect to formal accounts, savings, borrowings, and payment services.

H2: The association between formal institutions and financial inclusion with respect to formal accounts, savings, borrowings, and payment services is conditional on the level of financial barriers.

3. Methodology and data

In order to test the relationship between formal institutions and financial inclusion, we adopt the following econometric model:

$$\text{INCLUSION}_i = \alpha + \beta_1 \text{INSTITUTION}_i + \beta_2 X_i + \varepsilon_i,$$

where INCLUSION refers to the level of financial inclusion, INSTITUTION refers to the level of formal institutions, X is a vector of control variables and ε is the white-noise error term.

Dependent variable

The dependent variable is INCLUSION, which, as noted earlier, is defined as the use (i.e. uptake) of financial products and services. Specifically, we use four indicators to measure the level of financial inclusion: 1) formal account ownership (ACCOUNT); 2) use of saving (SAVED); 3) use of borrowing

(BORROWED); and 4) use of digital payments (DIGITAL).[13] We collect the data of these financial inclusion variables from the Global Findex Database 2017.

As illustrated in Table A.4, ACCOUNT, SAVED, BORROWED and DIGITAL are highly correlated. One plausible reason is that having a formal account is the pre-requisite for formal saving, borrowing and payment services. Hence, we employ principal component analysis (PCA) to create an indicator that captures the common variation in these variables. The results of PCA are presented in Table A.6 and Figure A.1. The results suggest that the first principal component explains almost 80% of the variation in these four financial inclusion variables. The eigenvalue of the first principal component is 3.164, which is larger than one. We name the first principal component PINCLUSION and use it to measure the overall level of financial inclusion in our empirical analysis.

Explanatory variable

The key explanatory variable is INSTITUTION. Following the literature (La Porta et al., 1997, 1998; Levine, 1998; Levine, 1999; Law and Azman-Saini, 2012), formal institutions are measured in two ways. First, we collect information on legal origin from La Porta et al., (1998), La Porta et al., (1999), and Beck, Demirgüç-Kunt and Levine, (2003a). Specifically, we distinguish four legal families: 1) English common law (ENGLISH); 2) French civil law (FRENCH); 3) German civil law (GERMAN); and 4) other law families (OTHER), including Scandinavian civil law and Socialist law. According to the law and finance theory, we expect a country's legal tradition has a strong explanatory power on the level of financial inclusion.

Second, we use the Worldwide Governance Indicators (WGIs) constructed by Kaufmann, Kraay and Mastruzzi, (2011) to measure the quality of formal institutions. Specifically, these indicators are: 1) voice and accountability (VOICE); 2) political stability and absence of violence (POLITICAL); 3) government effectiveness (GOVERNMENT); 4) regulatory quality (REGQUALITY); 5) rule of law (LAW); and 6) control of corruption (CORRUPTION).[14] To measure the overall institutional quality, we follow Beck et al., (2007) and take the average of these six indicators, named as INSTITUTION. Alternatively, we follow Elkhuizen et al., (2018) and use principal component analysis to create an indicator that captures the common variation in these six indicators, since they are highly correlated

[13] Specifically, ACCOUNT refers to the percentage of respondents who reported having an account (by themselves or together with someone else) at a bank or another type of financial institution. SAVED refers to the percentage of respondents who report saving or setting aside any money in the past 12 months by using an account at a bank or another type of financial institution. BORROWED refers to the percentage of respondents who reported borrowing any money from a bank or another type of financial institution, or using a credit card, in the past 12 months. DIGITAL refers to percentage of respondents who reported using mobile money, a debit or credit card, or a mobile phone to make a payment from an account, or reported using the internet to pay bills or to buy something online, in the past 12 months. It also includes respondents who reported paying bills, sending or receiving remittances, receiving payments for agricultural products, receiving government transfers, receiving wages, or receiving a public sector pension directly from or into a financial institution account or through a mobile money account in the past 12 months.

[14] The six World Governance Indicators range approximately from -2.5 to + 2.5, with a higher value indicating a higher level of governance.

with each other as illustrated in Table A.7. The results of PCA are reported in Table A.8 and Figure A.2. The results suggest that the first principal component explains about 86% of the variation in the governance indicators. The eigenvalue for the first principal component is 5.17, which is larger than one. We name the first principal component PINSTITUTION and adopt it as an alternative measure for formal institutions in our robustness checks.

Control variables

We include several control variables captured in vector X, with respect to the level of economic and financial development, the level of infrastructure, and the level of financial barriers (as we have noted in Section 2).

First, we control for the level of economic development measured by GDP per capita (GDP). The intuition is that a higher level of per capita income makes financial products and services affordable to more individuals, which has a positive impact on financial inclusion. Second, we control for the level of financial development measured by credit-to-GDP ratio (CREDIT). We expect that more financial products and services will be available for individuals to choose and use as a financial system becomes larger. Therefore, financial inclusion is expected to be positively associated with the size of a financial system. We collect the data of GDP per capita and CREDIT from the Global Financial Development Database (2017).

Third, as suggested by Beck, Demirgüç-Kunt and Martinez (2008) we control for telecommunication infrastructure measured by the share of fixed telephone subscriptions per 100 people (PHONE). We expect that better telecommunication infrastructure facilitates the provision of financial products and services and positively impacts financial inclusion. Fourth, we also include an outreach indicator that captures the level of financial infrastructure. The idea is that having access to finance is a pre-requisite for being able to use finance. In other words, access to finance determines the possibility that financial products and services can be used. The chance of using financial resources is slim, when finance is not even accessible in the first place. In our empirical analysis, we use demographic ATMs penetration as a measure for financial access. Data of PHONE and ATM are collected from the World Development Indicators and the Global Financial Development Database (2017).

Finally, we take into account potential obstacles to financial inclusion. On the demand side, we control for the factors that may lead to self-exclusion from formal finance: 1) people do not have sufficient fund (FUND), which reflects the degree to which income blocks people from using finance; 2) people do not have need for financial services (NEED), which captures the degree to which people do not use formal finance because of a lack economic opportunities; 3) people lack trust in financial institutions (DISTRUST), which measures the degree to which people believe that financial institutions are not trustworthy; 4) cultural reasons (RELIGION), which describes the degree to which financial inclusion is hindered by religious considerations; and 5) level of financial literacy (FINLIT), which represents

the degree to which people have acquired basic financial knowledge.[15] On the supply side, we control for the factors that may contribute to a sub-optimal supply of financial services: 1) financial services are too expensive (COST), which measures the level of transaction costs involved financial services provision; 2) financial institutions are too far away (FAR), which captures the degree of physical barrier; and 3) people lack necessary documentation (DOC), which reflects asymmetric information in the financial system.[16] Data of these financial barrier variables are collected from the Global Findex Database (2017).

A first look at the data

We constructed a cross-country database that includes 144 countries.[17] Table 1 provides summary statistics on the financial inclusion indicators. From Table A.2, it can be seen that there is a large cross-country variation in financial inclusion. For example, account ownership is less than 10% in Madagascar, Niger, South Sudan and Chad, while that exceeds 95% in countries, such as Australia, Germany, Japan, Norway and Singapore. Institutional quality also varies considerably across countries. For instance, formal institutions are weak in Afghanistan, Central African Republic, Democratic Republic of the Congo and Libya with an overall score less than -1.5. However, the score is much larger (>1.5) in Canada, Switzerland, Netherlands, New Zealand and Sweden. Overall, the dataset exhibits large variations in the variables of interest, which allows us to investigate the relationship between financial inclusion and institutions in a cross-country setting.

Figure 1 depicts the level of financial inclusion across different legal tradition families. In general, financial inclusion is highest in countries with a German legal tradition where the share of people who have owned a financial account, saved and used digital products is larger than that in countries with the other legal origins. In contrast, French civil law countries have the least development in financial inclusion. Figure 2 shows that account ownership and use of saving, borrowing and digital products are higher in economically developed countries. Figure 3 suggests that there is a positive correlation between financial inclusion and institutions. In general, financial inclusion is higher in countries with

[15] Following the Global Findex Database (2017), FUND refers to the percentage of respondents who report not having a financial institution account because they do not have enough money to use one. NEED refers to the percentage of respondents who report not having a financial institution account only because they have no need for formal financial services. DISTRUST refers to the percentage of respondents who report not having a financial institution account because they do not trust financial institutions. RELIGION refers to the percentage of respondents who report not having a financial institution account for religious reasons. Following Klapper, Lusardi and van Oudheusden (2015), FINLIT refers to the proportion of people that answer at least three out four financial concepts correctly from The Standard & Poor's Ratings Services Global Financial Literacy Survey, including risk diversification, inflation, interest, and interest compounding.

[16] Following the Global Findex Database (2017), COST refers to the percentage of respondents who report not having a financial institution account because financial services are too expensive. FAR refers to the percentage of respondents who report not having a financial institution account because financial institutions are too far away. DOC refers to the percentage of respondents who report not having a financial institution account because they lack the documentation needed to open one, such as an identity card, a wage slip, or the like.

[17] Countries included in our sample are summarized in Table A.1. The data are listed in Table A.2. Table A.3 provides descriptive statistics for the variables we use in our empirical model. Table A.4 shows the correlations between these variables. Definition and source of the variables are presented in Table A.5.

stronger formal institutions. Figure 4 illustrates seven barriers to financial inclusion cited by the 2017 Global Findex survey. It seems that, globally, not having sufficient fund is the main reason why some people still remain unbanked, that is why they do not have an account at a formal financial institution. Only about 2% of respondent on average believe that they do not have an account because they do not have the need for financial services.

4. Results

Formal institutions and financial inclusion

As a starting point, we investigate whether legal origins explain cross-country differences in financial inclusion, using the specification suggested by Levine et al., (2000). Table 2 presents the regressions of financial inclusion indicators on legal dummy variables, namely French civil law, German civil law, and the other legal traditions (Scandinavian and Socialist law system). Our reference group is countries with English common law tradition. The results show that the coefficients of FRENCH are negative and statistically significant in all specifications. This suggests that financial inclusion is less developed in countries with a French civil law tradition compared with English common law counterparts. In contrast, the coefficients of GERMAN are all positive and significant at 1% level, except for specification (5). Compared with English common law countries, German civil law countries tend to have a higher level of financial inclusion.

In Table 3, we perform regressions using the same specifications as in Table 2, but controlling for GDP per capita. We find that the coefficients of FRENCH remain negative and highly significant. In addition, income turns out to be an important determinant of financial inclusion. The coefficients of determination increase significantly after GDP per capita is introduced into our models. Specifically, we find a strong positive relationship between financial inclusion and GDP per capita, suggesting that account ownership and use of saving, borrowing and digital payments are higher in economically advanced countries.

Overall, our findings are consistent with the law-finance literature, which suggests that legal tradition has a strong explanatory power on financial development. Moreover, we complement the literature by showing that legal tradition is a key determinant of financial development with respect to not only the size of financial intermediation, but also the inclusiveness of a financial system.

Next, we examine how financial inclusion is associated with formal institutions. Estimation results are presented in Table 4.[18] In all specifications, INSTITUTION has a positive and significant coefficient.

[18] As robustness checks, we regress the financial inclusion indicators on the quality of formal institutions indicated by the first principal components of the six Worldwide Governance Indicators. Since our robustness checks yield highly consistent results, estimation results are not reported in the main text.

It implies a strong positive relationship between financial inclusion and the quality of formal institutions. Better formal institutions tend to promote financial inclusion. Moreover, GDP per capita and outreach of financial infrastructure are important for financial inclusion. Specifically, account ownership, use of digital products, and the overall level of financial inclusion are positively related to the level of income and demographic ATMs penetration. Besides, in line with our previous finding, countries with French legal tradition have less development in financial inclusion compared with countries with English law system, except for the use of borrowing.

Formal institutions, financial inclusion and the role of financial barriers

As discussed in Section 2, financial inclusion, i.e. the observed uptake of financial products and services, is a combined outcome of both supply and demand of formal finance. Therefore, we take one step further by taking into account the role of financial barriers, when it comes to the impact of formal institutions on financial inclusion. Specifically, we run the same regressions as before, but include financial barrier variables as additional control variables. On the demand side, we take into account the following five barriers: 1) insufficient income (people do not have sufficient fund); 2) a lack of economic opportunities (people do not have need for financial services); 3) distrust (people lack trust in financial institutions; 4) culture (people do not have a formal account due to religious reasons); and 5) financial illiteracy (people lack sufficient financial knowledge). On the supply side, we control for the following three barriers: 1) transaction costs (financial services are too expensive); 2) physical access barrier (financial institutions are too far away); and 3) asymmetric information (people lack necessary documentation).

Estimation results are presented in Table 5-9. First, we find that the coefficients of INSTITUTION remain positive and highly significant in all specifications, except for column (1) and (5) in Table 8 with respect to use of borrowing. These consistent results suggest that formal institutions have a positive and significant impact on financial inclusion even after the impact of financial barriers has been taken into account. Second, we find a strong, direct relationship between financial barriers and financial inclusion.[19] On the demand side, insufficient income, a lack of economic opportunities, a lack of trust in financial institutions, cultural considerations, and financial illiteracy tend to drag the level financial inclusion.[20] On the supply side, high transaction costs, inadequate physical access, and asymmetric information adversely impact financial inclusion. The coefficients of the supply-side financial barrier variables have the expected signs and are highly significant in most regressions, except for borrowing.

Furthermore, we extend our analysis and investigate how financial barriers may moderate the impact of formal institutions on financial inclusion. The intuition is that the positive impact of formal

[19] The overall explanatory power of formal institutions and financial barriers on the use of borrowing is weak.
[20] Exceptions are: 1) financial illiteracy does not explain formal account ownership (Column 5 from Table 5); and 2) a lack of economic opportunities does not explain overall level of financial inclusion (Column 2 from Table 9).

institutions on financial inclusion is conditional on the prevailing level of financial barriers, which lead to voluntary exclusion from using finance or a sub-optimal provision of financial services. To this end, we interact INSTITUTION with each of the eight financial barrier variables. We include these interaction terms as additional control variables and run the same regressions as before. Particularly, we are interested in the coefficients of INSTITUTION and the coefficients of the interaction terms in the regressions.

Table 10-14 present the estimation results. Consistent with our analysis thus far, the level of financial inclusion is positively associated with the level of formal institutions (except for column 5 from Table 14) and negatively associated with the prevailing level of financial barriers.[21] In addition, our evidence suggests that most financial barrier variables impose a negative moderating effect on the relationship between formal institutions and financial inclusion. That is, the positive impact of formal institutions on financial inclusion becomes weak as the degree of financial barriers increases, which is captured by the negative and significant coefficients before the interaction variables in our regressions (except for the interaction between formal institutions and financial literacy, which we expect a positive sign, since the higher the level of financial literacy, the lower the level of financial barrier).[22]

Summary of the results

First, our empirical evidence shows that formal institutions, measured by the average score of the six Worldwide Governance Indicators, have a strong, positive impact on financial inclusion with respect to account ownership, use of saving, borrowing and digital payments services. This result is consistently found under different model specification, which confirms our first hypothesis. Besides, the result also confirms the theoretical prediction of the law-finance literature that formal institutions are important determinant for financial development. Our contribution is that we look at financial development from the dimension of financial inclusion, rather than financial depth.

Second, we find that financial barriers, from both the demand and the supply side, have a direct negative impact on financial inclusion. Our explanation is that these barriers drag the demand and the supply of financial services, leading to a lower equilibrium level of uptake, i.e. financial inclusion as is defined in this paper. Next to this direct effect, our evidence further shows that financial barriers exert an indirect impact on financial inclusion by moderating the positive relationship between formal institutions and financial inclusion. The positive impact of formal institutions on financial inclusion is weakened by the prevailing level of financial barriers.

[21] Again, the overall explanatory power of formal institutions and financial barriers on the use of borrowing is weak. Besides, we find exceptions that financial illiteracy does not explain formal account ownership (Column 5 from Table 10); 2) a lack of economic opportunities does not explain the use of formal saving, digital payments and the overall level of financial inclusion (Column 2 from Table 11, 12, and 14).

[22] We do not find a moderating effect 1) for a lack of economic opportunities and financial illiteracy on account ownership and the use of digital payments (Column 2 and 5 from Table 10 and Table 12); 2) for a lack of economic opportunities and physical access barrier on formal saving and overall level of financial inclusion (Column 2 and 7 from Table 11 and 14).

5. Conclusion

In this paper, we investigate the impact of institutions on financial inclusion. Using the recent edition of the Global Findex Database, we contribute to the literature by directly linking institutions to financial inclusion rather than financial depth as a traditional measure for financial development. Moreover, we measure financial inclusion as the actual uptake of financial service rather than financial access. Our motivation is that financial inclusion not only concerns the supply of a financial system, i.e. accessibility of financial resources, but also the demand for financial services. To our knowledge, this paper is the first attempt at analyzing institutional determinants of financial inclusion based on indicators from the Global Findex Database.

To perform empirical analysis, we construct a cross-country data that provides information on how people use of formal accounts, saving, borrowing and digital payments across 144 countries. First, we find that a country's legal tradition explains financial inclusion. Our results suggest that countries with a French legal tradition tend to have a lower level of financial inclusion compared with English common law counterparts. Second, there is a strong positive relationship between formal institutions and financial inclusion. Institutional quality is not only important for increasing the size of financial system, but also the use of financial services. Third, we find that the positive impact of formal institutions on financial inclusion is weakened by the prevailing level of financial barriers. One policy implication is that promoting financial inclusion not only needs an improvement in the institutional environment, but also an endeavor to reduce the degree of financial barriers that may lead to voluntary exclusion from formal finance or a sub-optimal provision of financial services.

One limitation of this paper is the potential endogeneity in the key explanatory variable of our interest INSTITUTION. We expect that country-specific characteristics, which are captured by the error term, also explain cross-country differences in financial inclusion. Therefore, future research may extend our analysis by introducing an appropriate instrument variable for INSTITUTION and test its impact on financial inclusion. Moreover, our data does not allow us to control for these time-invariant fixed effects using panel estimations. While it still takes time before we are able to explore a longer data series on financial inclusion, investigating the impact of institutions on financial inclusion in a panel setting is definitely a direction for future research.

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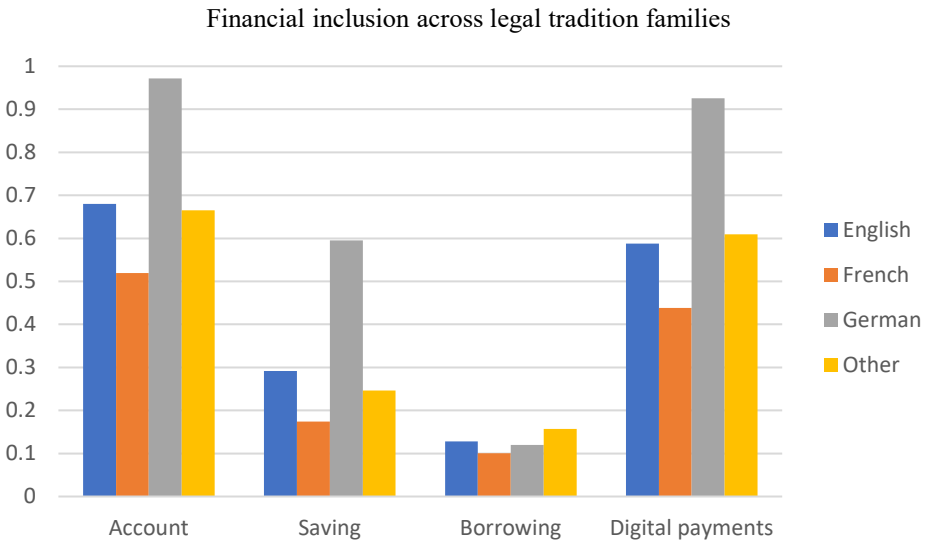
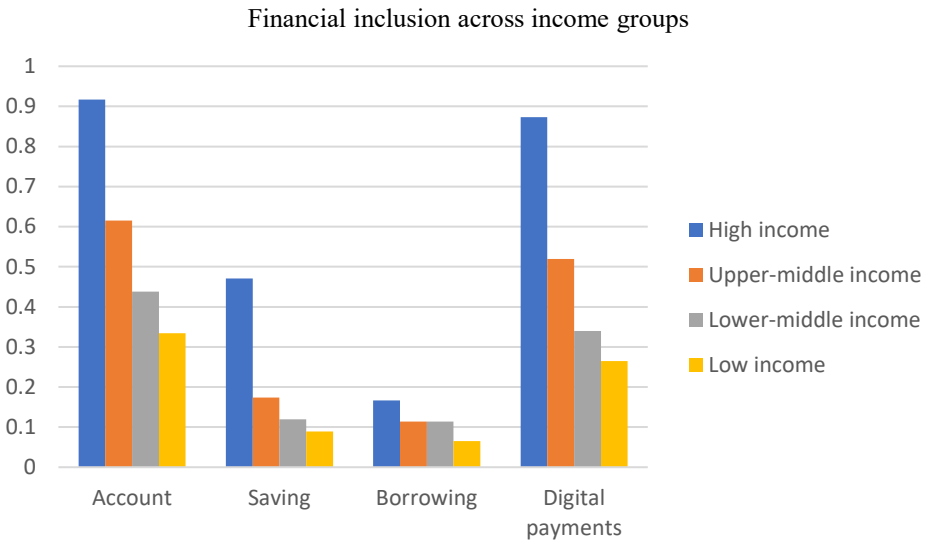
FIGURE 1



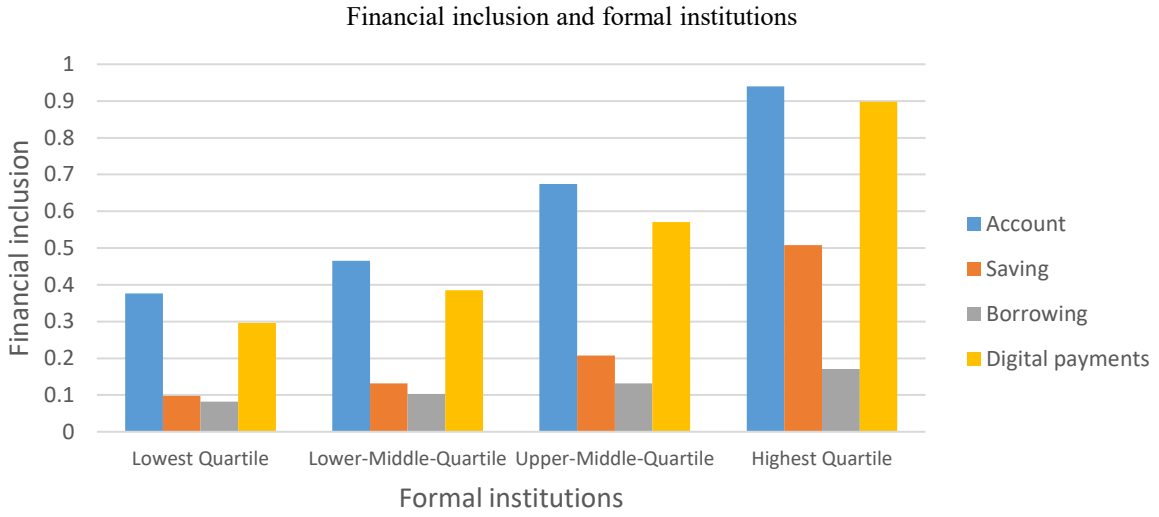
Note: The figure illustrates the average level of financial inclusion (account ownership, use of saving, borrowing, and digital payments) by legal family in the sample.

