

# Role of Institutional Quality in Promoting Financial Inclusion

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# Role of Institutional Quality in Promoting Financial Inclusion

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## List of abbreviations and acronyms

|       |                                             |
|-------|---------------------------------------------|
| AFI   | Alliance for Financial Inclusion            |
| CPIA  | Country Policy and Institutional Assessment |
| GWP   | Gallup World Poll                           |
| IMF   | International Monetary Fund                 |
| SSA   | Sub-Saharan Africa                          |
| WAEMU | West African Economic and Monetary Union    |
| WGI   | Worldwide Governance Indicators             |

# Abstract

Despite evidence on the importance of financial inclusion, little is known about the role institutions play in fostering inclusion across countries. Using panel data corresponding to 125 countries for the period 2004-2015, this study sought to understand the country institutional characteristics associated with the ownership of deposit accounts. A standard regression model is estimated using fixed effects panel data techniques along a financial inclusion proxy and three measures of institutional quality. We provide the first empirical justification for the hypothesis that financial inclusion is non-negligibly driven by the institutional context. Specifically, rule of law is crucial in enhancing financial inclusiveness, more so in sub-Saharan Africa (SSA) where it has a stronger positive effect relative to other regions. In view of the fact that formal finance can be used as a means of boosting economic growth and combating social exclusion, increasing transparency of the legal framework, having fair judicial proceedings and good administration are essential ingredients for raising financial inclusiveness. The evidence presented in this paper may therefore help with the sequencing of institutional reforms that could promote financial inclusion.

**Keywords:** Financial inclusion; Institutional development; Financial institutions; Cross-country data analysis.

**JEL Classification:** G20; G21; G28.

# 1. Introduction

Access to and use of quality financial services by both households and firms is of increasing concern to policy makers across the globe (World Bank, 2016; Arun and Kamath, 2015; IMF, 2014). Theory and empirical evidence point to the critical role that improved access to finance plays in promoting growth and reducing income inequality (Mohammed et al., 2017; Kim et al., 2018]. Credit constraints reduce the efficiency of capital allocation (Lopez and Serven, 2009; Beck et al., 2007). Families can smooth out consumption and increase productive investment (Dupas & Robinson, 2013; Beck et al., 2009). Small and medium enterprises can boost investment as well as expand scale (Chauvet and Jacolin, 2017; Beck et al., 2007). Financial inclusion also contributes to greater bank stability (Ahamed and Mallick, 2017). The relationship may, however, be asymmetrical, where stable banks enhance financial inclusion (Čihák et al., 2016) via trust in financial systems and the likelihood that households save formally (Mehrotra and Yetman, 2014). More importantly, financial inclusion enhances welfare by lowering poverty and inequality (Neaime and Gaysset, 2018).

The Alliance for Financial Inclusion (AFI) describes financial inclusion as access to financial services, use of financial services and quality of products and delivery<sup>1</sup>. This definition has, however, been criticised, particularly when conceptualised in developed countries, since it does not differentiate between those who choose to be excluded and those who are forced to be included (Salignac et al., 2016). Voluntary exclusion arises when individuals or firms choose not to use financial services either because they have no need for them or due to cultural or religious reasons (World Bank, 2014). Although account penetration depicts financial access, it does not encompass financial inclusion in its entirety. Due to data limitations and consistent with Beck (2016), Kumar (2013) and Sarma (2008), we use the narrow definition by focusing on the formal banking sector. All the empirical findings should be viewed in that light.

The main objective of this study is to investigate the effect of institutional quality on financial inclusion at the bank level across developed and developing countries. Specifically, we investigate whether the influence of institutional quality on account penetration in sub-Saharan Africa (SSA) is significantly different from the rest of the regions. While most countries have recorded an improvement in account penetration, progress has been very uneven. Wang and Guan (2017), for example, show a geographical spatial aggregation distribution in which most SSA countries have a low score for each

dimension of financial inclusion compared to the developed nations. What explains this disparity?