FIGURE 2



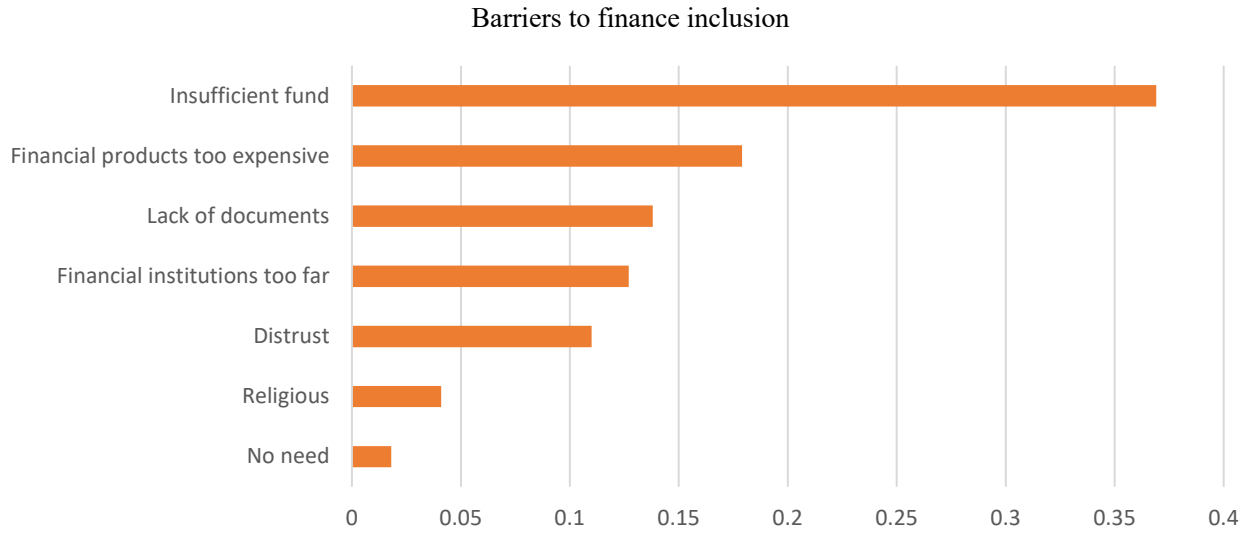
Note: The figure illustrates the average level of financial inclusion (account ownership, use of saving, borrowing, and digital payments) by income group in the sample.

FIGURE 3



Note: The figure illustrates the average level of financial inclusion (account ownership, use of saving, borrowing, and digital payments) by institution quartile in the sample.

FIGURE 4



Note: The figure illustrates the average level of financial barriers in the sample.

TABLE 1

Summary statistics

	Financial inclusion indicators				
	Account ownership	Use of saving	Digital payments	Use of borrowing	Mobile money
Mean	0.614	0.236	0.538	0.122	0.146
Median	0.586	0.154	0.483	0.109	0.095
Maximum	0.999	0.793	0.994	0.35	0.729
Minimum	0.086	0.016	0.073	0.018	0.003
Std. Dev	0.267	0.196	0.283	0.07	0.145
Observation	144	144	144	144	77

TABLE 2

Financial inclusion and legal origins

	(1) Account ownership	(2) Use of saving	(3) Digital payments	(4) Use of borrowing	(5) Inclusion (PCA)
FRENCH	-0.145**	-0.118***	-0.150***	-0.028*	-1.017***
	(0.062)	(0.040)	(0.057)	(0.015)	(0.379)
GERMAN	0.347***	0.304***	0.337***	-0.008	2.021***
	(0.051)	(0.040)	(0.055)	(0.027)	(0.350)
OTHER	0.038	-0.045	0.022	0.029	0.158
	(0.066)	(0.049)	(0.065)	(0.018)	(0.423)
Constant	0.624***	0.292***	0.588***	0.128***	0.356
	(0.051)	(0.035)	(0.046)	(0.013)	(0.324)
Observations	139	139	139	139	139
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000
R-squared	0.155	0.208	0.160	0.109	0.169

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 3

Financial inclusion and legal origins

	(1) Account ownership	(2) Use of saving	(3) Digital payments	(4) Use of borrowing	(5) Inclusion (PCA)
FRENCH	-0.121***	-0.096***	-0.124***	-0.024**	-0.845***
	(0.028)	(0.024)	(0.030)	(0.012)	(0.183)
GERMAN	0.003	0.083**	0.045	-0.043	0.058
	(0.029)	(0.034)	(0.029)	(0.029)	(0.272)
OTHER	-0.012	-0.073**	-0.025	0.021	-0.140
	(0.031)	(0.028)	(0.034)	(0.016)	(0.204)
GDP	0.162***	0.096***	0.149***	0.023***	0.960***
	(0.007)	(0.008)	(0.008)	(0.003)	(0.050)
Constant	-0.758***	-0.533***	-0.687***	-0.066**	-7.858***
	(0.066)	(0.066)	(0.080)	(0.028)	(0.443)
Observations	133	133	133	133	133
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000
R-squared	0.797	0.677	0.751	0.334	0.777

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 4

Financial inclusion and formal institutions

	(1) Account ownership	(2) Use of saving	(3) Digital payments	(4) Use of borrowing	(5) Inclusion (PCA)
INSTITUTION	0.099***	0.121***	0.154***	0.026**	0.937***
	(0.024)	(0.021)	(0.024)	(0.010)	(0.137)
CREDIT	0.000	0.001	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
GDP	0.070***	0.033**	0.039**	0.009	0.341***
	(0.015)	(0.013)	(0.017)	(0.007)	(0.092)
ATM	0.001***	-0.000	0.001***	0.000**	0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
PHONE	0.003*	0.000	0.003*	-0.001	0.004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)
FRENCH	-0.103***	-0.055**	-0.083***	-0.009	-0.542***
	(0.029)	(0.023)	(0.030)	(0.013)	(0.177)
GERMAN	-0.156***	0.049	-0.095***	-0.042	-0.573**
	(0.042)	(0.038)	(0.034)	(0.030)	(0.266)
OTHER	-0.001	-0.032	0.008	0.039**	0.152
	(0.034)	(0.026)	(0.035)	(0.019)	(0.194)
Constant	-0.096	-0.055	0.145	0.039	-3.225***
	(0.126)	(0.095)	(0.141)	(0.055)	(0.732)
Observations	116	116	116	116	116
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000
R-squared	0.856	0.793	0.832	0.360	0.857

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 5

Account ownership and formal institutions

	(1) Account ownership	(2) Account ownership	(3) Account ownership	(4) Account ownership	(5) Account ownership	(6) Account ownership	(7) Account ownership	(8) Account ownership
INSTITUTION	0.057**	0.107***	0.080***	0.098***	0.116***	0.091***	0.093***	0.099***
	(0.023)	(0.026)	(0.021)	(0.023)	(0.030)	(0.021)	(0.025)	(0.023)
CREDIT	0.000	0.001*	0.001	0.001*	0.000	0.000	0.001**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.008	0.038**	0.040***	0.039**	0.069***	0.047***	0.027*	0.031**
	(0.014)	(0.019)	(0.014)	(0.016)	(0.017)	(0.013)	(0.015)	(0.015)
ATM	0.001	0.002***	0.002***	0.001***	0.001**	0.002***	0.002***	0.001***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.001	0.005***	0.005***	0.003*	0.002	0.002*	0.003	0.003*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
FUND	-0.855***							
	(0.097)							
NEED		-1.190**						
		(0.545)						
DISTRUST			-0.924***					
			(0.161)					
RELIGION				-1.454***				
				(0.355)				
FINLIT					-0.016			
					(0.134)			
COST						-0.695***		
						(0.099)		
FAR							-0.734***	
							(0.163)	
DOC								-0.940***
								(0.153)
Constant	0.698***	0.064	0.134	0.129	-0.120	0.145	0.253**	0.290**
	(0.130)	(0.141)	(0.112)	(0.128)	(0.130)	(0.104)	(0.127)	(0.125)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.901	0.753	0.817	0.786	0.822	0.841	0.792	0.823

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 6

Use of saving and formal institutions

	(1) Saving	(2) Saving	(3) Saving	(4) Saving	(5) Saving	(6) Saving	(7) Saving	(8) Saving
INSTITUTION	0.045**	0.068***	0.057***	0.065***	0.097***	0.062***	0.066***	0.065***
	(0.018)	(0.022)	(0.019)	(0.020)	(0.021)	(0.018)	(0.020)	(0.018)
CREDIT	0.000	0.000	0.000	0.000	0.001**	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.011	0.025*	0.026**	0.026**	0.011	0.030**	0.022*	0.021*
	(0.011)	(0.013)	(0.012)	(0.012)	(0.011)	(0.012)	(0.012)	(0.011)
ATM	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.004***	-0.002	-0.002	-0.003*	-0.001	-0.003**	-0.003*	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
FUND	-0.417***							
	(0.065)							
NEED		-0.713**						
		(0.324)						
DISTRUST			-0.428***					
			(0.114)					
RELIGION				-0.732***				
				(0.193)				
FINLIT					0.401***			
					(0.089)			
COST						-0.339***		
						(0.063)		
FAR							-0.272***	
							(0.088)	
DOC								-0.508***
								(0.091)
Constant	0.272***	-0.035	-0.006	-0.005	-0.078	0.002	0.030	0.086
	(0.087)	(0.090)	(0.081)	(0.080)	(0.089)	(0.077)	(0.083)	(0.072)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.648	0.472	0.535	0.510	0.804	0.574	0.489	0.574

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 7

Use of digital payments and formal institutions

	(1) Digital payments	(2) Digital payments	(3) Digital payments	(4) Digital payments	(5) Digital payments	(6) Digital payments	(7) Digital payments	(8) Digital payments
INSTITUTION	0.108***	0.132***	0.119***	0.128***	0.133***	0.128***	0.132***	0.132***
	(0.026)	(0.027)	(0.026)	(0.026)	(0.030)	(0.026)	(0.028)	(0.025)
CREDIT	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.009	0.009	0.011	0.010	0.026	0.015	0.004	0.005
	(0.021)	(0.021)	(0.019)	(0.020)	(0.018)	(0.019)	(0.019)	(0.019)
ATM	0.001	0.001***	0.002***	0.001***	0.001***	0.001***	0.001***	0.001**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.002	0.005***	0.004***	0.003*	0.002	0.003*	0.003*	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
FUND	-0.518***							
	(0.135)							
NEED		-1.279**						
		(0.556)						
DISTRUST			-0.628***					
			(0.164)					
RELIGION				-1.241***				
				(0.357)				
FINLIT					0.353**			
					(0.161)			
COST						-0.433***		
						(0.124)		
FAR							-0.378**	
							(0.171)	
DOC								-0.641***
								(0.153)
Constant	0.672***	0.299*	0.337**	0.349**	0.082	0.339**	0.383**	0.443***
	(0.192)	(0.159)	(0.140)	(0.155)	(0.131)	(0.143)	(0.148)	(0.156)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.719	0.659	0.688	0.685	0.822	0.694	0.661	0.693

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 8

Use of borrowing and formal institutions

	(1) Borrowing	(2) Borrowing	(3) Borrowing	(4) Borrowing	(5) Borrowing	(6) Borrowing	(7) Borrowing	(8) Borrowing
INSTITUTION	0.019	0.029**	0.021*	0.019*	0.020	0.022*	0.020*	0.022*
	(0.012)	(0.012)	(0.012)	(0.011)	(0.013)	(0.012)	(0.012)	(0.012)
CREDIT	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.003	-0.000	-0.001	-0.001	0.005	-0.000	-0.002	-0.001
	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ATM	0.000*	0.000**	0.001**	0.000**	0.000***	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.000	-0.000	-0.000	-0.000	-0.001*	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FUND	-0.067							
	(0.050)							
NEED		0.524						
		(0.371)						
DISTRUST			-0.066					
			(0.066)					
RELIGION				-0.321*				
				(0.180)				
FINLIT					0.106			
					(0.081)			
COST						-0.051		
						(0.044)		
FAR							-0.100	
							(0.067)	
DOC								-0.072
								(0.079)
Constant	0.159**	0.097	0.114*	0.127**	0.041	0.115*	0.137**	0.127**
	(0.064)	(0.063)	(0.063)	(0.060)	(0.068)	(0.062)	(0.061)	(0.062)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.002
R-squared	0.181	0.196	0.171	0.199	0.261	0.174	0.180	0.173

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 9

Financial inclusion (1st principal component) and formal institutions

	(1) Financial inclusion	(2) Financial inclusion	(3) Financial inclusion	(4) Financial inclusion	(5) Financial inclusion	(6) Financial inclusion	(7) Financial inclusion	(8) Financial inclusion
INSTITUTION	0.537***	0.790***	0.640***	0.701***	0.834***	0.696***	0.710***	0.729***
	(0.143)	(0.171)	(0.143)	(0.137)	(0.156)	(0.141)	(0.153)	(0.141)
CREDIT	0.001	0.003	0.002	0.002	0.003	0.001	0.003	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GDP	0.008	0.151	0.160*	0.152	0.234**	0.191**	0.102	0.112
	(0.087)	(0.114)	(0.096)	(0.097)	(0.098)	(0.093)	(0.098)	(0.096)
ATM	0.005	0.010***	0.010***	0.008***	0.008***	0.009***	0.009***	0.007***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
PHONE	-0.006	0.014	0.011	0.002	-0.001	0.001	0.002	0.002
	(0.009)	(0.013)	(0.010)	(0.011)	(0.009)	(0.010)	(0.013)	(0.011)
FUND	-4.022***							
	(0.626)							
NEED		-3.448						
		(3.643)						
DISTRUST			-4.375***					
			(0.863)					
RELIGION				-8.767***				
				(1.756)				
FINLIT					2.300***			
					(0.813)			
COST						-3.271***		
						(0.598)		
FAR							-3.348***	
							(0.908)	
DOC								-4.678***
								(0.809)
Constant	0.772	-2.251***	-1.877***	-1.786**	-3.431***	-1.826***	-1.351*	-1.079
	(0.755)	(0.824)	(0.689)	(0.702)	(0.728)	(0.645)	(0.712)	(0.724)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.803	0.671	0.731	0.728	0.841	0.751	0.707	0.744

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 10

Account ownership, formal institutions and financial barriers (OLS)

	(1) Account ownership	(2) Account ownership	(3) Account ownership	(4) Account ownership	(5) Account ownership	(6) Account ownership	(7) Account ownership	(8) Account ownership
INSTITUTION	0.100***	0.132***	0.134***	0.128***	0.148***	0.132***	0.130***	0.143***
	(0.030)	(0.041)	(0.033)	(0.032)	(0.043)	(0.031)	(0.035)	(0.033)
CREDIT	0.000	0.001*	0.001	0.001*	0.000	0.000	0.001**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.004	0.035*	0.036**	0.037**	0.070***	0.043***	0.025	0.026*
	(0.012)	(0.019)	(0.015)	(0.016)	(0.017)	(0.013)	(0.015)	(0.015)
ATM	0.001	0.002***	0.002***	0.002***	0.001**	0.002***	0.002***	0.001***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.001	0.005***	0.004***	0.003	0.002	0.002	0.002	0.003
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
FUND	-0.908***							
	(0.092)							
INS×FUND	-0.138*							
	(0.071)							
NEED		-1.685**						
		(0.779)						
INS×NEED		-1.424						
		(1.609)						
DISTRUST			-1.123***					
			(0.193)					
INS×DISTRUST			-0.528**					
			(0.238)					
RELIGION				-1.879***				
				(0.424)				
INS×RELIGION				-0.778**				
				(0.372)				
FINLIT					0.020			
					(0.149)			
INS×FINLIT					-0.078			
					(0.081)			
COST						-0.788***		
						(0.099)		
INS×COST						-0.267*		
						(0.136)		
FAR							-0.946***	
							(0.208)	
INS×FAR							-0.391*	
							(0.203)	
DOC								-1.147***
								(0.183)
INS×DOC								-0.424*
								(0.220)
Constant	0.737***	0.091	0.178	0.154	-0.132	0.178*	0.287**	0.337**
	(0.117)	(0.147)	(0.119)	(0.130)	(0.132)	(0.105)	(0.130)	(0.130)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.905	0.755	0.822	0.791	0.823	0.844	0.798	0.828

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 11

Use of saving, formal institutions and financial barriers (OLS)

	(1) Saving	(2) Saving	(3) Saving	(4) Saving	(5) Saving	(6) Saving	(7) Saving	(8) Saving
INSTITUTION	0.094***	0.063**	0.099***	0.089***	-0.059*	0.098***	0.090***	0.128***
	(0.031)	(0.029)	(0.034)	(0.030)	(0.032)	(0.031)	(0.031)	(0.028)
CREDIT	0.000	0.000	0.000	0.000	0.001***	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.006	0.026*	0.023*	0.024**	0.007	0.027**	0.020	0.015
	(0.010)	(0.013)	(0.012)	(0.012)	(0.010)	(0.012)	(0.012)	(0.010)
ATM	0.000	0.000	0.000	0.000	0.001**	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.004***	-0.002	-0.002	-0.003*	-0.000	-0.003**	-0.003*	-0.003**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
FUND	-0.478***							
	(0.067)							
INS×FUND	-0.156***							
	(0.059)							
NEED		-0.607						
		(0.517)						
INS×NEED		0.306						
		(0.964)						
DISTRUST			-0.581***					
			(0.152)					
INS×DISTRUST			-0.406*					
			(0.213)					
RELIGION				-1.080***				
				(0.281)				
INS×RELIGION				-0.636*				
				(0.341)				
FINLIT					0.223***			
					(0.077)			
INS×FINLIT					0.380***			
					(0.060)			
COST						-0.422***		
						(0.077)		
INS×COST						-0.239*		
						(0.128)		
FAR							-0.412***	
							(0.147)	
INS×FAR							-0.258	
							(0.165)	
DOC								-0.807***
								(0.127)
INS×DOC								-0.612***
								(0.182)
Constant	0.317***	-0.041	0.028	0.016	-0.021	0.032	0.052	0.154**
	(0.085)	(0.093)	(0.084)	(0.083)	(0.076)	(0.079)	(0.088)	(0.070)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.672	0.472	0.552	0.528	0.851	0.587	0.501	0.625

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 12

Use of digital payments, formal institutions and financial barriers (OLS)

	(1) Digital payments	(2) Digital payments	(3) Digital payments	(4) Digital payments	(5) Digital payments	(6) Digital payments	(7) Digital payments	(8) Digital payments
INSTITUTION	0.173***	0.123***	0.206***	0.164***	0.147***	0.221***	0.176***	0.205***
	(0.040)	(0.040)	(0.044)	(0.035)	(0.042)	(0.043)	(0.038)	(0.035)
CREDIT	-0.000	0.000	0.000	0.000	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.015	0.010	0.005	0.008	0.026	0.008	0.001	-0.003
	(0.020)	(0.021)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)	(0.020)
ATM	0.001*	0.001**	0.002***	0.001***	0.001***	0.002***	0.002***	0.001***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.002	0.005***	0.004**	0.002	0.002	0.002	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
FUND	-0.600***							
	(0.130)							
INS×FUND	-0.210**							
	(0.081)							
NEED		-1.104						
		(0.758)						
INS×NEED		0.504						
		(1.465)						
DISTRUST			-0.950***					
			(0.179)					
INS×DISTRUST			-0.851***					
			(0.303)					
RELIGION				-1.754***				
				(0.426)				
INS×RELIGION				-0.940**				
				(0.395)				
FINLIT					0.369*			
					(0.191)			
INS×FINLIT					-0.034			
					(0.097)			
COST						-0.645***		
						(0.112)		
INS×COST						-0.605***		
						(0.190)		
FAR							-0.635***	
							(0.222)	
INS×FAR							-0.475**	
							(0.225)	
DOC								-0.987***
								(0.172)
INS×DOC								-0.707***
								(0.227)
Constant	0.732***	0.290*	0.408***	0.380**	0.077	0.414***	0.425***	0.522***
	(0.189)	(0.165)	(0.144)	(0.153)	(0.133)	(0.149)	(0.148)	(0.160)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.730	0.659	0.707	0.695	0.822	0.716	0.672	0.710

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 13

Use of borrowing, formal institutions and financial barriers (OLS)

	(1) Borrowing	(2) Borrowing	(3) Borrowing	(4) Borrowing	(5) Borrowing	(6) Borrowing	(7) Borrowing	(8) Borrowing
INSTITUTION	0.005	0.025	0.014	0.019	-0.007	0.011	0.016	0.008
	(0.020)	(0.018)	(0.022)	(0.015)	(0.025)	(0.021)	(0.017)	(0.018)
CREDIT	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.002	0.000	-0.000	-0.001	0.005	0.001	-0.002	0.000
	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)
ATM	0.000	0.000**	0.000**	0.000**	0.001***	0.000**	0.000**	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.000	-0.000	0.000	-0.000	-0.001*	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FUND	-0.050							
	(0.053)							
INS×FUND	0.045							
	(0.044)							
NEED		0.600						
		(0.454)						
INS×NEED		0.217						
		(0.758)						
DISTRUST			-0.039					
			(0.076)					
INS×DISTRUST			0.069					
			(0.139)					
RELIGION				-0.319				
				(0.216)				
INS×RELIGION				0.003				
				(0.218)				
FINLIT					0.075			
					(0.089)			
INS×FINLIT					0.066			
					(0.054)			
COST						-0.026		
						(0.050)		
INS×COST						0.072		
						(0.089)		
FAR							-0.074	
							(0.076)	
INS×FAR							0.050	
							(0.093)	
DOC								-0.004
								(0.096)
INS×DOC								0.139
								(0.134)
Constant	0.146**	0.092	0.108*	0.127**	0.051	0.106	0.132**	0.111*
	(0.067)	(0.063)	(0.065)	(0.062)	(0.068)	(0.065)	(0.063)	(0.062)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.002
R-squared	0.187	0.196	0.173	0.199	0.273	0.178	0.182	0.181

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 14

Financial inclusion (1st principal component), formal institutions and financial barriers (OLS)

	(1) Financial inclusion	(2) Financial inclusion	(3) Financial inclusion	(4) Financial inclusion	(5) Financial inclusion	(6) Financial inclusion	(7) Financial inclusion	(8) Financial inclusion
INSTITUTION	0.787***	0.782***	0.973***	0.888***	0.355	0.978***	0.896***	1.031***
	(0.236)	(0.238)	(0.248)	(0.200)	(0.263)	(0.245)	(0.222)	(0.216)
CREDIT	0.000	0.003	0.002	0.002	0.002	0.001	0.003	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GDP	-0.017	0.152	0.136	0.141	0.222**	0.167*	0.087	0.081
	(0.090)	(0.117)	(0.098)	(0.095)	(0.100)	(0.097)	(0.098)	(0.101)
ATM	0.006*	0.010***	0.011***	0.009***	0.009***	0.010***	0.010***	0.008***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
PHONE	-0.007	0.014	0.009	-0.002	-0.000	-0.001	-0.001	0.001
	(0.010)	(0.013)	(0.011)	(0.013)	(0.009)	(0.011)	(0.014)	(0.011)
FUND	-4.334***							
	(0.625)							
INS×FUND	-0.801							
	(0.487)							
NEED		-3.307						
		(4.875)						
INS×NEED		0.405						
		(7.586)						
DISTRUST			-5.598***					
			(1.076)					
INS×DISTRUST			-3.240*					
			(1.638)					
RELIGION				-11.417***				
				(2.210)				
INS×RELIGION				-4.848**				
				(2.341)				
FINLIT					1.753**			
					(0.846)			
INS×FINLIT					1.168**			
					(0.524)			
COST						-3.917***		
						(0.629)		
INS×COST						-1.843*		
						(1.077)		
FAR							-4.431***	
							(1.253)	
INS×FAR							-2.002	
							(1.329)	
DOC								-6.104***
								(1.099)
INS×DOC								-2.915*
								(1.522)
Constant	1.003	-2.259**	-1.606**	-1.627**	-3.257***	-1.596**	-1.174	-0.754
	(0.773)	(0.858)	(0.730)	(0.708)	(0.730)	(0.695)	(0.731)	(0.772)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.807	0.671	0.739	0.736	0.846	0.757	0.712	0.753

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE A.1

List of countries in the sample

Afghanistan	Greece	Nigeria
Albania	Guatemala	Nicaragua
United Arab Emirates	Hong Kong SAR, China	Netherlands
Argentina	Honduras	Norway
Armenia	Croatia	Nepal
Australia	Haiti	New Zealand
Austria	Hungary	Pakistan
Azerbaijan	Indonesia	Panama
Belgium	India	Peru
Benin	Ireland	Philippines
Burkina Faso	Iran, Islamic Rep.	Poland
Bangladesh	Iraq	Portugal
Bulgaria	Israel	Paraguay
Bahrain	Italy	West Bank and Gaza
Bosnia and Herzegovina	Jordan	Romania
Belarus	Japan	Russian Federation
Bolivia	Kazakhstan	Rwanda
Brazil	Kenya	Saudi Arabia
Botswana	Kyrgyz Republic	Senegal
Central African Republic	Cambodia	Singapore
Canada	Korea, Rep.	Sierra Leone
Switzerland	Kuwait	El Salvador
Chile	Lao PDR	Serbia
China	Lebanon	South Sudan
Cote d'Ivoire	Liberia	Slovak Republic
Cameroon	Libya	Slovenia
Congo, Dem. Rep.	Sri Lanka	Sweden
Congo, Rep.	Lesotho	Chad
Colombia	Lithuania	Togo
Costa Rica	Luxembourg	Thailand
Cyprus	Latvia	Tajikistan
Czech Republic	Morocco	Turkmenistan
Germany	Moldova	Trinidad and Tobago
Denmark	Madagascar	Tunisia
Dominican Republic	Mexico	Turkey
Algeria	Macedonia, FYR	Taiwan, China
Ecuador	Mali	Tanzania
Egypt, Arab Rep.	Malta	Uganda
Spain	Myanmar	Ukraine
Estonia	Montenegro	Uruguay
Ethiopia	Mongolia	United States
Finland	Mozambique	Uzbekistan
France	Mauritania	Venezuela, RB
Gabon	Mauritius	Vietnam
United Kingdom	Malawi	Kosovo
Georgia	Malaysia	South Africa
Ghana	Namibia	Zambia
Guinea	Niger	Zimbabwe

TABLE A.2

Legal origin, institutions and financial inclusion across countries

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
AFG	Afghanistan	0.145	0.037	0.033	0.108	0.009	-1.547		French
ALB	Albania	0.393	0.087	0.088	0.288	0.024	-0.004	10.6	Socialist
ARE	United Arab Emirates	0.874	0.287	0.189	0.840	0.213	0.651		English
ARG	Argentina	0.479	0.072	0.073	0.402	0.024	-0.046	17.4	French
ARM	Armenia	0.453	0.100	0.285	0.415	0.098	-0.305	10.9	Socialist
AUS	Australia	0.995	0.621	0.203	0.959		1.573	51.4	English
AUT	Austria	0.982	0.558	0.142	0.961		1.427	36.8	German
AZE	Azerbaijan	0.286	0.045	0.131	0.246		-0.694	14.8	Socialist
BEL	Belgium	0.986	0.556	0.158	0.971		1.253	34.6	French
BEN	Benin	0.319	0.098	0.094	0.285	0.181	-0.301		French
BFA	Burkina Faso	0.233	0.121	0.091	0.389	0.330	-0.399	13.8	French
BGD	Bangladesh	0.410	0.099	0.091	0.341	0.212	-0.808		English
BGR	Bulgaria	0.722	0.278	0.119	0.649		0.201	19.6	Socialist
BHR	Bahrain	0.826	0.307	0.168	0.773		-0.133		English
BIH	Bosnia and Herzegovina	0.588	0.098	0.086	0.503		-0.294	26.6	Socialist
BLR	Belarus	0.812	0.222	0.147	0.787		-0.599	32.6	Socialist
BOL	Bolivia	0.512	0.164	0.163	0.400	0.071	-0.618		French
BRA	Brazil	0.700	0.145	0.086	0.579	0.048	-0.141	7.1	French
BWA	Botswana	0.448	0.180	0.052	0.418	0.244	0.648		English
CAF	Central African Republic	0.137	0.057	0.035	0.093		-1.529		French
CAN	Canada	0.997	0.676	0.264	0.979		1.676	41.8	English
CHE	Switzerland	0.984	0.595	0.102	0.965		1.782	51.2	German
CHL	Chile	0.738	0.211	0.134	0.654	0.187	1.011	12.4	French
CHN	China	0.802	0.348	0.086	0.679		-0.426	60.3	Socialist
CIV	Côte d'Ivoire	0.148	0.064	0.022	0.383	0.341	-0.566		French
CMR	Cameroon	0.269	0.109	0.065	0.286	0.151	-0.972		French
COD	Congo, Dem. Rep.	0.150	0.047	0.030	0.217	0.161	-1.569		French
COG	Congo, Rep.	0.233	0.074	0.037	0.178	0.062	-1.036		French
COL	Colombia	0.449	0.087	0.145	0.373	0.047	-0.157	4.1	French

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
CRI	Costa Rica	0.678	0.230	0.141	0.592		0.625		French
CYP	Cyprus	0.887	0.260	0.088	0.801		0.869	7.5	English
CZE	Czech Republic	0.810	0.453	0.149	0.796		0.936	30.1	Socialist
DEU	Germany	0.991	0.554	0.196	0.978		1.510	44.6	German
DNK	Denmark	0.999	0.631	0.206	0.994		1.667	76	Scandinavian
DOM	Dominican Republic	0.548	0.195	0.227	0.444	0.039	-0.172		French
DZA	Algeria	0.428	0.114	0.030	0.260		-0.869	17.2	French
ECU	Ecuador	0.509	0.122	0.118	0.316	0.029	-0.537	7.2	French
EGY	Egypt, Arab Rep.	0.321	0.062	0.063	0.228	0.018	-0.895	21.5	French
ESP	Spain	0.938	0.508	0.184	0.905		0.846	19	French
EST	Estonia	0.980	0.469	0.140	0.968		1.196	39	Socialist
ETH	Ethiopia	0.348	0.263	0.106	0.119	0.003	-0.946	21.4	French
FIN	Finland	0.998	0.545	0.201	0.983		1.739	58	Scandinavian
FRA	France	0.940	0.481	0.183	0.922		1.055	18.7	French
GAB	Gabon	0.340	0.135	0.051	0.540	0.436	-0.670		French
GBR	United Kingdom	0.964	0.637	0.176	0.956		1.435	30	English
GEO	Georgia	0.612	0.046	0.237	0.530	0.022	0.428	8.8	Socialist
GHA	Ghana	0.423	0.162	0.102	0.495	0.389	-0.014	5	English
GIN	Guinea	0.146	0.065	0.044	0.202	0.138	-0.860		French
GRC	Greece	0.855	0.127	0.018	0.737		0.156	21.3	French
GTM	Guatemala	0.435	0.121	0.096	0.333	0.021	-0.567	14.9	French
HKG	Hong Kong SAR, China	0.953	0.509	0.088	0.845		1.401	48	English
HND	Honduras	0.429	0.146	0.124	0.372	0.062	-0.649		French
HRV	Croatia	0.861	0.358	0.131	0.831		0.443	19.7	Socialist
HTI	Haiti	0.282	0.122	0.115	0.275	0.135	-1.190	21.3	French
HUN	Hungary	0.749	0.236	0.073	0.715		0.439	28.7	Socialist
IDN	Indonesia	0.484	0.215	0.172	0.346	0.031	-0.178	37.5	French
IND	India	0.798	0.196	0.066	0.287	0.020	-0.176	16.7	English
IRL	Ireland	0.953	0.475	0.172	0.935		1.385	38.9	English
IRN	Iran, Islamic Rep.	0.934	0.262	0.239	0.898	0.263	-0.827	10.5	French
IRQ	Iraq	0.203	0.016	0.028	0.191	0.042	-1.456	30	French
ISR	Israel	0.928	0.534	0.350	0.908		0.818	22.9	English

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
ITA	Italy	0.938	0.453	0.162	0.897		0.510	27.5	French
JOR	Jordan	0.421	0.101	0.166	0.325	0.011	-0.074	13.2	French
JPN	Japan	0.982	0.645	0.057	0.953		1.361	35.9	German
KAZ	Kazakhstan	0.587	0.139	0.200	0.539		-0.436	38.3	Socialist
KEN	Kenya	0.557	0.268	0.168	0.790	0.729	-0.569		English
KGZ	Kyrgyz Republic	0.383	0.030	0.094	0.361	0.031	-0.737	36.3	Socialist
KHM	Cambodia	0.178	0.053	0.267	0.156	0.057	-0.732		Socialist
KOR	Korea, Rep.	0.949	0.553	0.177	0.924		0.768	26.5	German
KWT	Kuwait	0.798	0.266	0.165	0.748		-0.191	28.5	French
LAO	Lao PDR	0.291	0.180	0.086	0.133		-0.679		Socialist
LBN	Lebanon	0.448	0.212	0.166	0.331		-0.803	9.8	French
LBR	Liberia	0.216	0.109	0.075	0.276	0.208	-0.748		English
LBY	Libya	0.657	0.171	0.047	0.318		-1.887	10	French
LKA	Sri Lanka	0.736	0.288	0.148	0.472	0.024	-0.069		English
LSO	Lesotho	0.333	0.088	0.049	0.378	0.276	-0.263		English
LTU	Lithuania	0.829	0.340	0.133	0.776		0.965	29.9	Socialist
LUX	Luxembourg	0.988	0.616	0.213	0.983		1.699	31.1	French
LVA	Latvia	0.932	0.275	0.099	0.909		0.800	25.5	Socialist
MAR	Morocco	0.284	0.063	0.026	0.167	0.006	-0.261	12.3	French
MDA	Moldova	0.438	0.088	0.090	0.404		-0.416	17.6	Socialist
MDG	Madagascar	0.096	0.040	0.036	0.150	0.121	-0.698		French
MEX	Mexico	0.354	0.098	0.057	0.317	0.056	-0.259	12.4	French
MKD	Macedonia, FYR	0.766	0.173	0.131	0.658		-0.102	20.1	Socialist
MLI	Mali	0.182	0.061	0.063	0.310	0.244	-0.805	14.9	French
MLT	Malta	0.974	0.466	0.091	0.888		1.018	21.7	French
MMR	Myanmar	0.256	0.081	0.191	0.077	0.007	-0.826		Socialist
MNE	Montenegro	0.684	0.101	0.150	0.598		0.097	24.9	Civil law
MNG	Mongolia	0.930	0.193	0.289	0.853	0.219	0.042		Socialist
MOZ	Mozambique	0.330	0.108	0.050	0.341	0.219	-0.834		French
MRT	Mauritania	0.190	0.091	0.075	0.157	0.040	-0.749		French
MUS	Mauritius	0.895	0.244	0.101	0.685	0.056	0.797		French
MWI	Malawi	0.230	0.087	0.085	0.276	0.203	-0.475		English

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
MYS	Malaysia	0.851	0.378	0.123	0.704	0.109	0.317	8.5	English
NAM	Namibia	0.773	0.344	0.087	0.714	0.434	0.336		English
NER	Niger	0.095	0.019	0.028	0.130	0.087	-0.685		French
NGA	Nigeria	0.394	0.206	0.040	0.297	0.056	-1.042	15	English
NIC	Nicaragua	0.284	0.081	0.110	0.246	0.039	-0.582		French
NLD	Netherlands	0.996	0.593	0.121	0.977		1.678	66.1	French
NOR	Norway	0.997	0.793	0.350	0.991		1.777	73.7	Scandinavian
NPL	Nepal	0.454	0.171	0.134	0.163		-0.714		English
NZL	New Zealand	0.992	0.694	0.291	0.973		1.862	55.3	English
PAK	Pakistan	0.180	0.061	0.023	0.177	0.069	-1.024	22.2	English
PAN	Panama	0.458	0.145	0.083	0.350	0.035	0.170		French
PER	Peru	0.422	0.082	0.147	0.339	0.026	-0.075	8.4	French
PHL	Philippines	0.318	0.119	0.097	0.251	0.045	-0.348	3.2	French
POL	Poland	0.867	0.326	0.234	0.819		0.729	22.2	Socialist
PRT	Portugal	0.923	0.316	0.089	0.863		1.035	17.2	French
PRY	Paraguay	0.311	0.063	0.133	0.446	0.289	-0.407		French
PSE	West Bank and Gaza	0.250	0.060	0.052	0.142		-0.689		
ROU	Romania	0.576	0.136	0.149	0.472	0.030	0.263	7.7	Socialist
RUS	Russian Federation	0.758	0.135	0.139	0.705		-0.718	27.8	Socialist
RWA	Rwanda	0.367	0.189	0.077	0.389	0.311	-0.044	16.6	French
SAU	Saudi Arabia	0.717	0.143	0.112	0.612		-0.216	50.5	English
SEN	Senegal	0.204	0.073	0.066	0.395	0.318	-0.095		French
SGP	Singapore	0.978	0.669	0.156	0.901	0.095	1.605	37.3	English
SLE	Sierra Leone	0.124	0.052	0.043	0.156	0.110	-0.678		English
SLV	El Salvador	0.293	0.109	0.085	0.236	0.035	-0.223		French
SRB	Serbia	0.714	0.120	0.121	0.661		0.000	13.6	Civil
SSD	South Sudan	0.086	0.037	0.030	0.073		-2.011		English
SVK	Slovak Republic	0.842	0.499	0.195	0.815		0.725	12.6	Socialist
SVN	Slovenia	0.975	0.312	0.163	0.957		0.946	19.9	Socialist
SWE	Sweden	0.997	0.754	0.215	0.983		1.737	60.1	Scandinavian
TCD	Chad	0.088	0.025	0.028	0.190	0.152	-1.368		French
TGO	Togo	0.341	0.118	0.075	0.313	0.215	-0.647		French

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
THA	Thailand	0.810	0.388	0.152	0.623	0.083	-0.316	32.1	English
TJK	Tajikistan	0.470	0.113	0.147	0.439		-1.148		Socialist
TKM	Turkmenistan	0.406	0.048	0.068	0.343		-1.432		Socialist
TTO	Trinidad and Tobago	0.808	0.362	0.189	0.641		0.127	3.2	English
TUN	Tunisia	0.368	0.183	0.085	0.294	0.020	-0.275	15.5	French
TUR	Turkey	0.677	0.229	0.138	0.638	0.164	-0.463	11.6	French
TWN	Taiwan, China	0.942	0.669	0.045	0.771		1.102	30.3	German
TZA	Tanzania	0.210	0.061	0.053	0.430	0.385	-0.423	7.7	English
UGA	Uganda	0.328	0.127	0.137	0.547	0.506	-0.577	7.6	English
UKR	Ukraine	0.629	0.129	0.109	0.607		-0.740	23.1	Socialist
URY	Uruguay	0.639	0.118	0.183	0.593		0.862	13.8	French
USA	United States	0.931	0.622	0.289	0.911		1.246	34.8	English
UZB	Uzbekistan	0.371	0.023	0.021	0.342		-1.105	13.9	Socialist
VEN	Venezuela, RB	0.732	0.194	0.076	0.688	0.110	-1.507	15.8	French
VNM	Vietnam	0.300	0.145	0.206	0.227	0.035	-0.327	50.9	Socialist
XKX	Kosovo	0.523	0.087	0.103	0.386		-0.303	11.2	Civil
ZAF	South Africa	0.674	0.221	0.093	0.601	0.190	0.206	23.3	English
ZMB	Zambia	0.358	0.136	0.088	0.387	0.278	-0.335	10.8	English
ZWE	Zimbabwe	0.282	0.053	0.040	0.525	0.486	-1.217	8.3	English

TABLE A.3

Descriptive statistics

Variable	Observation	Mean	Std. Dev	Minimum	Maximum
Dependent variables					
ACCOUNT	144	0.614	0.267	0.086	0.999
SAVED	144	0.236	0.196	0.016	0.793
BORROWED	144	0.122	0.070	0.018	0.350
DIGITAL	144	0.538	0.283	0.073	0.994
MOBILE	77	0.146	0.145	0.003	0.729
Independent variables					
ENGLISH	139	0.259	0.440	0.000	1.000
FRENCH	139	0.439	0.498	0.000	1.000
GERMAN	139	0.043	0.204	0.000	1.000
OTHER	139	0.259	0.440	0.000	1.000
INSTITUTION	144	-0.032	0.910	-2.011	1.862
TRUST2	99	0.247	0.162	0.032	0.760
GDP	138	8.630	1.503	5.677	11.575
CREDIT	131	61.159	47.511	2.883	247.636
FINLIT	134	0.372	0.136	0.14	0.71
FUND	112	0.369	0.195	0.040	0.750
NEED	112	0.018	0.215	0.000	0.012
COST	112	0.179	0.115	0.010	0.480
FAR	112	0.127	0.095	0.000	0.470
DOC	112	0.138	0.097	0.000	0.460
DISTRUST	112	0.110	0.073	0.010	0.360
REILIGION	112	0.041	0.039	0.000	0.200
PHONE	142	17.524	16.500	0.000	60.395