The role of institutional differences in explaining account penetration is not yet well understood, partly because of data availability. Establishing such a relationship requires a sufficiently long time-series data. Comparative data at the global level have not been forthcoming until 2004, as part of the IMF's Financial Access Survey<sup>2</sup>. Similarly, comparable demand-side data, at the household level, was not available prior to the first World Bank Global Findex database in 2011 (Demirguc-Kunt et al., 2015). The Findex data, however, does not cater for variation across countries and changes over time, for example between 2011 and 2014. Whereas the Findex data are only available every three years, IMF's Financial Access Survey data are available on a yearly basis.

This study builds on previous research and new database to understand two fundamental questions related to financial inclusion. Does institutional quality explain variation in account penetration? Second, does our estimation model predict that institutional constraints would have disproportionate influence on SSA? These questions highlight an important, but relatively under-examined, channel through which well-developed institutions may influence financial inclusion. Any evaluation of financial inclusion that does not take into account the role of institutions, if they are found to robustly and non-negligibly predict inclusive finance, would therefore be incomplete.

This paper makes at least three main contributions to an emerging literature on financial inclusion. First, it is timely in view of the broader issue of how institutional quality may affect access to financial services, especially in SSA. Second, this study is based on a dataset sufficiently large to enable robust conclusions to be drawn. Rigorous analysis is often impeded by the lack of appropriate data. The data compilations used in this study offer a unique opportunity to explore account penetration. Third, the findings may ignite new policies. If there is clear evidence that weak institutions significantly hamper financial inclusion, then policy makers should propose measures that strengthen institutions to improve financial intermediation and foster sustainable provision of formal financial services. The importance of understanding the factors behind the time-series variation in account penetration, alongside those that shape the cross-country variation, cannot be overemphasised.

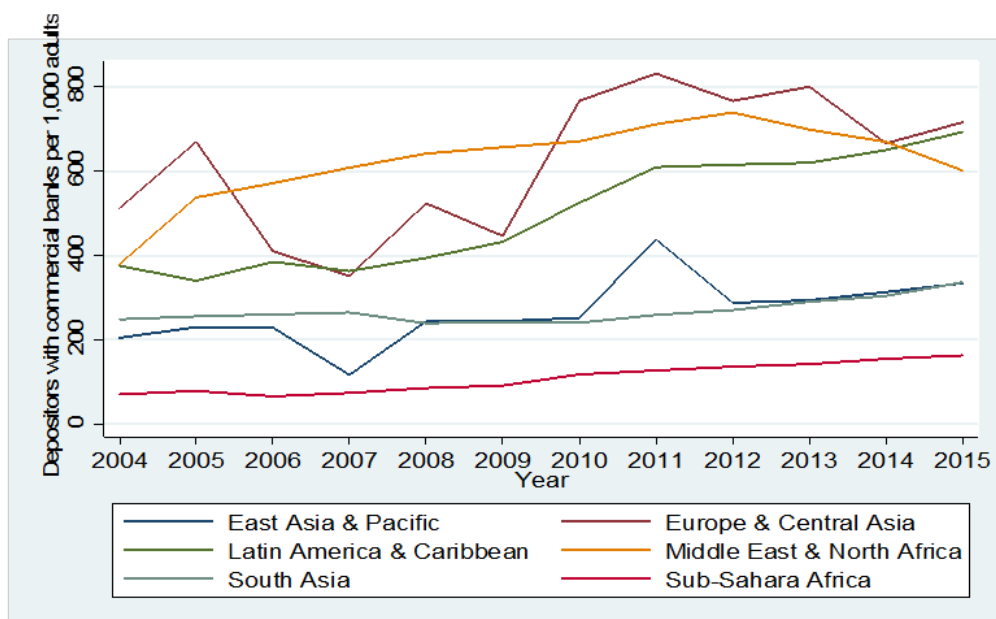
The remainder of this paper is structured as follows. The next section offers brief stylised facts on account penetration as well as the quality of institutions over time, relying on Financial Access Survey and World Governance Indicators (WGI) data. Section 3 presents a brief literature review. Section 4 explains the empirical model, econometric methodology, and data employed. Section 5 reports the estimated results and interprets the findings. The final section concludes the discussion.