TABLE A.4

Pairwise correlation matrix

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
[1] ACCOUNT	1																					
[2] SAVED	0.84	1																				
[3] BORROWED	0.56	0.54	1																			
[4] DIGITAL	0.94	0.84	0.55	1																		
[5] MOBILE	-0.03	0.09	-0.09	0.43	1																	
[6] ENGLISH	0.08	0.15	0.04	0.09	0.42	1																
[7] FRENCH	-0.32	-0.3	-0.29	-0.33	-0.24	-0.52	1															
[8] GERMAN	0.28	0.38	-0.01	0.29	.	-0.13	-0.19	1														
[9] OTHER	0.15	0.02	0.29	0.14	-0.22	-0.35	-0.52	-0.13	1													
[10] INSTITUTION	0.81	0.84	0.52	0.82	-0.01	0.09	-0.27	0.31	0.07	1												
[11] TRUST	0.52	0.66	0.36	0.54	-0.28	0.01	-0.32	0.2	0.23	0.56	1											
[12] GDP	0.87	0.78	0.51	0.84	-0.25	0	-0.18	0.27	0.09	0.84	0.54	1										
[13] CREDIT	0.68	0.7	0.33	0.63	-0.17	0.12	-0.2	0.3	-0.02	0.66	0.47	0.67	1									
[14] FINLIT	0.65	0.75	0.44	0.69	0.30	0.13	-0.24	0.17	0.35	0.06	0.61	0.68	0.46	1								
[15] FAR	-0.72	-0.48	-0.35	-0.62	0.07	-0.04	0.28	.	-0.28	-0.48	-0.2	-0.61	-0.36	-0.20	1							
[16] COST	-0.62	-0.53	-0.25	-0.5	-0.01	-0.17	0.43	.	-0.32	-0.3	-0.33	-0.34	-0.32	-0.22	0.77	1						
[17] DOC	-0.76	-0.63	-0.37	-0.63	0.12	-0.01	0.24	.	-0.26	-0.5	-0.3	-0.61	-0.44	-0.15	0.78	0.66	1					
[18] DISTRUST	-0.49	-0.49	-0.21	-0.39	-0.05	-0.26	0.29	.	-0.08	-0.35	-0.25	-0.25	-0.29	-0.17	0.59	0.82	0.52	1				
[19] RELIGION	-0.6	-0.48	-0.34	-0.56	-0.14	-0.11	0.34	.	-0.28	-0.4	-0.17	-0.44	-0.31	-0.28	0.6	0.53	0.56	0.49	1			
[20] FUND	-0.92	-0.68	-0.41	-0.79	0.14	-0.04	0.31	.	-0.32	-0.55	-0.21	-0.76	-0.52	-0.26	0.76	0.66	0.75	0.47	0.58	1		
[21] NEED	-0.1	-0.25	0.08	-0.13	-0.21	-0.24	-0.2	.	0.46	-0.09	0.23	0	-0.05	-0.12	-0.25	-0.22	-0.19	-0.08	-0.11	-0.07	1	
[22] PHONE	0.81	0.71	0.42	0.79	-0.27	-0.05	-0.17	0.39	0.07	0.72	0.35	0.81	0.61	0.56	-0.62	-0.43	-0.59	-0.23	-0.5	-0.72	0.11	1

TABLE A.5

Data description and sources

Variable	Short definition	Source
ACCOUNT	The percentage of respondents who reported having an account (by themselves or together with someone else) at a bank or another type of financial institution.	Global Findex Database (2017)
SAVED	The percentage of respondents who report saving or setting aside any money in the past 12 months by using an account at a bank or another type of financial institution.	Global Findex Database (2017)
BORROWED	The percentage of respondents who reported borrowing any money from a bank or another type of financial institution, or using a credit card, in the past 12 months.	Global Findex Database (2017)
DIGITAL	The percentage of respondents who reported using mobile money, a debit or credit card, or a mobile phone to make a payment from an account, or reported using the internet to pay bills or to buy something online, in the past 12 months. It also includes respondents who reported paying bills, sending or receiving remittances, receiving payments for agricultural products, receiving government transfers, receiving wages, or receiving a public sector pension directly from or into a financial institution account or through a mobile money account in the past 12 months.	Global Findex Database (2017)
MOBILE	The percentage of respondents who reported personally using a mobile money service in the past 12 months.	Global Findex Database (2017)
ENGLISH	Dummy=1, if English legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
FRENCH	Dummy=1, if French legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
GERMAN	Dummy=1, if German legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
OTHER	Dummy=1, if Scandinavian or Socialist legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
INSTITUTION	Unweighted averages of the six indices from WGIs	World Governance Indicators (2017)
TRUST	The share of respondents who select the answer 'Most people can be trusted.' to the question: 'Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?'	World Values Survey Wave 6: 2010-2014 World Values Survey Wave 5: 2005-2009 European Values Study Wave 4: 2008
GDP	GDP per capita (in log)	Global Financial Development Database (2017)
CREDIT	Private credit (% GDP)	Global Financial Development Database (2017)
EDUCATION	Average Years of Schooling (aged 15+)	Barro-Lee Educational Attainment Database (2010)
FINLIT	Proportion of people that answer at least three out four financial concepts correctly, including risk diversification, inflation, interest, and interest compounding.	S&P Global FinLit Survey (2015) https://gflec.org/initiatives/sp-global-finlit-survey/
ATM	Number of ATMs per 100,000 adults.	Financial Access Survey (2015)
BRANCH	Number of commercial bank branches per 100,000 adults.	Financial Access Survey (2015)
FUND	The percentage of respondents who report not having a financial institution account because they do not have enough money to use one (% age 15+).	Global Findex Database (2017)

Table A.5 (continued)

Variable	Short definition	Source
NEED	The percentage of respondents who report not having a financial institution account only because they have no need for formal financial services (% age 15+).	Global Findex Database (2017)
COST	The percentage of respondents who report not having a financial institution account because financial services are too expensive (% age 15+).	Global Findex Database (2017)
FAR	The percentage of respondents who report not having a financial institution account because financial institutions are too far away (% age 15+).	Global Findex Database (2017)
DOC	The percentage of respondents who report not having a financial institution account because they lack the documentation needed to open one, such as an identity card, a wage slip, or the like (% age 15+).	Global Findex Database (2017)
DISTRUST	The percentage of respondents who report not having a financial institution account because they do not trust financial institutions (% age 15+).	Global Findex Database (2017)
RELIGION	The percentage of respondents who report not having a financial institution account for religious reasons (% age 15+).	Global Findex Database (2017)
PHONE	Fixed telephone subscriptions (%)	World Development Indicators (2017)

TABLE A.6

Correlations between financial inclusion indicators

	[1]	[2]	[3]	[4]
[1] account	1			
[2] saving	0.84	1		
[3] borrowing	0.54	0.54	1	
[4] digital payments	0.97	0.84	0.55	1

TABLE A.7

Principal component analysis for financial inclusion indicators

Component	Eigenvalue	Proportion	Cumulative proportion
1	3.164	0.791	0.791
2	0.582	0.145	0.936
3	0.193	0.048	0.985

FIGURE A.1

Principal component analysis for financial inclusion indicators: eigenvalues

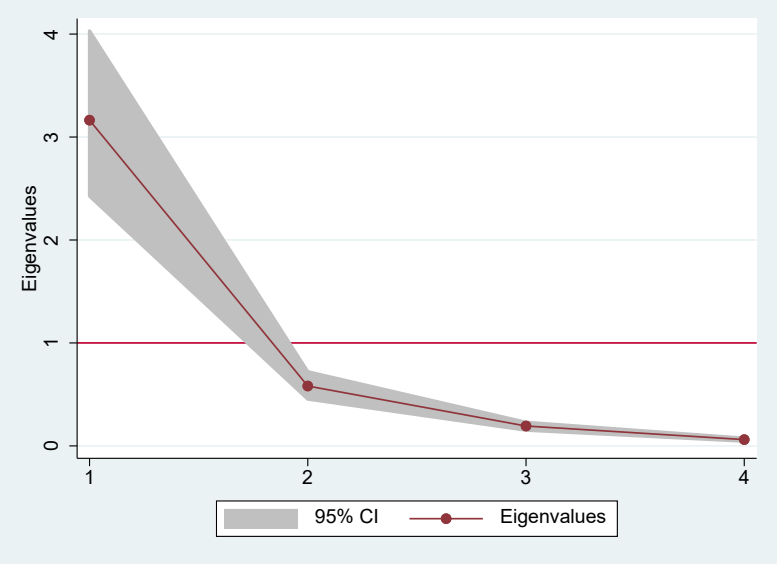


TABLE A.8

Correlations between Worldwide Governance Indicators

	[1]	[2]	[3]	[4]	[5]	[6]
[1] VOICE	1					
[2] POLITICAL	0.68	1				
[3] GOVERNMENT	0.75	0.76	1			
[4] REGQUALITY	0.8	0.72	0.94	1		
[5] LAW	0.79	0.76	0.96	0.95	1	
[6] CORRUPTION	0.78	0.74	0.93	0.92	0.96	1

TABLE A.9

Principal component analysis for World Governance Indicators

Component	Eigenvalue	Proportion	Cumulative proportion
1	5.170	0.862	0.862
2	0.363	0.061	0.922
3	0.309	0.052	0.974
4	0.084	0.014	0.988
5	0.045	0.008	0.995
6	0.028	0.005	1.000

FIGURE A.2

Principal component analysis for World Governance Indicators: eigenvalues

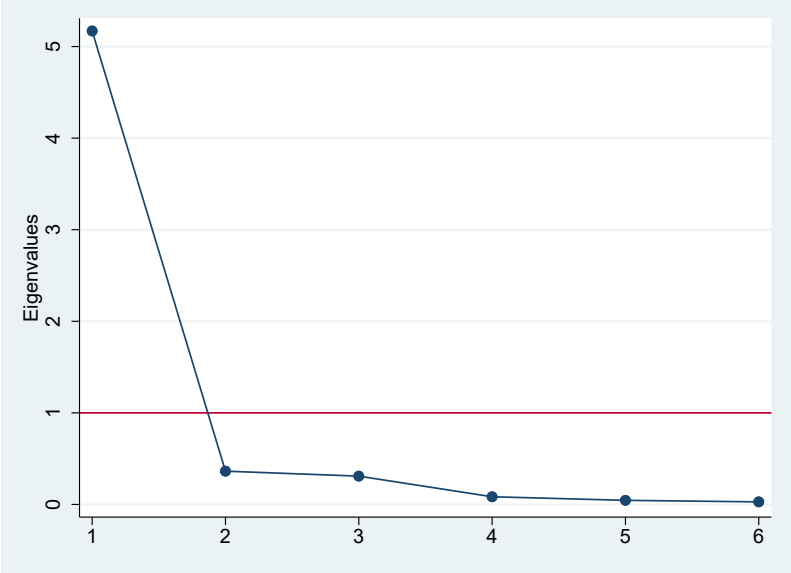
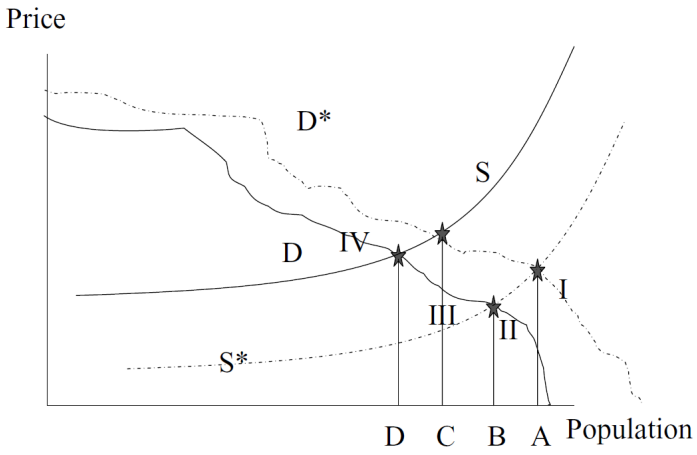


FIGURE A.3

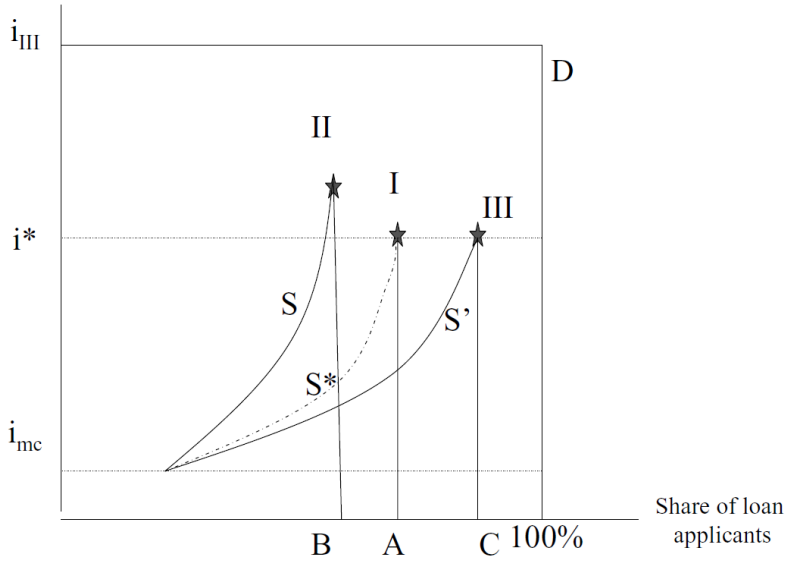
Access Possibilities Frontier for payment and savings services



Source: The Basic Analytics of Access to Financial Services (Beck and De La Torre, 2007, p.88)

FIGURE A.4

Access Possibilities Frontier for credit services



Source: The Basic Analytics of Access to Financial Services (Beck and De La Torre, 2007, p.103)

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Do Better Formal Institutions Promote Financial Inclusion?

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Abstract

This paper investigates the impact of formal institutions on financial inclusion. Our main argument is that the level of financial inclusion is jointly determined by the supply and demand of financial services, both of which are positively influenced by institutional quality. On the supply side, strong institutions strengthen rule of law, investor rights protection and contract enforceability, which incentivize financial institutions to offer more financial services. On the demand side, strong institutions reinforce people's trust on financial institutions and increases their willingness to make use of financial services. Results from cross-country regressions suggest a positive relationship between formal institutions and financial inclusion. This finding is robust to different measures for institutions and model specifications. Further, we find that the positive impact of formal institutions on financial inclusion is weakened as the degree of existing barriers to finance increases.

Key words: formal institutions, financial inclusion, financial barriers

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1. Introduction

A financial system is inclusive, if it offers financial products and services not only to those who have already accessed the financial system, but also those who were previously excluded from formal finance. Thus, financial inclusion captures the extent to which a financial system has developed to allow more individuals to access the financial system and use financial resources. By improving financial inclusion, those who largely live outside the mainstream financial system are able to finance prospective economic opportunities and improve their well-being. Therefore, financial inclusion is especially important for the disadvantaged groups and imposes an impact on economic growth, poverty and income inequality (Beck, Levine and Loayza, 2000; Beck, Demirgüç-Kunt and Levine, 2007).

Nevertheless, empirical evidence on what factors explain cross-country variations in financial inclusion is still scant, because country-level data on financial inclusion has not been accessible until recently. This paper aims to explore these questions using the latest release of the Global Findex Database (2017), which provides us with comprehensive information on how people make use of financial products and services across the globe.[1] Specifically, we revisit the law and finance literature and investigate whether formal institutions have a positive impact on financial inclusion with respect to use of formal account, savings, borrowing, and digital payments. A country is said to have a higher level of financial inclusion, if the percentage of adults who have used the above-mentioned financial products is higher.

Results from our cross-country regressions show that a country's legal tradition has a strong explanatory power on financial inclusion. In line with Levine, Loayza and Beck (2000), we find that countries with an English common law tradition have a higher level of financial inclusion, while financial inclusion is lower in French civil law countries. Moreover, our results suggest a strong positive relationship between formal institutions and financial inclusion. This finding is robust to different measures for institutions and model specifications. Further, we find that the impact of formal institutions on financial inclusion is conditional on the degree of financial barriers.[2] The positive impact of formal institutions on financial inclusion is weakened when the degree of barriers is high.

This paper is related to the literature on financial access, which captures the extent to which individuals have access to financial infrastructure, such as bank branches and ATM machines.[3] While having access to finance is a prerequisite for financial inclusion, it should be clearly distinguished from use of finance.

[1] Although the latest Global Findex Database (2017) provides with cross-country observations on financial inclusion in 2011, 2014 and 2017, the data remains highly unbalanced. For example, financial inclusion with respect to the use of digital payments and indicators of financial barriers do not exist in the 2011 and 2014 release. However, as we will explain later, the prevailing level of financial barriers is a very important determinant of financial inclusion and should be controlled for in the regression analysis. Therefore, we do not conduct rigorous statistical analysis in a panel setting in this study. Nevertheless, to explore the determinants of financial inclusion using panel data is definitely a direction for future research.

[2] As we will discuss later, financial barriers from the supply side include high transaction costs, physical barriers to financial infrastructure, requirement of documentation and collateral. On de demand side, financial barriers include financial illiteracy, lack of trust on financial institutions, lack of economic opportunities, and low income.

[3] See Claessens (2006) for an overview of this literature.

Access mainly captures the supply of a financial system, while use captures the ultimate uptake of financial services, which is a combined outcome of both the supply and demand of financial services. Hence, a high level of financial access does not necessarily imply a high level of financial usage. People who have access to financial resources may still choose not using finance due to various demand-side barriers, such as financial illiteracy, a lack of trust on financial institutions, and a low level of income.[4] Since the goal of financial inclusion is to allow more individuals, especially the poor, to improve their well-being by making use of financial resources, research on financial inclusion should also go beyond financial access. We provide the first empirical study at the country level that investigates the impact of formal institutions on the uptake of financial services.

This paper is also related to the literature on formal institutions and financial development.[5] While the literature has established a positive impact of formal institutions on financial development, it remains unclear whether the impact of formal institutions operates on the intensive or the extensive margin, i.e. whether strong institutions promote financial development, because more financial services have been offered to those who have already accessed the financial system, or because more formerly-excluded individuals have started to make use of financial services. This is a relevant research question, because it may well be possible that a financial system becomes large in size, but without being inclusive.[6] That is why many countries and international organizations have put promoting financial inclusion as one of their development goals.[7] Motivated by this, we explicitly examine whether formal institutions promote financial inclusion in this chapter. To the best of our knowledge, we are among the first to empirically test the theory of law and finance with a focus on financial inclusion.

The remainder of the chapter proceeds as follows. In Section 2, we review the literature. In Section 3, we discuss the methodology used in our empirical analysis and provide a description of the data set. Section 4 discusses the estimation results. The chapter concludes in Section 5.

2. Formal institutions, financial inclusion and the role of financial barriers

Financial inclusion captures the degree to which formal finance, such as bank accounts, savings, credit and payment services, is accessible to individuals, and the degree to which these financial services are

[4] For example, the Global Findex Database (2017) shows that while financial access, measured by formal account ownership, has increased to 69% in 2017 globally, only 38% of the account owners have saved formally.
[5] See Fergusson (2006) for an overview of this literature.
[6] For example, both the United Kingdom and the United States have a large financial system. However, in the UK 1.7 million adults still do not have a formal account. In the US, 109 million adults are non-prime; 53 million adults are "credit invisibles", i.e. they do not have any credit history from credit reporting companies; and there has been a total of 143 billion dollar credit reduction to the non-prime since 2008. Source: the House of Lords Select Committee on Financial Exclusion (2017), available at: https://publications.parliament.uk/pa/ld201617/ldselect/ldfinexcl/132/13202.htm; the Centre for the New Middle Class, Elevate, available at: https://www.elevate.com/who-we-help.html.
[7] For example, the leaders of the G20 nations have initiated the Financial Inclusion Action Plan, which aims at strengthening financial inclusion practices. See https://www.gpfi.org/.

being used. Thus, financial inclusion can be described from two dimensions: access to finance and use of finance. Specifically, access to finance refers to the outreach of financial infrastructure, such as bank branches and ATM machines, which capture the supply of financial services. Use of finance refers to the uptake of financial products and services, which is a combined outcome of both demand and supply of a financial system. As we have noted earlier, this paper looks at financial inclusion from the use dimension. A higher level of financial inclusion means a higher uptake of financial services.

Beck and De La Torre (2007) develop a theoretical model to explain the uptake of financial services.[8] To begin with, they define the *potential* demand and supply of payment and savings services. "Potential" means that the demand and supply are affected by the price of payment and savings services only, with no regard of other influential factors. Potential demand captures individuals' willingness to pay for the financial services at any given price, while potential supply captures the payment and savings services financial institutions are willing to offer at any given price that maximizes their profits. Potential demand and supply jointly determine the potential uptake of payment and savings services. However, the *actual* demand and supply may deviate from the potential demand and supply of payment and savings services. For example, the actual demand may be lower than the potential demand at any given price due to self-exclusion (which, as we will discuss later, arises from demand-side barriers, such as insufficient income, financial illiteracy, or a lack of trust on financial institutions). The actual supply may also be lower than the potential supply at any given price (for example, due to a lack of financial infrastructure). Consequently, the actual observed uptake of payment and savings services will be lower than the potential level.

Beck and De La Torre (2007) apply the same analytical framework to lending services by first defining the potential demand and potential supply of credit. Potential demand for credit represents individuals' willingness to borrow, while potential supply of credit reflects the willingness of financial institutions to offer credit services, both of which are assumed to be dependent on the lending rate only. However, the actual demand for credit may be lower than the potential demand at any given lending rate, due to self-exclusion that arises, for example, from cultural or religious reasons. The actual supply of credit may also be lower than the potential supply at any given lending rate due to the presence of asymmetric information (which we will discuss later). As a result, the actual, observed uptake of lending services will be less than the potential level.

The impact of formal institutions on financial inclusion can be illustrated by a shift of actual demand or supply curve in the model. Improvement in formal institutions, such as regulatory quality and control of corruption, may reinforce people's trust that financial institutions will responsibly keep their savings, and that making and receiving payments via financial institutions is safe and efficient. In this case, a higher level of trust generates additional demand for savings and payment services at any given price,

[8] See Figure A.3 and Figure A.4 for a graphical representation of this model developed by Beck and De La Torre (2007).

leading to increased uptake of these services. As to lending services, the law and finance theory suggests that strong legal institutions strengthen rule of law, investor rights protection and contract enforceability, which incentivizes financial institutions to offer more lending services, especially to individuals who were previously viewed as disqualified for credit under a weak institutional environment. Consequently, increased supply of credit, featured by an outward shift of the potential supply curve, leads to a higher level of uptake of lending services.

While, at any given price and lending rate, improved institutions shift the actual demand for savings and payment services and the actual supply of lending services outward, leading to an increased uptake that is closer to the potential level, actual demand and actual supply may, at the same time, be dragged by the presence of various demand-side and supply-side constraints.

On the *supply* side, the literature suggests that transaction costs and asymmetric information are the two main barriers to financial access.[9] First, transaction costs arise, because financial institutions developing, maintaining, and providing products and services generate costs. Take savings and payment services for example. At the client level, opening a savings account, offering deposits and withdrawals services, and processing payment requests incur costs. At the institution level, maintaining existing accounts, setting up new ATM machines or service points, and introducing innovative operating system also incur costs. Hence, high transaction costs will discourage financial institutions to offer services to potential clients, who lives in remote areas, and whose value of transaction is too small for financial institutions to stay profitable. In both cases, high transaction costs limit the supply of financial services.

Second, asymmetric information impedes access to credit.[10] Since financial institutions are not able to perfectly identify the credibility of potential borrowers, i.e. their risk of default, they tend to include a high-risk premium in the lending rate. However, charging a high lending rate may not effectively reduce credit risk. For one thing, a high lending rate may attract riskier borrowers, while the potentially "safe" borrowers are deterred away by the high cost of borrowing and fail to get credit, i.e. the adverse selection problem. For another, charging a high interest may incentivize borrowers, after getting credit, to deviate from what they have agreed with financial institutions and take more risk in their investments in pursuit of a higher return, i.e. the moral hazard problem. Consequently, financial institutions have to either set up additional requirements before they offer lending services, such as collateral and documentation, or

[9] Following the theories on the role of transaction costs in credit rationing (Stiglitz and Weiss, 1981) and financial development (Levine, 1997 and 2005), we interpret transaction costs as a supply-side factor of financial access. However, we acknowledge that transaction costs may also operate on the demand side. Since transaction costs ultimately translate into the price of financial services, high transaction costs weaken the affordability of getting serviced and reduce the demand for finance. Nevertheless, this negative demand-side effect of transaction cost on financial inclusion can be compensated for by a higher income level of individuals, which we later consider as a demand-side determinant of financial inclusion.

[10] Compared with lending services, the problem of information asymmetry is less pronounced in the provision of savings and payment services because they do not involve clients' debt repayment obligations.

they simply refuse to offer lending services in the first place. In both cases, information frictions lead to an insufficient supply of credit.

On the *demand* side, the literature suggests that financial illiteracy, a lack of trust on financial institutions, and insufficient income are the main demand-side barriers to formal finance.[11] First, good knowledge of finance allows individuals to better understand financial contracts and use financial resources to meet the need of their business or personal development. Therefore, improved financial literacy is expected to trigger additional demand for financial services. At the micro-level, Van Rooij, Lusardi and Alessi (2011) find that financial literacy is positively associated with stock market participation in the Netherlands. Drexler, Fisher and Schoar (2014) implement an impact analysis in the Dominican Republic. They find that financial training improves micro-entrepreneurs' financial practices, especially the less skillful ones. Berry, Kalan and Pradhan (2018) implement a randomized experiment in Ghana. They find that financial education raises children's savings at primary and junior high schools. At the country level, Grohmann, Klühs and Menkhoff (2018) show that financial literacy has a positive influence on financial inclusion with respect to account ownership, debit card ownership, use of formal savings and use of debit card.

Second, trust on financial institutions represents the degree to which individuals believe that financial institutions are reliable.[12] If the level of trust is low, individuals are less willing to use financial services. A typical example is the demand for savings products. Individuals are less likely to save if they do not trust that financial institutions will keep their savings safely, and that they can always get their savings back when necessary. On the contrary, a higher level of trust will incentivize individuals to use services provided by financial institutions. Guiso, Sapienza and Zingales (2004) show that in Italy a high level of social trust is associated with more stock investments and use of checks. This relationship is more significant among low-educated people, who are not able to read and understand financial contracts.

Third, it is expected that economic development increases the demand for finance. At the country level, economic development generates additional economic opportunities, which need the financial system to support. At the individual level, a higher level of income, as a result of economic development, means that financial services will become increasingly affordable, especially to those who were previously excluded from formal finance due to price impediments. As illustrated by Peachey and Roe (2004), the substantial increase in bank account ownership in most industrial countries in the past two decades can be attributed to the improvement of income and living standard, accompanied by more women entering

[11] According to Lusardi and Mitchell (2014, p.6) financial literacy refers to "people's ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions".
[12] Here, trust is viewed from the perspective of individuals as their assessment on how trustful financial institutions are. However, we acknowledge that trust can also be described from the perspective of financial institutions as the degree to which financial institutions trust the credibility of potential clients. By this definition, trust should be viewed as a supply-side factor. Financial institutions are more willing to offer lending services, if the trust between lenders and borrowers is strong that the expectation that contractual obligations can be fulfilled is high.

the labor force. On the contrary, weak economic development limits the need for finance and ultimately leads to a low level of financial usage.

The above discussion suggests that both supply-side and demand-side barriers impose a direct, negative impact on financial inclusion. Next to the direct impact, financial barriers also affect financial inclusion indirectly by dragging the positive impact of formal institutions on financial inclusion. The intuition is that even though improved institutions reinforce individuals' trust on financial institutions (such that they are more willing to save) and ameliorate asymmetric information problems (such that financial institutions are more willing to lend), its positive impact on promoting financial inclusion will still be weakened, for example, by the fact that potential clients are not sufficiently well-informed to make financial decisions due to a lack of financial knowledge, or that financial services are too costly for potential clients to afford due to high transaction costs, or that there is a lack of economic opportunities that create the need for finance.

Therefore, we derive the following hypothesis:

H1: There is a positive association between formal institutions and financial inclusion with respect to formal accounts, savings, borrowings, and payment services.

H2: The association between formal institutions and financial inclusion with respect to formal accounts, savings, borrowings, and payment services is conditional on the level of financial barriers.

3. Methodology and data

In order to test the relationship between formal institutions and financial inclusion, we adopt the following econometric model:

$$\text{INCLUSION}_i = \alpha + \beta_1 \text{INSTITUTION}_i + \beta_2 X_i + \varepsilon_i,$$

where INCLUSION refers to the level of financial inclusion, INSTITUTION refers to the level of formal institutions, X is a vector of control variables and ε is the white-noise error term.

Dependent variable

The dependent variable is INCLUSION, which, as noted earlier, is defined as the use (i.e. uptake) of financial products and services. Specifically, we use four indicators to measure the level of financial inclusion: 1) formal account ownership (ACCOUNT); 2) use of saving (SAVED); 3) use of borrowing

(BORROWED); and 4) use of digital payments (DIGITAL).[13] We collect the data of these financial inclusion variables from the Global Findex Database 2017.

As illustrated in Table A.4, ACCOUNT, SAVED, BORROWED and DIGITAL are highly correlated. One plausible reason is that having a formal account is the pre-requisite for formal saving, borrowing and payment services. Hence, we employ principal component analysis (PCA) to create an indicator that captures the common variation in these variables. The results of PCA are presented in Table A.6 and Figure A.1. The results suggest that the first principal component explains almost 80% of the variation in these four financial inclusion variables. The eigenvalue of the first principal component is 3.164, which is larger than one. We name the first principal component PINCLUSION and use it to measure the overall level of financial inclusion in our empirical analysis.

Explanatory variable

The key explanatory variable is INSTITUTION. Following the literature (La Porta et al., 1997, 1998; Levine, 1998; Levine, 1999; Law and Azman-Saini, 2012), formal institutions are measured in two ways. First, we collect information on legal origin from La Porta et al., (1998), La Porta et al., (1999), and Beck, Demirgüç-Kunt and Levine, (2003a). Specifically, we distinguish four legal families: 1) English common law (ENGLISH); 2) French civil law (FRENCH); 3) German civil law (GERMAN); and 4) other law families (OTHER), including Scandinavian civil law and Socialist law. According to the law and finance theory, we expect a country's legal tradition has a strong explanatory power on the level of financial inclusion.

Second, we use the Worldwide Governance Indicators (WGIs) constructed by Kaufmann, Kraay and Mastruzzi, (2011) to measure the quality of formal institutions. Specifically, these indicators are: 1) voice and accountability (VOICE); 2) political stability and absence of violence (POLITICAL); 3) government effectiveness (GOVERNMENT); 4) regulatory quality (REGQUALITY); 5) rule of law (LAW); and 6) control of corruption (CORRUPTION).[14] To measure the overall institutional quality, we follow Beck et al., (2007) and take the average of these six indicators, named as INSTITUTION. Alternatively, we follow Elkhuizen et al., (2018) and use principal component analysis to create an indicator that captures the common variation in these six indicators, since they are highly correlated

[13] Specifically, ACCOUNT refers to the percentage of respondents who reported having an account (by themselves or together with someone else) at a bank or another type of financial institution. SAVED refers to the percentage of respondents who report saving or setting aside any money in the past 12 months by using an account at a bank or another type of financial institution. BORROWED refers to the percentage of respondents who reported borrowing any money from a bank or another type of financial institution, or using a credit card, in the past 12 months. DIGITAL refers to percentage of respondents who reported using mobile money, a debit or credit card, or a mobile phone to make a payment from an account, or reported using the internet to pay bills or to buy something online, in the past 12 months. It also includes respondents who reported paying bills, sending or receiving remittances, receiving payments for agricultural products, receiving government transfers, receiving wages, or receiving a public sector pension directly from or into a financial institution account or through a mobile money account in the past 12 months.

[14] The six World Governance Indicators range approximately from -2.5 to + 2.5, with a higher value indicating a higher level of governance.

with each other as illustrated in Table A.7. The results of PCA are reported in Table A.8 and Figure A.2. The results suggest that the first principal component explains about 86% of the variation in the governance indicators. The eigenvalue for the first principal component is 5.17, which is larger than one. We name the first principal component PINSTITUTION and adopt it as an alternative measure for formal institutions in our robustness checks.

Control variables

We include several control variables captured in vector X, with respect to the level of economic and financial development, the level of infrastructure, and the level of financial barriers (as we have noted in Section 2).

First, we control for the level of economic development measured by GDP per capita (GDP). The intuition is that a higher level of per capita income makes financial products and services affordable to more individuals, which has a positive impact on financial inclusion. Second, we control for the level of financial development measured by credit-to-GDP ratio (CREDIT). We expect that more financial products and services will be available for individuals to choose and use as a financial system becomes larger. Therefore, financial inclusion is expected to be positively associated with the size of a financial system. We collect the data of GDP per capita and CREDIT from the Global Financial Development Database (2017).

Third, as suggested by Beck, Demirgüç-Kunt and Martinez (2008) we control for telecommunication infrastructure measured by the share of fixed telephone subscriptions per 100 people (PHONE). We expect that better telecommunication infrastructure facilitates the provision of financial products and services and positively impacts financial inclusion. Fourth, we also include an outreach indicator that captures the level of financial infrastructure. The idea is that having access to finance is a pre-requisite for being able to use finance. In other words, access to finance determines the possibility that financial products and services can be used. The chance of using financial resources is slim, when finance is not even accessible in the first place. In our empirical analysis, we use demographic ATMs penetration as a measure for financial access. Data of PHONE and ATM are collected from the World Development Indicators and the Global Financial Development Database (2017).

Finally, we take into account potential obstacles to financial inclusion. On the demand side, we control for the factors that may lead to self-exclusion from formal finance: 1) people do not have sufficient fund (FUND), which reflects the degree to which income blocks people from using finance; 2) people do not have need for financial services (NEED), which captures the degree to which people do not use formal finance because of a lack economic opportunities; 3) people lack trust in financial institutions (DISTRUST), which measures the degree to which people believe that financial institutions are not trustworthy; 4) cultural reasons (RELIGION), which describes the degree to which financial inclusion is hindered by religious considerations; and 5) level of financial literacy (FINLIT), which represents

the degree to which people have acquired basic financial knowledge.[15] On the supply side, we control for the factors that may contribute to a sub-optimal supply of financial services: 1) financial services are too expensive (COST), which measures the level of transaction costs involved financial services provision; 2) financial institutions are too far away (FAR), which captures the degree of physical barrier; and 3) people lack necessary documentation (DOC), which reflects asymmetric information in the financial system.[16] Data of these financial barrier variables are collected from the Global Findex Database (2017).

A first look at the data

We constructed a cross-country database that includes 144 countries.[17] Table 1 provides summary statistics on the financial inclusion indicators. From Table A.2, it can be seen that there is a large cross-country variation in financial inclusion. For example, account ownership is less than 10% in Madagascar, Niger, South Sudan and Chad, while that exceeds 95% in countries, such as Australia, Germany, Japan, Norway and Singapore. Institutional quality also varies considerably across countries. For instance, formal institutions are weak in Afghanistan, Central African Republic, Democratic Republic of the Congo and Libya with an overall score less than -1.5. However, the score is much larger (>1.5) in Canada, Switzerland, Netherlands, New Zealand and Sweden. Overall, the dataset exhibits large variations in the variables of interest, which allows us to investigate the relationship between financial inclusion and institutions in a cross-country setting.

Figure 1 depicts the level of financial inclusion across different legal tradition families. In general, financial inclusion is highest in countries with a German legal tradition where the share of people who have owned a financial account, saved and used digital products is larger than that in countries with the other legal origins. In contrast, French civil law countries have the least development in financial inclusion. Figure 2 shows that account ownership and use of saving, borrowing and digital products are higher in economically developed countries. Figure 3 suggests that there is a positive correlation between financial inclusion and institutions. In general, financial inclusion is higher in countries with

[15] Following the Global Findex Database (2017), FUND refers to the percentage of respondents who report not having a financial institution account because they do not have enough money to use one. NEED refers to the percentage of respondents who report not having a financial institution account only because they have no need for formal financial services. DISTRUST refers to the percentage of respondents who report not having a financial institution account because they do not trust financial institutions. RELIGION refers to the percentage of respondents who report not having a financial institution account for religious reasons. Following Klapper, Lusardi and van Oudheusden (2015), FINLIT refers to the proportion of people that answer at least three out four financial concepts correctly from The Standard & Poor's Ratings Services Global Financial Literacy Survey, including risk diversification, inflation, interest, and interest compounding.

[16] Following the Global Findex Database (2017), COST refers to the percentage of respondents who report not having a financial institution account because financial services are too expensive. FAR refers to the percentage of respondents who report not having a financial institution account because financial institutions are too far away. DOC refers to the percentage of respondents who report not having a financial institution account because they lack the documentation needed to open one, such as an identity card, a wage slip, or the like.

[17] Countries included in our sample are summarized in Table A.1. The data are listed in Table A.2. Table A.3 provides descriptive statistics for the variables we use in our empirical model. Table A.4 shows the correlations between these variables. Definition and source of the variables are presented in Table A.5.

stronger formal institutions. Figure 4 illustrates seven barriers to financial inclusion cited by the 2017 Global Findex survey. It seems that, globally, not having sufficient fund is the main reason why some people still remain unbanked, that is why they do not have an account at a formal financial institution. Only about 2% of respondent on average believe that they do not have an account because they do not have the need for financial services.

4. Results

Formal institutions and financial inclusion

As a starting point, we investigate whether legal origins explain cross-country differences in financial inclusion, using the specification suggested by Levine et al., (2000). Table 2 presents the regressions of financial inclusion indicators on legal dummy variables, namely French civil law, German civil law, and the other legal traditions (Scandinavian and Socialist law system). Our reference group is countries with English common law tradition. The results show that the coefficients of FRENCH are negative and statistically significant in all specifications. This suggests that financial inclusion is less developed in countries with a French civil law tradition compared with English common law counterparts. In contrast, the coefficients of GERMAN are all positive and significant at 1% level, except for specification (5). Compared with English common law countries, German civil law countries tend to have a higher level of financial inclusion.

In Table 3, we perform regressions using the same specifications as in Table 2, but controlling for GDP per capita. We find that the coefficients of FRENCH remain negative and highly significant. In addition, income turns out to be an important determinant of financial inclusion. The coefficients of determination increase significantly after GDP per capita is introduced into our models. Specifically, we find a strong positive relationship between financial inclusion and GDP per capita, suggesting that account ownership and use of saving, borrowing and digital payments are higher in economically advanced countries.

Overall, our findings are consistent with the law-finance literature, which suggests that legal tradition has a strong explanatory power on financial development. Moreover, we complement the literature by showing that legal tradition is a key determinant of financial development with respect to not only the size of financial intermediation, but also the inclusiveness of a financial system.

Next, we examine how financial inclusion is associated with formal institutions. Estimation results are presented in Table 4.[18] In all specifications, INSTITUTION has a positive and significant coefficient.

[18] As robustness checks, we regress the financial inclusion indicators on the quality of formal institutions indicated by the first principal components of the six Worldwide Governance Indicators. Since our robustness checks yield highly consistent results, estimation results are not reported in the main text.

It implies a strong positive relationship between financial inclusion and the quality of formal institutions. Better formal institutions tend to promote financial inclusion. Moreover, GDP per capita and outreach of financial infrastructure are important for financial inclusion. Specifically, account ownership, use of digital products, and the overall level of financial inclusion are positively related to the level of income and demographic ATMs penetration. Besides, in line with our previous finding, countries with French legal tradition have less development in financial inclusion compared with countries with English law system, except for the use of borrowing.

Formal institutions, financial inclusion and the role of financial barriers

As discussed in Section 2, financial inclusion, i.e. the observed uptake of financial products and services, is a combined outcome of both supply and demand of formal finance. Therefore, we take one step further by taking into account the role of financial barriers, when it comes to the impact of formal institutions on financial inclusion. Specifically, we run the same regressions as before, but include financial barrier variables as additional control variables. On the demand side, we take into account the following five barriers: 1) insufficient income (people do not have sufficient fund); 2) a lack of economic opportunities (people do not have need for financial services); 3) distrust (people lack trust in financial institutions; 4) culture (people do not have a formal account due to religious reasons); and 5) financial illiteracy (people lack sufficient financial knowledge). On the supply side, we control for the following three barriers: 1) transaction costs (financial services are too expensive); 2) physical access barrier (financial institutions are too far away); and 3) asymmetric information (people lack necessary documentation).

Estimation results are presented in Table 5-9. First, we find that the coefficients of INSTITUTION remain positive and highly significant in all specifications, except for column (1) and (5) in Table 8 with respect to use of borrowing. These consistent results suggest that formal institutions have a positive and significant impact on financial inclusion even after the impact of financial barriers has been taken into account. Second, we find a strong, direct relationship between financial barriers and financial inclusion.[19] On the demand side, insufficient income, a lack of economic opportunities, a lack of trust in financial institutions, cultural considerations, and financial illiteracy tend to drag the level financial inclusion.[20] On the supply side, high transaction costs, inadequate physical access, and asymmetric information adversely impact financial inclusion. The coefficients of the supply-side financial barrier variables have the expected signs and are highly significant in most regressions, except for borrowing.

Furthermore, we extend our analysis and investigate how financial barriers may moderate the impact of formal institutions on financial inclusion. The intuition is that the positive impact of formal

[19] The overall explanatory power of formal institutions and financial barriers on the use of borrowing is weak.
[20] Exceptions are: 1) financial illiteracy does not explain formal account ownership (Column 5 from Table 5); and 2) a lack of economic opportunities does not explain overall level of financial inclusion (Column 2 from Table 9).

institutions on financial inclusion is conditional on the prevailing level of financial barriers, which lead to voluntary exclusion from using finance or a sub-optimal provision of financial services. To this end, we interact INSTITUTION with each of the eight financial barrier variables. We include these interaction terms as additional control variables and run the same regressions as before. Particularly, we are interested in the coefficients of INSTITUTION and the coefficients of the interaction terms in the regressions.

Table 10-14 present the estimation results. Consistent with our analysis thus far, the level of financial inclusion is positively associated with the level of formal institutions (except for column 5 from Table 14) and negatively associated with the prevailing level of financial barriers.[21] In addition, our evidence suggests that most financial barrier variables impose a negative moderating effect on the relationship between formal institutions and financial inclusion. That is, the positive impact of formal institutions on financial inclusion becomes weak as the degree of financial barriers increases, which is captured by the negative and significant coefficients before the interaction variables in our regressions (except for the interaction between formal institutions and financial literacy, which we expect a positive sign, since the higher the level of financial literacy, the lower the level of financial barrier).[22]

Summary of the results

First, our empirical evidence shows that formal institutions, measured by the average score of the six Worldwide Governance Indicators, have a strong, positive impact on financial inclusion with respect to account ownership, use of saving, borrowing and digital payments services. This result is consistently found under different model specification, which confirms our first hypothesis. Besides, the result also confirms the theoretical prediction of the law-finance literature that formal institutions are important determinant for financial development. Our contribution is that we look at financial development from the dimension of financial inclusion, rather than financial depth.

Second, we find that financial barriers, from both the demand and the supply side, have a direct negative impact on financial inclusion. Our explanation is that these barriers drag the demand and the supply of financial services, leading to a lower equilibrium level of uptake, i.e. financial inclusion as is defined in this paper. Next to this direct effect, our evidence further shows that financial barriers exert an indirect impact on financial inclusion by moderating the positive relationship between formal institutions and financial inclusion. The positive impact of formal institutions on financial inclusion is weakened by the prevailing level of financial barriers.

[21] Again, the overall explanatory power of formal institutions and financial barriers on the use of borrowing is weak. Besides, we find exceptions that financial illiteracy does not explain formal account ownership (Column 5 from Table 10); 2) a lack of economic opportunities does not explain the use of formal saving, digital payments and the overall level of financial inclusion (Column 2 from Table 11, 12, and 14).

[22] We do not find a moderating effect 1) for a lack of economic opportunities and financial illiteracy on account ownership and the use of digital payments (Column 2 and 5 from Table 10 and Table 12); 2) for a lack of economic opportunities and physical access barrier on formal saving and overall level of financial inclusion (Column 2 and 7 from Table 11 and 14).

5. Conclusion

In this paper, we investigate the impact of institutions on financial inclusion. Using the recent edition of the Global Findex Database, we contribute to the literature by directly linking institutions to financial inclusion rather than financial depth as a traditional measure for financial development. Moreover, we measure financial inclusion as the actual uptake of financial service rather than financial access. Our motivation is that financial inclusion not only concerns the supply of a financial system, i.e. accessibility of financial resources, but also the demand for financial services. To our knowledge, this paper is the first attempt at analyzing institutional determinants of financial inclusion based on indicators from the Global Findex Database.

To perform empirical analysis, we construct a cross-country data that provides information on how people use of formal accounts, saving, borrowing and digital payments across 144 countries. First, we find that a country's legal tradition explains financial inclusion. Our results suggest that countries with a French legal tradition tend to have a lower level of financial inclusion compared with English common law counterparts. Second, there is a strong positive relationship between formal institutions and financial inclusion. Institutional quality is not only important for increasing the size of financial system, but also the use of financial services. Third, we find that the positive impact of formal institutions on financial inclusion is weakened by the prevailing level of financial barriers. One policy implication is that promoting financial inclusion not only needs an improvement in the institutional environment, but also an endeavor to reduce the degree of financial barriers that may lead to voluntary exclusion from formal finance or a sub-optimal provision of financial services.

One limitation of this paper is the potential endogeneity in the key explanatory variable of our interest INSTITUTION. We expect that country-specific characteristics, which are captured by the error term, also explain cross-country differences in financial inclusion. Therefore, future research may extend our analysis by introducing an appropriate instrument variable for INSTITUTION and test its impact on financial inclusion. Moreover, our data does not allow us to control for these time-invariant fixed effects using panel estimations. While it still takes time before we are able to explore a longer data series on financial inclusion, investigating the impact of institutions on financial inclusion in a panel setting is definitely a direction for future research.

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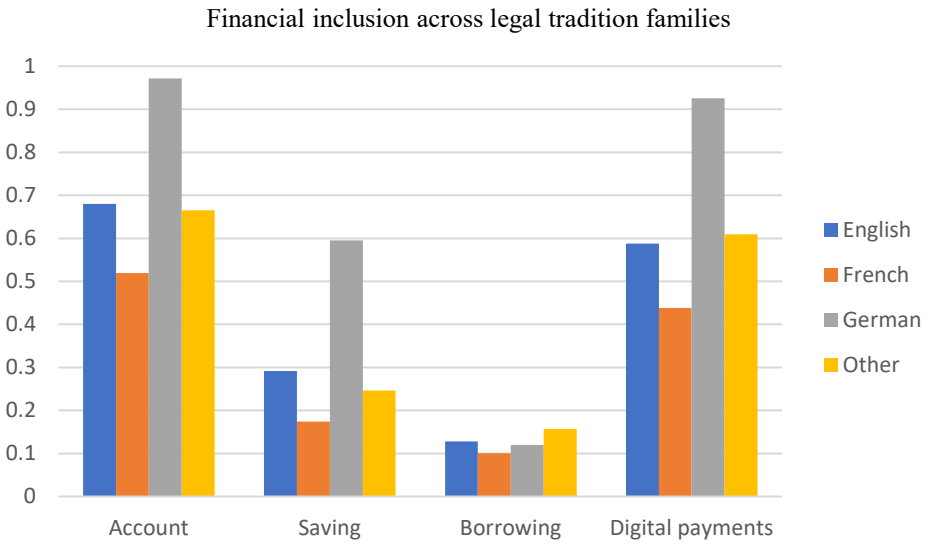
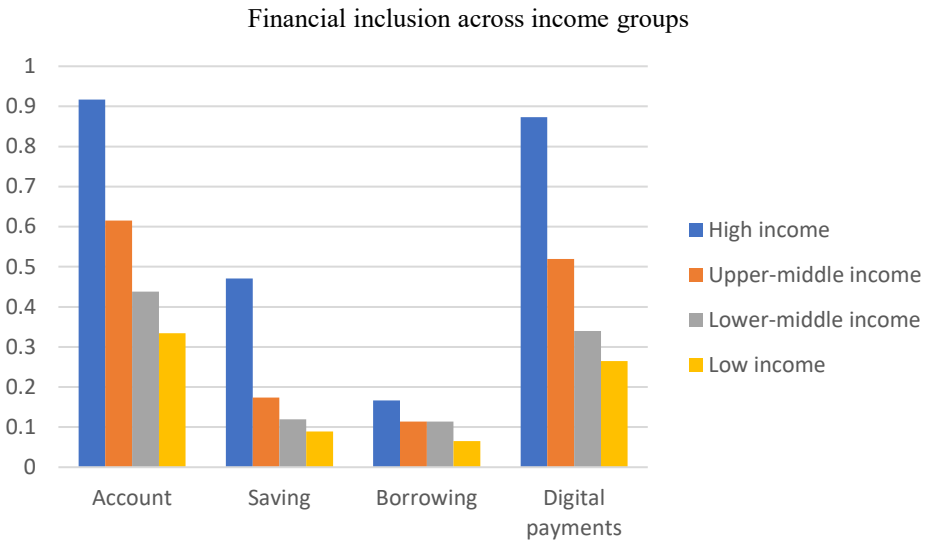
FIGURE 1



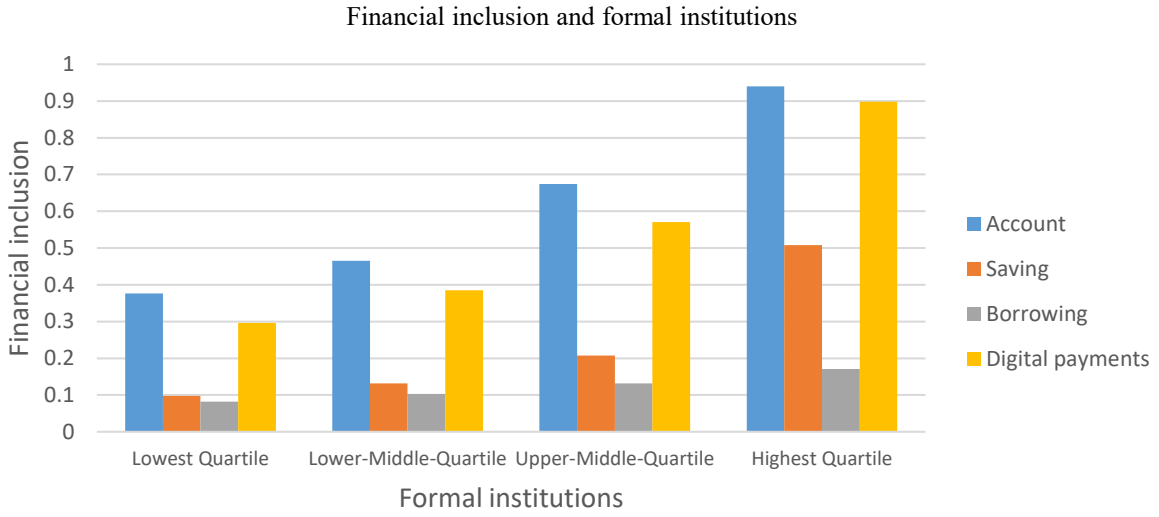
Note: The figure illustrates the average level of financial inclusion (account ownership, use of saving, borrowing, and digital payments) by legal family in the sample.

FIGURE 2



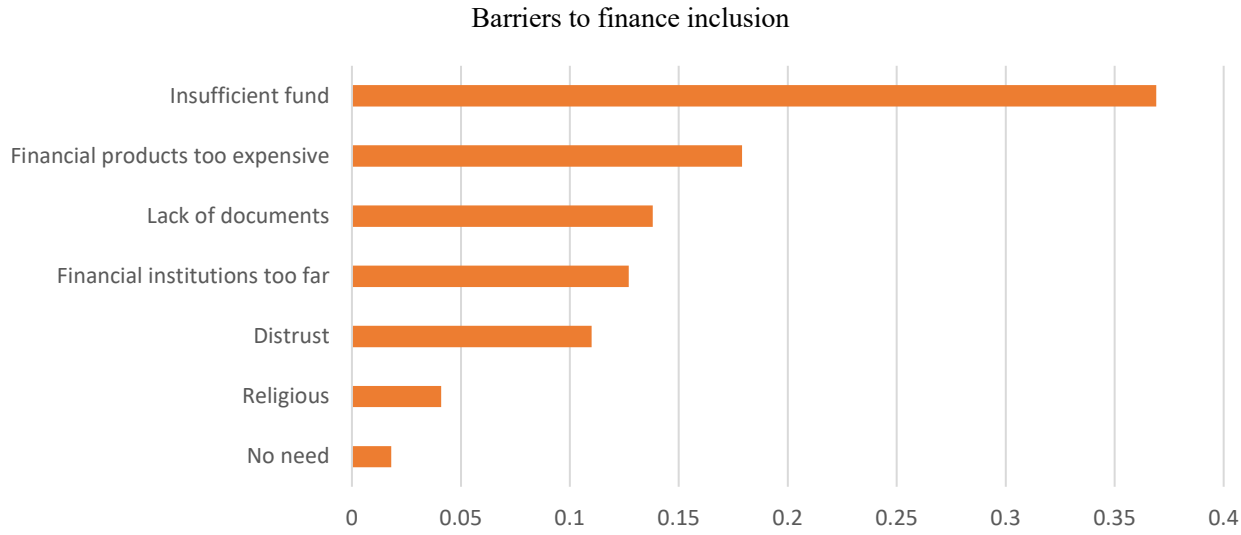
Note: The figure illustrates the average level of financial inclusion (account ownership, use of saving, borrowing, and digital payments) by income group in the sample.

FIGURE 3



Note: The figure illustrates the average level of financial inclusion (account ownership, use of saving, borrowing, and digital payments) by institution quartile in the sample.

FIGURE 4



Note: The figure illustrates the average level of financial barriers in the sample.

TABLE 1

Summary statistics

	Financial inclusion indicators				
	Account ownership	Use of saving	Digital payments	Use of borrowing	Mobile money
Mean	0.614	0.236	0.538	0.122	0.146
Median	0.586	0.154	0.483	0.109	0.095
Maximum	0.999	0.793	0.994	0.35	0.729
Minimum	0.086	0.016	0.073	0.018	0.003
Std. Dev	0.267	0.196	0.283	0.07	0.145
Observation	144	144	144	144	77

TABLE 2

Financial inclusion and legal origins

	(1) Account ownership	(2) Use of saving	(3) Digital payments	(4) Use of borrowing	(5) Inclusion (PCA)
FRENCH	-0.145**	-0.118***	-0.150***	-0.028*	-1.017***
	(0.062)	(0.040)	(0.057)	(0.015)	(0.379)
GERMAN	0.347***	0.304***	0.337***	-0.008	2.021***
	(0.051)	(0.040)	(0.055)	(0.027)	(0.350)
OTHER	0.038	-0.045	0.022	0.029	0.158
	(0.066)	(0.049)	(0.065)	(0.018)	(0.423)
Constant	0.624***	0.292***	0.588***	0.128***	0.356
	(0.051)	(0.035)	(0.046)	(0.013)	(0.324)
Observations	139	139	139	139	139
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000
R-squared	0.155	0.208	0.160	0.109	0.169

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 3

Financial inclusion and legal origins

	(1) Account ownership	(2) Use of saving	(3) Digital payments	(4) Use of borrowing	(5) Inclusion (PCA)
FRENCH	-0.121***	-0.096***	-0.124***	-0.024**	-0.845***
	(0.028)	(0.024)	(0.030)	(0.012)	(0.183)
GERMAN	0.003	0.083**	0.045	-0.043	0.058
	(0.029)	(0.034)	(0.029)	(0.029)	(0.272)
OTHER	-0.012	-0.073**	-0.025	0.021	-0.140
	(0.031)	(0.028)	(0.034)	(0.016)	(0.204)
GDP	0.162***	0.096***	0.149***	0.023***	0.960***
	(0.007)	(0.008)	(0.008)	(0.003)	(0.050)
Constant	-0.758***	-0.533***	-0.687***	-0.066**	-7.858***
	(0.066)	(0.066)	(0.080)	(0.028)	(0.443)
Observations	133	133	133	133	133
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000
R-squared	0.797	0.677	0.751	0.334	0.777

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 4

Financial inclusion and formal institutions

	(1) Account ownership	(2) Use of saving	(3) Digital payments	(4) Use of borrowing	(5) Inclusion (PCA)
INSTITUTION	0.099***	0.121***	0.154***	0.026**	0.937***
	(0.024)	(0.021)	(0.024)	(0.010)	(0.137)
CREDIT	0.000	0.001	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
GDP	0.070***	0.033**	0.039**	0.009	0.341***
	(0.015)	(0.013)	(0.017)	(0.007)	(0.092)
ATM	0.001***	-0.000	0.001***	0.000**	0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
PHONE	0.003*	0.000	0.003*	-0.001	0.004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)
FRENCH	-0.103***	-0.055**	-0.083***	-0.009	-0.542***
	(0.029)	(0.023)	(0.030)	(0.013)	(0.177)
GERMAN	-0.156***	0.049	-0.095***	-0.042	-0.573**
	(0.042)	(0.038)	(0.034)	(0.030)	(0.266)
OTHER	-0.001	-0.032	0.008	0.039**	0.152
	(0.034)	(0.026)	(0.035)	(0.019)	(0.194)
Constant	-0.096	-0.055	0.145	0.039	-3.225***
	(0.126)	(0.095)	(0.141)	(0.055)	(0.732)
Observations	116	116	116	116	116
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000
R-squared	0.856	0.793	0.832	0.360	0.857

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 5

Account ownership and formal institutions

	(1) Account ownership	(2) Account ownership	(3) Account ownership	(4) Account ownership	(5) Account ownership	(6) Account ownership	(7) Account ownership	(8) Account ownership
INSTITUTION	0.057**	0.107***	0.080***	0.098***	0.116***	0.091***	0.093***	0.099***
	(0.023)	(0.026)	(0.021)	(0.023)	(0.030)	(0.021)	(0.025)	(0.023)
CREDIT	0.000	0.001*	0.001	0.001*	0.000	0.000	0.001**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.008	0.038**	0.040***	0.039**	0.069***	0.047***	0.027*	0.031**
	(0.014)	(0.019)	(0.014)	(0.016)	(0.017)	(0.013)	(0.015)	(0.015)
ATM	0.001	0.002***	0.002***	0.001***	0.001**	0.002***	0.002***	0.001***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.001	0.005***	0.005***	0.003*	0.002	0.002*	0.003	0.003*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
FUND	-0.855***							
	(0.097)							
NEED		-1.190**						
		(0.545)						
DISTRUST			-0.924***					
			(0.161)					
RELIGION				-1.454***				
				(0.355)				
FINLIT					-0.016			
					(0.134)			
COST						-0.695***		
						(0.099)		
FAR							-0.734***	
							(0.163)	
DOC								-0.940***
								(0.153)
Constant	0.698***	0.064	0.134	0.129	-0.120	0.145	0.253**	0.290**
	(0.130)	(0.141)	(0.112)	(0.128)	(0.130)	(0.104)	(0.127)	(0.125)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.901	0.753	0.817	0.786	0.822	0.841	0.792	0.823

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 6

Use of saving and formal institutions

	(1) Saving	(2) Saving	(3) Saving	(4) Saving	(5) Saving	(6) Saving	(7) Saving	(8) Saving
INSTITUTION	0.045**	0.068***	0.057***	0.065***	0.097***	0.062***	0.066***	0.065***
	(0.018)	(0.022)	(0.019)	(0.020)	(0.021)	(0.018)	(0.020)	(0.018)
CREDIT	0.000	0.000	0.000	0.000	0.001**	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.011	0.025*	0.026**	0.026**	0.011	0.030**	0.022*	0.021*
	(0.011)	(0.013)	(0.012)	(0.012)	(0.011)	(0.012)	(0.012)	(0.011)
ATM	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.004***	-0.002	-0.002	-0.003*	-0.001	-0.003**	-0.003*	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
FUND	-0.417***							
	(0.065)							
NEED		-0.713**						
		(0.324)						
DISTRUST			-0.428***					
			(0.114)					
RELIGION				-0.732***				
				(0.193)				
FINLIT					0.401***			
					(0.089)			
COST						-0.339***		
						(0.063)		
FAR							-0.272***	
							(0.088)	
DOC								-0.508***
								(0.091)
Constant	0.272***	-0.035	-0.006	-0.005	-0.078	0.002	0.030	0.086
	(0.087)	(0.090)	(0.081)	(0.080)	(0.089)	(0.077)	(0.083)	(0.072)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.648	0.472	0.535	0.510	0.804	0.574	0.489	0.574

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 7

Use of digital payments and formal institutions

	(1) Digital payments	(2) Digital payments	(3) Digital payments	(4) Digital payments	(5) Digital payments	(6) Digital payments	(7) Digital payments	(8) Digital payments
INSTITUTION	0.108***	0.132***	0.119***	0.128***	0.133***	0.128***	0.132***	0.132***
	(0.026)	(0.027)	(0.026)	(0.026)	(0.030)	(0.026)	(0.028)	(0.025)
CREDIT	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.009	0.009	0.011	0.010	0.026	0.015	0.004	0.005
	(0.021)	(0.021)	(0.019)	(0.020)	(0.018)	(0.019)	(0.019)	(0.019)
ATM	0.001	0.001***	0.002***	0.001***	0.001***	0.001***	0.001***	0.001**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.002	0.005***	0.004***	0.003*	0.002	0.003*	0.003*	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
FUND	-0.518***							
	(0.135)							
NEED		-1.279**						
		(0.556)						
DISTRUST			-0.628***					
			(0.164)					
RELIGION				-1.241***				
				(0.357)				
FINLIT					0.353**			
					(0.161)			
COST						-0.433***		
						(0.124)		
FAR							-0.378**	
							(0.171)	
DOC								-0.641***
								(0.153)
Constant	0.672***	0.299*	0.337**	0.349**	0.082	0.339**	0.383**	0.443***
	(0.192)	(0.159)	(0.140)	(0.155)	(0.131)	(0.143)	(0.148)	(0.156)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.719	0.659	0.688	0.685	0.822	0.694	0.661	0.693

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 8

Use of borrowing and formal institutions

	(1) Borrowing	(2) Borrowing	(3) Borrowing	(4) Borrowing	(5) Borrowing	(6) Borrowing	(7) Borrowing	(8) Borrowing
INSTITUTION	0.019	0.029**	0.021*	0.019*	0.020	0.022*	0.020*	0.022*
	(0.012)	(0.012)	(0.012)	(0.011)	(0.013)	(0.012)	(0.012)	(0.012)
CREDIT	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.003	-0.000	-0.001	-0.001	0.005	-0.000	-0.002	-0.001
	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ATM	0.000*	0.000**	0.001**	0.000**	0.000***	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.000	-0.000	-0.000	-0.000	-0.001*	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FUND	-0.067							
	(0.050)							
NEED		0.524						
		(0.371)						
DISTRUST			-0.066					
			(0.066)					
RELIGION				-0.321*				
				(0.180)				
FINLIT					0.106			
					(0.081)			
COST						-0.051		
						(0.044)		
FAR							-0.100	
							(0.067)	
DOC								-0.072
								(0.079)
Constant	0.159**	0.097	0.114*	0.127**	0.041	0.115*	0.137**	0.127**
	(0.064)	(0.063)	(0.063)	(0.060)	(0.068)	(0.062)	(0.061)	(0.062)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.002
R-squared	0.181	0.196	0.171	0.199	0.261	0.174	0.180	0.173

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 9

Financial inclusion (1st principal component) and formal institutions

	(1) Financial inclusion	(2) Financial inclusion	(3) Financial inclusion	(4) Financial inclusion	(5) Financial inclusion	(6) Financial inclusion	(7) Financial inclusion	(8) Financial inclusion
INSTITUTION	0.537***	0.790***	0.640***	0.701***	0.834***	0.696***	0.710***	0.729***
	(0.143)	(0.171)	(0.143)	(0.137)	(0.156)	(0.141)	(0.153)	(0.141)
CREDIT	0.001	0.003	0.002	0.002	0.003	0.001	0.003	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GDP	0.008	0.151	0.160*	0.152	0.234**	0.191**	0.102	0.112
	(0.087)	(0.114)	(0.096)	(0.097)	(0.098)	(0.093)	(0.098)	(0.096)
ATM	0.005	0.010***	0.010***	0.008***	0.008***	0.009***	0.009***	0.007***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
PHONE	-0.006	0.014	0.011	0.002	-0.001	0.001	0.002	0.002
	(0.009)	(0.013)	(0.010)	(0.011)	(0.009)	(0.010)	(0.013)	(0.011)
FUND	-4.022***							
	(0.626)							
NEED		-3.448						
		(3.643)						
DISTRUST			-4.375***					
			(0.863)					
RELIGION				-8.767***				
				(1.756)				
FINLIT					2.300***			
					(0.813)			
COST						-3.271***		
						(0.598)		
FAR							-3.348***	
							(0.908)	
DOC								-4.678***
								(0.809)
Constant	0.772	-2.251***	-1.877***	-1.786**	-3.431***	-1.826***	-1.351*	-1.079
	(0.755)	(0.824)	(0.689)	(0.702)	(0.728)	(0.645)	(0.712)	(0.724)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.803	0.671	0.731	0.728	0.841	0.751	0.707	0.744

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 10

Account ownership, formal institutions and financial barriers (OLS)

	(1) Account ownership	(2) Account ownership	(3) Account ownership	(4) Account ownership	(5) Account ownership	(6) Account ownership	(7) Account ownership	(8) Account ownership
INSTITUTION	0.100***	0.132***	0.134***	0.128***	0.148***	0.132***	0.130***	0.143***
	(0.030)	(0.041)	(0.033)	(0.032)	(0.043)	(0.031)	(0.035)	(0.033)
CREDIT	0.000	0.001*	0.001	0.001*	0.000	0.000	0.001**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.004	0.035*	0.036**	0.037**	0.070***	0.043***	0.025	0.026*
	(0.012)	(0.019)	(0.015)	(0.016)	(0.017)	(0.013)	(0.015)	(0.015)
ATM	0.001	0.002***	0.002***	0.002***	0.001**	0.002***	0.002***	0.001***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.001	0.005***	0.004***	0.003	0.002	0.002	0.002	0.003
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
FUND	-0.908***							
	(0.092)							
INS×FUND	-0.138*							
	(0.071)							
NEED		-1.685**						
		(0.779)						
INS×NEED		-1.424						
		(1.609)						
DISTRUST			-1.123***					
			(0.193)					
INS×DISTRUST			-0.528**					
			(0.238)					
RELIGION				-1.879***				
				(0.424)				
INS×RELIGION				-0.778**				
				(0.372)				
FINLIT					0.020			
					(0.149)			
INS×FINLIT					-0.078			
					(0.081)			
COST						-0.788***		
						(0.099)		
INS×COST						-0.267*		
						(0.136)		
FAR							-0.946***	
							(0.208)	
INS×FAR							-0.391*	
							(0.203)	
DOC								-1.147***
								(0.183)
INS×DOC								-0.424*
								(0.220)
Constant	0.737***	0.091	0.178	0.154	-0.132	0.178*	0.287**	0.337**
	(0.117)	(0.147)	(0.119)	(0.130)	(0.132)	(0.105)	(0.130)	(0.130)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.905	0.755	0.822	0.791	0.823	0.844	0.798	0.828

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 11

Use of saving, formal institutions and financial barriers (OLS)

	(1) Saving	(2) Saving	(3) Saving	(4) Saving	(5) Saving	(6) Saving	(7) Saving	(8) Saving
INSTITUTION	0.094***	0.063**	0.099***	0.089***	-0.059*	0.098***	0.090***	0.128***
	(0.031)	(0.029)	(0.034)	(0.030)	(0.032)	(0.031)	(0.031)	(0.028)
CREDIT	0.000	0.000	0.000	0.000	0.001***	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.006	0.026*	0.023*	0.024**	0.007	0.027**	0.020	0.015
	(0.010)	(0.013)	(0.012)	(0.012)	(0.010)	(0.012)	(0.012)	(0.010)
ATM	0.000	0.000	0.000	0.000	0.001**	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.004***	-0.002	-0.002	-0.003*	-0.000	-0.003**	-0.003*	-0.003**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
FUND	-0.478***							
	(0.067)							
INS×FUND	-0.156***							
	(0.059)							
NEED		-0.607						
		(0.517)						
INS×NEED		0.306						
		(0.964)						
DISTRUST			-0.581***					
			(0.152)					
INS×DISTRUST			-0.406*					
			(0.213)					
RELIGION				-1.080***				
				(0.281)				
INS×RELIGION				-0.636*				
				(0.341)				
FINLIT					0.223***			
					(0.077)			
INS×FINLIT					0.380***			
					(0.060)			
COST						-0.422***		
						(0.077)		
INS×COST						-0.239*		
						(0.128)		
FAR							-0.412***	
							(0.147)	
INS×FAR							-0.258	
							(0.165)	
DOC								-0.807***
								(0.127)
INS×DOC								-0.612***
								(0.182)
Constant	0.317***	-0.041	0.028	0.016	-0.021	0.032	0.052	0.154**
	(0.085)	(0.093)	(0.084)	(0.083)	(0.076)	(0.079)	(0.088)	(0.070)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.672	0.472	0.552	0.528	0.851	0.587	0.501	0.625

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 12

Use of digital payments, formal institutions and financial barriers (OLS)

	(1) Digital payments	(2) Digital payments	(3) Digital payments	(4) Digital payments	(5) Digital payments	(6) Digital payments	(7) Digital payments	(8) Digital payments
INSTITUTION	0.173***	0.123***	0.206***	0.164***	0.147***	0.221***	0.176***	0.205***
	(0.040)	(0.040)	(0.044)	(0.035)	(0.042)	(0.043)	(0.038)	(0.035)
CREDIT	-0.000	0.000	0.000	0.000	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.015	0.010	0.005	0.008	0.026	0.008	0.001	-0.003
	(0.020)	(0.021)	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)	(0.020)
ATM	0.001*	0.001**	0.002***	0.001***	0.001***	0.002***	0.002***	0.001***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	0.002	0.005***	0.004**	0.002	0.002	0.002	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
FUND	-0.600***							
	(0.130)							
INS×FUND	-0.210**							
	(0.081)							
NEED		-1.104						
		(0.758)						
INS×NEED		0.504						
		(1.465)						
DISTRUST			-0.950***					
			(0.179)					
INS×DISTRUST			-0.851***					
			(0.303)					
RELIGION				-1.754***				
				(0.426)				
INS×RELIGION				-0.940**				
				(0.395)				
FINLIT					0.369*			
					(0.191)			
INS×FINLIT					-0.034			
					(0.097)			
COST						-0.645***		
						(0.112)		
INS×COST						-0.605***		
						(0.190)		
FAR							-0.635***	
							(0.222)	
INS×FAR							-0.475**	
							(0.225)	
DOC								-0.987***
								(0.172)
INS×DOC								-0.707***
								(0.227)
Constant	0.732***	0.290*	0.408***	0.380**	0.077	0.414***	0.425***	0.522***
	(0.189)	(0.165)	(0.144)	(0.153)	(0.133)	(0.149)	(0.148)	(0.160)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.730	0.659	0.707	0.695	0.822	0.716	0.672	0.710

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 13

Use of borrowing, formal institutions and financial barriers (OLS)

	(1) Borrowing	(2) Borrowing	(3) Borrowing	(4) Borrowing	(5) Borrowing	(6) Borrowing	(7) Borrowing	(8) Borrowing
INSTITUTION	0.005	0.025	0.014	0.019	-0.007	0.011	0.016	0.008
	(0.020)	(0.018)	(0.022)	(0.015)	(0.025)	(0.021)	(0.017)	(0.018)
CREDIT	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	-0.002	0.000	-0.000	-0.001	0.005	0.001	-0.002	0.000
	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)
ATM	0.000	0.000**	0.000**	0.000**	0.001***	0.000**	0.000**	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PHONE	-0.000	-0.000	0.000	-0.000	-0.001*	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FUND	-0.050							
	(0.053)							
INS×FUND	0.045							
	(0.044)							
NEED		0.600						
		(0.454)						
INS×NEED		0.217						
		(0.758)						
DISTRUST			-0.039					
			(0.076)					
INS×DISTRUST			0.069					
			(0.139)					
RELIGION				-0.319				
				(0.216)				
INS×RELIGION				0.003				
				(0.218)				
FINLIT					0.075			
					(0.089)			
INS×FINLIT					0.066			
					(0.054)			
COST						-0.026		
						(0.050)		
INS×COST						0.072		
						(0.089)		
FAR							-0.074	
							(0.076)	
INS×FAR							0.050	
							(0.093)	
DOC								-0.004
								(0.096)
INS×DOC								0.139
								(0.134)
Constant	0.146**	0.092	0.108*	0.127**	0.051	0.106	0.132**	0.111*
	(0.067)	(0.063)	(0.065)	(0.062)	(0.068)	(0.065)	(0.063)	(0.062)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.002
R-squared	0.187	0.196	0.173	0.199	0.273	0.178	0.182	0.181

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE 14

Financial inclusion (1st principal component), formal institutions and financial barriers (OLS)

	(1) Financial inclusion	(2) Financial inclusion	(3) Financial inclusion	(4) Financial inclusion	(5) Financial inclusion	(6) Financial inclusion	(7) Financial inclusion	(8) Financial inclusion
INSTITUTION	0.787***	0.782***	0.973***	0.888***	0.355	0.978***	0.896***	1.031***
	(0.236)	(0.238)	(0.248)	(0.200)	(0.263)	(0.245)	(0.222)	(0.216)
CREDIT	0.000	0.003	0.002	0.002	0.002	0.001	0.003	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GDP	-0.017	0.152	0.136	0.141	0.222**	0.167*	0.087	0.081
	(0.090)	(0.117)	(0.098)	(0.095)	(0.100)	(0.097)	(0.098)	(0.101)
ATM	0.006*	0.010***	0.011***	0.009***	0.009***	0.010***	0.010***	0.008***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
PHONE	-0.007	0.014	0.009	-0.002	-0.000	-0.001	-0.001	0.001
	(0.010)	(0.013)	(0.011)	(0.013)	(0.009)	(0.011)	(0.014)	(0.011)
FUND	-4.334***							
	(0.625)							
INS×FUND	-0.801							
	(0.487)							
NEED		-3.307						
		(4.875)						
INS×NEED		0.405						
		(7.586)						
DISTRUST			-5.598***					
			(1.076)					
INS×DISTRUST			-3.240*					
			(1.638)					
RELIGION				-11.417***				
				(2.210)				
INS×RELIGION				-4.848**				
				(2.341)				
FINLIT					1.753**			
					(0.846)			
INS×FINLIT					1.168**			
					(0.524)			
COST						-3.917***		
						(0.629)		
INS×COST						-1.843*		
						(1.077)		
FAR							-4.431***	
							(1.253)	
INS×FAR							-2.002	
							(1.329)	
DOC								-6.104***
								(1.099)
INS×DOC								-2.915*
								(1.522)
Constant	1.003	-2.259**	-1.606**	-1.627**	-3.257***	-1.596**	-1.174	-0.754
	(0.773)	(0.858)	(0.730)	(0.708)	(0.730)	(0.695)	(0.731)	(0.772)
Observations	91	91	91	91	113	91	91	91
Prob (*F*-test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.807	0.671	0.739	0.736	0.846	0.757	0.712	0.753

Notes: All specifications are estimated using OLS. Robust standard errors in parentheses, *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Descriptive statistics and data sources of the variables are presented in Table A.3 and Table A.5.

TABLE A.1

List of countries in the sample

Afghanistan	Greece	Nigeria
Albania	Guatemala	Nicaragua
United Arab Emirates	Hong Kong SAR, China	Netherlands
Argentina	Honduras	Norway
Armenia	Croatia	Nepal
Australia	Haiti	New Zealand
Austria	Hungary	Pakistan
Azerbaijan	Indonesia	Panama
Belgium	India	Peru
Benin	Ireland	Philippines
Burkina Faso	Iran, Islamic Rep.	Poland
Bangladesh	Iraq	Portugal
Bulgaria	Israel	Paraguay
Bahrain	Italy	West Bank and Gaza
Bosnia and Herzegovina	Jordan	Romania
Belarus	Japan	Russian Federation
Bolivia	Kazakhstan	Rwanda
Brazil	Kenya	Saudi Arabia
Botswana	Kyrgyz Republic	Senegal
Central African Republic	Cambodia	Singapore
Canada	Korea, Rep.	Sierra Leone
Switzerland	Kuwait	El Salvador
Chile	Lao PDR	Serbia
China	Lebanon	South Sudan
Cote d'Ivoire	Liberia	Slovak Republic
Cameroon	Libya	Slovenia
Congo, Dem. Rep.	Sri Lanka	Sweden
Congo, Rep.	Lesotho	Chad
Colombia	Lithuania	Togo
Costa Rica	Luxembourg	Thailand
Cyprus	Latvia	Tajikistan
Czech Republic	Morocco	Turkmenistan
Germany	Moldova	Trinidad and Tobago
Denmark	Madagascar	Tunisia
Dominican Republic	Mexico	Turkey
Algeria	Macedonia, FYR	Taiwan, China
Ecuador	Mali	Tanzania
Egypt, Arab Rep.	Malta	Uganda
Spain	Myanmar	Ukraine
Estonia	Montenegro	Uruguay
Ethiopia	Mongolia	United States
Finland	Mozambique	Uzbekistan
France	Mauritania	Venezuela, RB
Gabon	Mauritius	Vietnam
United Kingdom	Malawi	Kosovo
Georgia	Malaysia	South Africa
Ghana	Namibia	Zambia
Guinea	Niger	Zimbabwe

TABLE A.2

Legal origin, institutions and financial inclusion across countries

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
AFG	Afghanistan	0.145	0.037	0.033	0.108	0.009	-1.547		French
ALB	Albania	0.393	0.087	0.088	0.288	0.024	-0.004	10.6	Socialist
ARE	United Arab Emirates	0.874	0.287	0.189	0.840	0.213	0.651		English
ARG	Argentina	0.479	0.072	0.073	0.402	0.024	-0.046	17.4	French
ARM	Armenia	0.453	0.100	0.285	0.415	0.098	-0.305	10.9	Socialist
AUS	Australia	0.995	0.621	0.203	0.959		1.573	51.4	English
AUT	Austria	0.982	0.558	0.142	0.961		1.427	36.8	German
AZE	Azerbaijan	0.286	0.045	0.131	0.246		-0.694	14.8	Socialist
BEL	Belgium	0.986	0.556	0.158	0.971		1.253	34.6	French
BEN	Benin	0.319	0.098	0.094	0.285	0.181	-0.301		French
BFA	Burkina Faso	0.233	0.121	0.091	0.389	0.330	-0.399	13.8	French
BGD	Bangladesh	0.410	0.099	0.091	0.341	0.212	-0.808		English
BGR	Bulgaria	0.722	0.278	0.119	0.649		0.201	19.6	Socialist
BHR	Bahrain	0.826	0.307	0.168	0.773		-0.133		English
BIH	Bosnia and Herzegovina	0.588	0.098	0.086	0.503		-0.294	26.6	Socialist
BLR	Belarus	0.812	0.222	0.147	0.787		-0.599	32.6	Socialist
BOL	Bolivia	0.512	0.164	0.163	0.400	0.071	-0.618		French
BRA	Brazil	0.700	0.145	0.086	0.579	0.048	-0.141	7.1	French
BWA	Botswana	0.448	0.180	0.052	0.418	0.244	0.648		English
CAF	Central African Republic	0.137	0.057	0.035	0.093		-1.529		French
CAN	Canada	0.997	0.676	0.264	0.979		1.676	41.8	English
CHE	Switzerland	0.984	0.595	0.102	0.965		1.782	51.2	German
CHL	Chile	0.738	0.211	0.134	0.654	0.187	1.011	12.4	French
CHN	China	0.802	0.348	0.086	0.679		-0.426	60.3	Socialist
CIV	Côte d'Ivoire	0.148	0.064	0.022	0.383	0.341	-0.566		French
CMR	Cameroon	0.269	0.109	0.065	0.286	0.151	-0.972		French
COD	Congo, Dem. Rep.	0.150	0.047	0.030	0.217	0.161	-1.569		French
COG	Congo, Rep.	0.233	0.074	0.037	0.178	0.062	-1.036		French
COL	Colombia	0.449	0.087	0.145	0.373	0.047	-0.157	4.1	French

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
CRI	Costa Rica	0.678	0.230	0.141	0.592		0.625		French
CYP	Cyprus	0.887	0.260	0.088	0.801		0.869	7.5	English
CZE	Czech Republic	0.810	0.453	0.149	0.796		0.936	30.1	Socialist
DEU	Germany	0.991	0.554	0.196	0.978		1.510	44.6	German
DNK	Denmark	0.999	0.631	0.206	0.994		1.667	76	Scandinavian
DOM	Dominican Republic	0.548	0.195	0.227	0.444	0.039	-0.172		French
DZA	Algeria	0.428	0.114	0.030	0.260		-0.869	17.2	French
ECU	Ecuador	0.509	0.122	0.118	0.316	0.029	-0.537	7.2	French
EGY	Egypt, Arab Rep.	0.321	0.062	0.063	0.228	0.018	-0.895	21.5	French
ESP	Spain	0.938	0.508	0.184	0.905		0.846	19	French
EST	Estonia	0.980	0.469	0.140	0.968		1.196	39	Socialist
ETH	Ethiopia	0.348	0.263	0.106	0.119	0.003	-0.946	21.4	French
FIN	Finland	0.998	0.545	0.201	0.983		1.739	58	Scandinavian
FRA	France	0.940	0.481	0.183	0.922		1.055	18.7	French
GAB	Gabon	0.340	0.135	0.051	0.540	0.436	-0.670		French
GBR	United Kingdom	0.964	0.637	0.176	0.956		1.435	30	English
GEO	Georgia	0.612	0.046	0.237	0.530	0.022	0.428	8.8	Socialist
GHA	Ghana	0.423	0.162	0.102	0.495	0.389	-0.014	5	English
GIN	Guinea	0.146	0.065	0.044	0.202	0.138	-0.860		French
GRC	Greece	0.855	0.127	0.018	0.737		0.156	21.3	French
GTM	Guatemala	0.435	0.121	0.096	0.333	0.021	-0.567	14.9	French
HKG	Hong Kong SAR, China	0.953	0.509	0.088	0.845		1.401	48	English
HND	Honduras	0.429	0.146	0.124	0.372	0.062	-0.649		French
HRV	Croatia	0.861	0.358	0.131	0.831		0.443	19.7	Socialist
HTI	Haiti	0.282	0.122	0.115	0.275	0.135	-1.190	21.3	French
HUN	Hungary	0.749	0.236	0.073	0.715		0.439	28.7	Socialist
IDN	Indonesia	0.484	0.215	0.172	0.346	0.031	-0.178	37.5	French
IND	India	0.798	0.196	0.066	0.287	0.020	-0.176	16.7	English
IRL	Ireland	0.953	0.475	0.172	0.935		1.385	38.9	English
IRN	Iran, Islamic Rep.	0.934	0.262	0.239	0.898	0.263	-0.827	10.5	French
IRQ	Iraq	0.203	0.016	0.028	0.191	0.042	-1.456	30	French
ISR	Israel	0.928	0.534	0.350	0.908		0.818	22.9	English

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
ITA	Italy	0.938	0.453	0.162	0.897		0.510	27.5	French
JOR	Jordan	0.421	0.101	0.166	0.325	0.011	-0.074	13.2	French
JPN	Japan	0.982	0.645	0.057	0.953		1.361	35.9	German
KAZ	Kazakhstan	0.587	0.139	0.200	0.539		-0.436	38.3	Socialist
KEN	Kenya	0.557	0.268	0.168	0.790	0.729	-0.569		English
KGZ	Kyrgyz Republic	0.383	0.030	0.094	0.361	0.031	-0.737	36.3	Socialist
KHM	Cambodia	0.178	0.053	0.267	0.156	0.057	-0.732		Socialist
KOR	Korea, Rep.	0.949	0.553	0.177	0.924		0.768	26.5	German
KWT	Kuwait	0.798	0.266	0.165	0.748		-0.191	28.5	French
LAO	Lao PDR	0.291	0.180	0.086	0.133		-0.679		Socialist
LBN	Lebanon	0.448	0.212	0.166	0.331		-0.803	9.8	French
LBR	Liberia	0.216	0.109	0.075	0.276	0.208	-0.748		English
LBY	Libya	0.657	0.171	0.047	0.318		-1.887	10	French
LKA	Sri Lanka	0.736	0.288	0.148	0.472	0.024	-0.069		English
LSO	Lesotho	0.333	0.088	0.049	0.378	0.276	-0.263		English
LTU	Lithuania	0.829	0.340	0.133	0.776		0.965	29.9	Socialist
LUX	Luxembourg	0.988	0.616	0.213	0.983		1.699	31.1	French
LVA	Latvia	0.932	0.275	0.099	0.909		0.800	25.5	Socialist
MAR	Morocco	0.284	0.063	0.026	0.167	0.006	-0.261	12.3	French
MDA	Moldova	0.438	0.088	0.090	0.404		-0.416	17.6	Socialist
MDG	Madagascar	0.096	0.040	0.036	0.150	0.121	-0.698		French
MEX	Mexico	0.354	0.098	0.057	0.317	0.056	-0.259	12.4	French
MKD	Macedonia, FYR	0.766	0.173	0.131	0.658		-0.102	20.1	Socialist
MLI	Mali	0.182	0.061	0.063	0.310	0.244	-0.805	14.9	French
MLT	Malta	0.974	0.466	0.091	0.888		1.018	21.7	French
MMR	Myanmar	0.256	0.081	0.191	0.077	0.007	-0.826		Socialist
MNE	Montenegro	0.684	0.101	0.150	0.598		0.097	24.9	Civil law
MNG	Mongolia	0.930	0.193	0.289	0.853	0.219	0.042		Socialist
MOZ	Mozambique	0.330	0.108	0.050	0.341	0.219	-0.834		French
MRT	Mauritania	0.190	0.091	0.075	0.157	0.040	-0.749		French
MUS	Mauritius	0.895	0.244	0.101	0.685	0.056	0.797		French
MWI	Malawi	0.230	0.087	0.085	0.276	0.203	-0.475		English

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
MYS	Malaysia	0.851	0.378	0.123	0.704	0.109	0.317	8.5	English
NAM	Namibia	0.773	0.344	0.087	0.714	0.434	0.336		English
NER	Niger	0.095	0.019	0.028	0.130	0.087	-0.685		French
NGA	Nigeria	0.394	0.206	0.040	0.297	0.056	-1.042	15	English
NIC	Nicaragua	0.284	0.081	0.110	0.246	0.039	-0.582		French
NLD	Netherlands	0.996	0.593	0.121	0.977		1.678	66.1	French
NOR	Norway	0.997	0.793	0.350	0.991		1.777	73.7	Scandinavian
NPL	Nepal	0.454	0.171	0.134	0.163		-0.714		English
NZL	New Zealand	0.992	0.694	0.291	0.973		1.862	55.3	English
PAK	Pakistan	0.180	0.061	0.023	0.177	0.069	-1.024	22.2	English
PAN	Panama	0.458	0.145	0.083	0.350	0.035	0.170		French
PER	Peru	0.422	0.082	0.147	0.339	0.026	-0.075	8.4	French
PHL	Philippines	0.318	0.119	0.097	0.251	0.045	-0.348	3.2	French
POL	Poland	0.867	0.326	0.234	0.819		0.729	22.2	Socialist
PRT	Portugal	0.923	0.316	0.089	0.863		1.035	17.2	French
PRY	Paraguay	0.311	0.063	0.133	0.446	0.289	-0.407		French
PSE	West Bank and Gaza	0.250	0.060	0.052	0.142		-0.689		
ROU	Romania	0.576	0.136	0.149	0.472	0.030	0.263	7.7	Socialist
RUS	Russian Federation	0.758	0.135	0.139	0.705		-0.718	27.8	Socialist
RWA	Rwanda	0.367	0.189	0.077	0.389	0.311	-0.044	16.6	French
SAU	Saudi Arabia	0.717	0.143	0.112	0.612		-0.216	50.5	English
SEN	Senegal	0.204	0.073	0.066	0.395	0.318	-0.095		French
SGP	Singapore	0.978	0.669	0.156	0.901	0.095	1.605	37.3	English
SLE	Sierra Leone	0.124	0.052	0.043	0.156	0.110	-0.678		English
SLV	El Salvador	0.293	0.109	0.085	0.236	0.035	-0.223		French
SRB	Serbia	0.714	0.120	0.121	0.661		0.000	13.6	Civil
SSD	South Sudan	0.086	0.037	0.030	0.073		-2.011		English
SVK	Slovak Republic	0.842	0.499	0.195	0.815		0.725	12.6	Socialist
SVN	Slovenia	0.975	0.312	0.163	0.957		0.946	19.9	Socialist
SWE	Sweden	0.997	0.754	0.215	0.983		1.737	60.1	Scandinavian
TCD	Chad	0.088	0.025	0.028	0.190	0.152	-1.368		French
TGO	Togo	0.341	0.118	0.075	0.313	0.215	-0.647		French

Table A.2 (continued)

		Financial inclusion indicators					Institutional indicators		
Country code	Country name	Account ownership	Use of saving	Use of bororwing	Digital products	Mobile money	Formal institutions	Social trust	Legal origin
THA	Thailand	0.810	0.388	0.152	0.623	0.083	-0.316	32.1	English
TJK	Tajikistan	0.470	0.113	0.147	0.439		-1.148		Socialist
TKM	Turkmenistan	0.406	0.048	0.068	0.343		-1.432		Socialist
TTO	Trinidad and Tobago	0.808	0.362	0.189	0.641		0.127	3.2	English
TUN	Tunisia	0.368	0.183	0.085	0.294	0.020	-0.275	15.5	French
TUR	Turkey	0.677	0.229	0.138	0.638	0.164	-0.463	11.6	French
TWN	Taiwan, China	0.942	0.669	0.045	0.771		1.102	30.3	German
TZA	Tanzania	0.210	0.061	0.053	0.430	0.385	-0.423	7.7	English
UGA	Uganda	0.328	0.127	0.137	0.547	0.506	-0.577	7.6	English
UKR	Ukraine	0.629	0.129	0.109	0.607		-0.740	23.1	Socialist
URY	Uruguay	0.639	0.118	0.183	0.593		0.862	13.8	French
USA	United States	0.931	0.622	0.289	0.911		1.246	34.8	English
UZB	Uzbekistan	0.371	0.023	0.021	0.342		-1.105	13.9	Socialist
VEN	Venezuela, RB	0.732	0.194	0.076	0.688	0.110	-1.507	15.8	French
VNM	Vietnam	0.300	0.145	0.206	0.227	0.035	-0.327	50.9	Socialist
XKX	Kosovo	0.523	0.087	0.103	0.386		-0.303	11.2	Civil
ZAF	South Africa	0.674	0.221	0.093	0.601	0.190	0.206	23.3	English
ZMB	Zambia	0.358	0.136	0.088	0.387	0.278	-0.335	10.8	English
ZWE	Zimbabwe	0.282	0.053	0.040	0.525	0.486	-1.217	8.3	English

TABLE A.3

Descriptive statistics

Variable	Observation	Mean	Std. Dev	Minimum	Maximum
Dependent variables					
ACCOUNT	144	0.614	0.267	0.086	0.999
SAVED	144	0.236	0.196	0.016	0.793
BORROWED	144	0.122	0.070	0.018	0.350
DIGITAL	144	0.538	0.283	0.073	0.994
MOBILE	77	0.146	0.145	0.003	0.729
Independent variables					
ENGLISH	139	0.259	0.440	0.000	1.000
FRENCH	139	0.439	0.498	0.000	1.000
GERMAN	139	0.043	0.204	0.000	1.000
OTHER	139	0.259	0.440	0.000	1.000
INSTITUTION	144	-0.032	0.910	-2.011	1.862
TRUST2	99	0.247	0.162	0.032	0.760
GDP	138	8.630	1.503	5.677	11.575
CREDIT	131	61.159	47.511	2.883	247.636
FINLIT	134	0.372	0.136	0.14	0.71
FUND	112	0.369	0.195	0.040	0.750
NEED	112	0.018	0.215	0.000	0.012
COST	112	0.179	0.115	0.010	0.480
FAR	112	0.127	0.095	0.000	0.470
DOC	112	0.138	0.097	0.000	0.460
DISTRUST	112	0.110	0.073	0.010	0.360
REILIGION	112	0.041	0.039	0.000	0.200
PHONE	142	17.524	16.500	0.000	60.395

TABLE A.4

Pairwise correlation matrix

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
[1] ACCOUNT	1																					
[2] SAVED	0.84	1																				
[3] BORROWED	0.56	0.54	1																			
[4] DIGITAL	0.94	0.84	0.55	1																		
[5] MOBILE	-0.03	0.09	-0.09	0.43	1																	
[6] ENGLISH	0.08	0.15	0.04	0.09	0.42	1																
[7] FRENCH	-0.32	-0.3	-0.29	-0.33	-0.24	-0.52	1															
[8] GERMAN	0.28	0.38	-0.01	0.29	.	-0.13	-0.19	1														
[9] OTHER	0.15	0.02	0.29	0.14	-0.22	-0.35	-0.52	-0.13	1													
[10] INSTITUTION	0.81	0.84	0.52	0.82	-0.01	0.09	-0.27	0.31	0.07	1												
[11] TRUST	0.52	0.66	0.36	0.54	-0.28	0.01	-0.32	0.2	0.23	0.56	1											
[12] GDP	0.87	0.78	0.51	0.84	-0.25	0	-0.18	0.27	0.09	0.84	0.54	1										
[13] CREDIT	0.68	0.7	0.33	0.63	-0.17	0.12	-0.2	0.3	-0.02	0.66	0.47	0.67	1									
[14] FINLIT	0.65	0.75	0.44	0.69	0.30	0.13	-0.24	0.17	0.35	0.06	0.61	0.68	0.46	1								
[15] FAR	-0.72	-0.48	-0.35	-0.62	0.07	-0.04	0.28	.	-0.28	-0.48	-0.2	-0.61	-0.36	-0.20	1							
[16] COST	-0.62	-0.53	-0.25	-0.5	-0.01	-0.17	0.43	.	-0.32	-0.3	-0.33	-0.34	-0.32	-0.22	0.77	1						
[17] DOC	-0.76	-0.63	-0.37	-0.63	0.12	-0.01	0.24	.	-0.26	-0.5	-0.3	-0.61	-0.44	-0.15	0.78	0.66	1					
[18] DISTRUST	-0.49	-0.49	-0.21	-0.39	-0.05	-0.26	0.29	.	-0.08	-0.35	-0.25	-0.25	-0.29	-0.17	0.59	0.82	0.52	1				
[19] RELIGION	-0.6	-0.48	-0.34	-0.56	-0.14	-0.11	0.34	.	-0.28	-0.4	-0.17	-0.44	-0.31	-0.28	0.6	0.53	0.56	0.49	1			
[20] FUND	-0.92	-0.68	-0.41	-0.79	0.14	-0.04	0.31	.	-0.32	-0.55	-0.21	-0.76	-0.52	-0.26	0.76	0.66	0.75	0.47	0.58	1		
[21] NEED	-0.1	-0.25	0.08	-0.13	-0.21	-0.24	-0.2	.	0.46	-0.09	0.23	0	-0.05	-0.12	-0.25	-0.22	-0.19	-0.08	-0.11	-0.07	1	
[22] PHONE	0.81	0.71	0.42	0.79	-0.27	-0.05	-0.17	0.39	0.07	0.72	0.35	0.81	0.61	0.56	-0.62	-0.43	-0.59	-0.23	-0.5	-0.72	0.11	1

TABLE A.5

Data description and sources

Variable	Short definition	Source
ACCOUNT	The percentage of respondents who reported having an account (by themselves or together with someone else) at a bank or another type of financial institution.	Global Findex Database (2017)
SAVED	The percentage of respondents who report saving or setting aside any money in the past 12 months by using an account at a bank or another type of financial institution.	Global Findex Database (2017)
BORROWED	The percentage of respondents who reported borrowing any money from a bank or another type of financial institution, or using a credit card, in the past 12 months.	Global Findex Database (2017)
DIGITAL	The percentage of respondents who reported using mobile money, a debit or credit card, or a mobile phone to make a payment from an account, or reported using the internet to pay bills or to buy something online, in the past 12 months. It also includes respondents who reported paying bills, sending or receiving remittances, receiving payments for agricultural products, receiving government transfers, receiving wages, or receiving a public sector pension directly from or into a financial institution account or through a mobile money account in the past 12 months.	Global Findex Database (2017)
MOBILE	The percentage of respondents who reported personally using a mobile money service in the past 12 months.	Global Findex Database (2017)
ENGLISH	Dummy=1, if English legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
FRENCH	Dummy=1, if French legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
GERMAN	Dummy=1, if German legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
OTHER	Dummy=1, if Scandinavian or Socialist legal origin	La Porta et al., (1998, 1999); Beck et al., (2003)
INSTITUTION	Unweighted averages of the six indices from WGIs	World Governance Indicators (2017)
TRUST	The share of respondents who select the answer 'Most people can be trusted.' to the question: 'Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?'	World Values Survey Wave 6: 2010-2014 World Values Survey Wave 5: 2005-2009 European Values Study Wave 4: 2008
GDP	GDP per capita (in log)	Global Financial Development Database (2017)
CREDIT	Private credit (% GDP)	Global Financial Development Database (2017)
EDUCATION	Average Years of Schooling (aged 15+)	Barro-Lee Educational Attainment Database (2010)
FINLIT	Proportion of people that answer at least three out four financial concepts correctly, including risk diversification, inflation, interest, and interest compounding.	S&P Global FinLit Survey (2015) https://gflec.org/initiatives/sp-global-finlit-survey/
ATM	Number of ATMs per 100,000 adults.	Financial Access Survey (2015)
BRANCH	Number of commercial bank branches per 100,000 adults.	Financial Access Survey (2015)
FUND	The percentage of respondents who report not having a financial institution account because they do not have enough money to use one (% age 15+).	Global Findex Database (2017)

Table A.5 (continued)

Variable	Short definition	Source
NEED	The percentage of respondents who report not having a financial institution account only because they have no need for formal financial services (% age 15+).	Global Findex Database (2017)
COST	The percentage of respondents who report not having a financial institution account because financial services are too expensive (% age 15+).	Global Findex Database (2017)
FAR	The percentage of respondents who report not having a financial institution account because financial institutions are too far away (% age 15+).	Global Findex Database (2017)
DOC	The percentage of respondents who report not having a financial institution account because they lack the documentation needed to open one, such as an identity card, a wage slip, or the like (% age 15+).	Global Findex Database (2017)
DISTRUST	The percentage of respondents who report not having a financial institution account because they do not trust financial institutions (% age 15+).	Global Findex Database (2017)
RELIGION	The percentage of respondents who report not having a financial institution account for religious reasons (% age 15+).	Global Findex Database (2017)
PHONE	Fixed telephone subscriptions (%)	World Development Indicators (2017)

TABLE A.6

Correlations between financial inclusion indicators

	[1]	[2]	[3]	[4]
[1] account	1			
[2] saving	0.84	1		
[3] borrowing	0.54	0.54	1	
[4] digital payments	0.97	0.84	0.55	1

TABLE A.7

Principal component analysis for financial inclusion indicators

Component	Eigenvalue	Proportion	Cumulative proportion
1	3.164	0.791	0.791
2	0.582	0.145	0.936
3	0.193	0.048	0.985

FIGURE A.1

Principal component analysis for financial inclusion indicators: eigenvalues

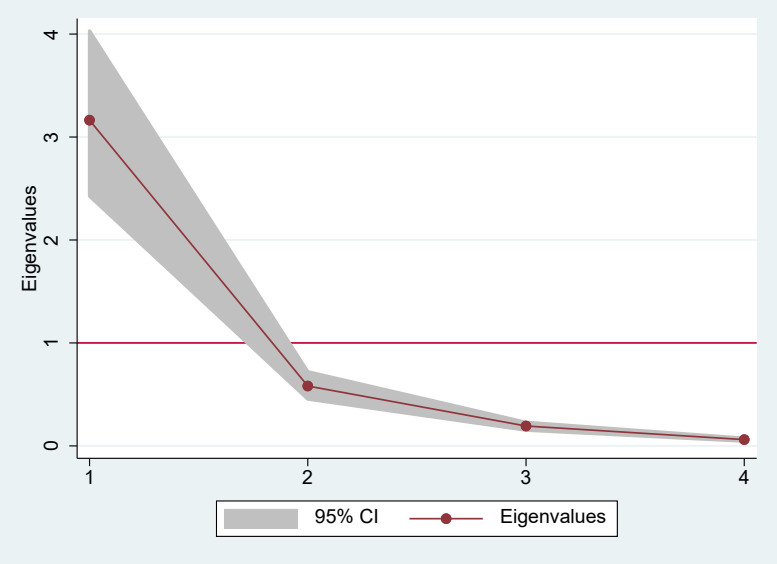


TABLE A.8

Correlations between Worldwide Governance Indicators

	[1]	[2]	[3]	[4]	[5]	[6]
[1] VOICE	1					
[2] POLITICAL	0.68	1				
[3] GOVERNMENT	0.75	0.76	1			
[4] REGQUALITY	0.8	0.72	0.94	1		
[5] LAW	0.79	0.76	0.96	0.95	1	
[6] CORRUPTION	0.78	0.74	0.93	0.92	0.96	1

TABLE A.9

Principal component analysis for World Governance Indicators

Component	Eigenvalue	Proportion	Cumulative proportion
1	5.170	0.862	0.862
2	0.363	0.061	0.922
3	0.309	0.052	0.974
4	0.084	0.014	0.988
5	0.045	0.008	0.995
6	0.028	0.005	1.000

FIGURE A.2

Principal component analysis for World Governance Indicators: eigenvalues

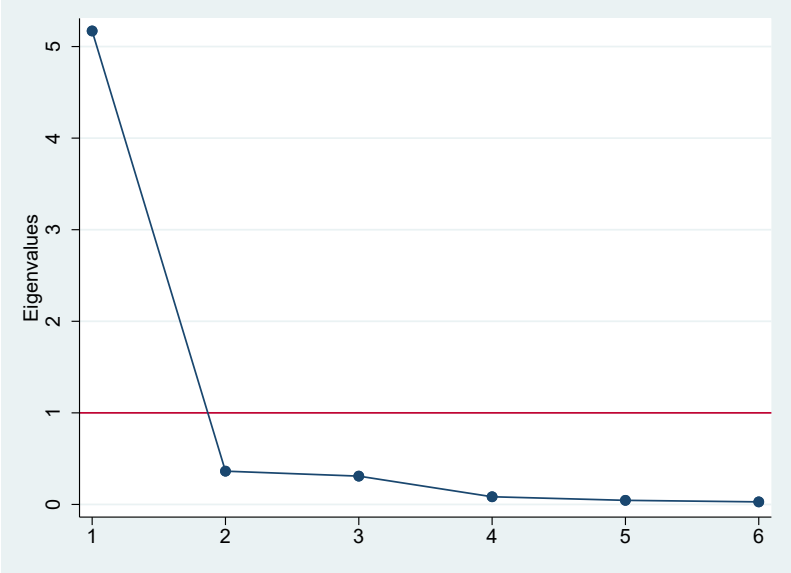
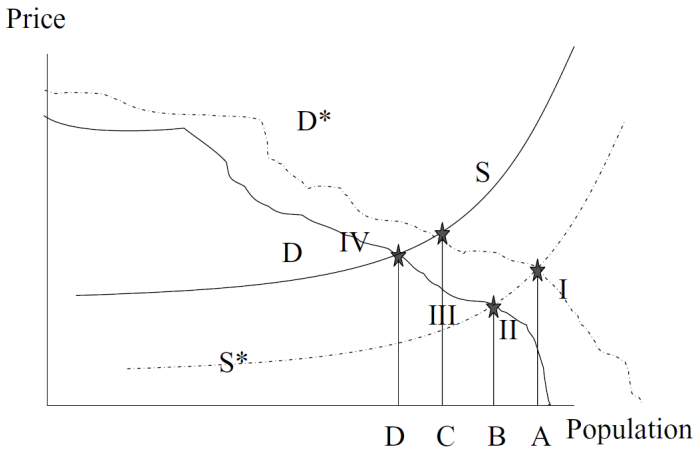


FIGURE A.3

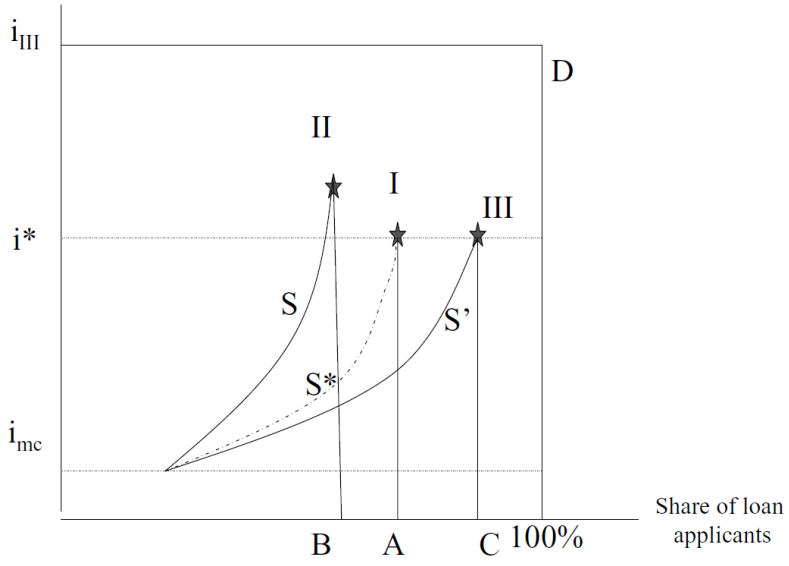
Access Possibilities Frontier for payment and savings services



Source: The Basic Analytics of Access to Financial Services (Beck and De La Torre, 2007, p.88)

FIGURE A.4

Access Possibilities Frontier for credit services



Source: The Basic Analytics of Access to Financial Services (Beck and De La Torre, 2007, p.103)