## 2. Stylised facts

### Financial inclusion

Figure 1 shows an increase in deposit account penetration over time across some of the regions. With the exception of Sub-Saharan Africa, the rest of the regions have seen quite some variation over time. It is important to stress, however, that data for deposit account penetration are available for fewer countries than branch penetration, and variation over time might therefore be driven by outliers in some of the smaller regions. Nevertheless, Sub-Saharan Africa lags behind, which is consistent with Wang and Guan (2017).

Figure 1: Deposit account penetration over time and across regions



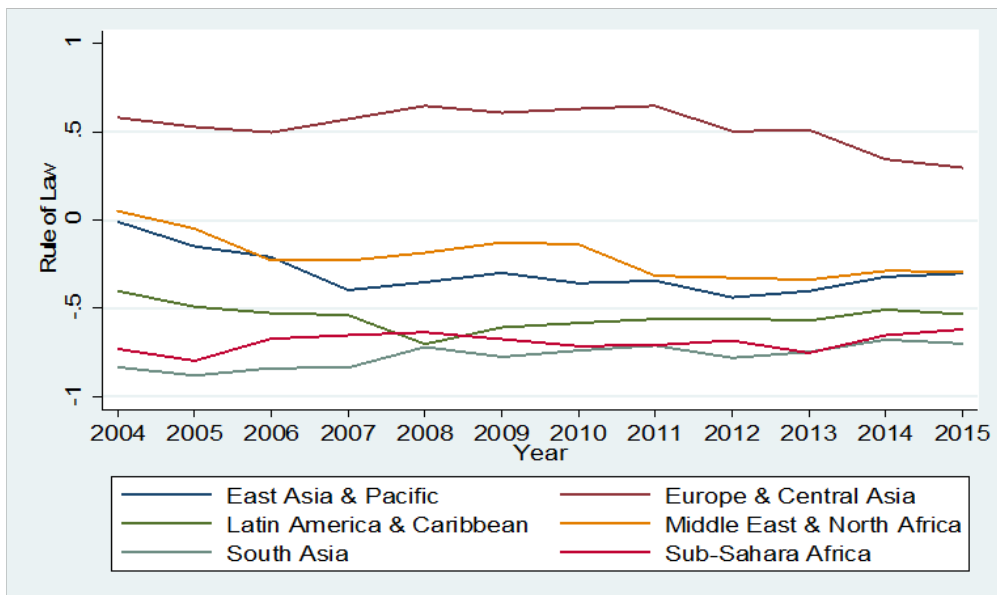
Source: Financial Access Survey, IMF (2016) and calculation by author.

## Institutional quality

Figure 2 shows that, consistent with account penetration, Europe and Central Asia have over time reported high levels of observance of the rule of law. Notably also, South Asia has been on decline since 2007. The region has consistently obtained the lowest scores, which according to the (WJP) Rule of Law report<sup>3</sup>, there is little acceptance within the private sector of the jurisdiction of the courts in civil and commercial matters.

Sub-Saharan Africa performs poorly as well. Anayiotos and Toroyan (2009) show that financial sector across SSA economies operate within weak institutional environments. The region is characterised by weak judicial systems, bureaucracy, law and order, and property rights (Creane et al., 2004). Of the 35 SSA countries covered in the 2017-2018 Global Competitiveness Index, 26 score below 4 in terms of institutions index, which covers judicial independence, protection of property rights, burden of government regulation, among other variables, placing them among the worst 51 countries. Additionally, 39 of the 48 countries that are covered by the 2017 Economic Freedom Index (of the Heritage Foundation) are considered either “mostly unfree” or “repressed”.

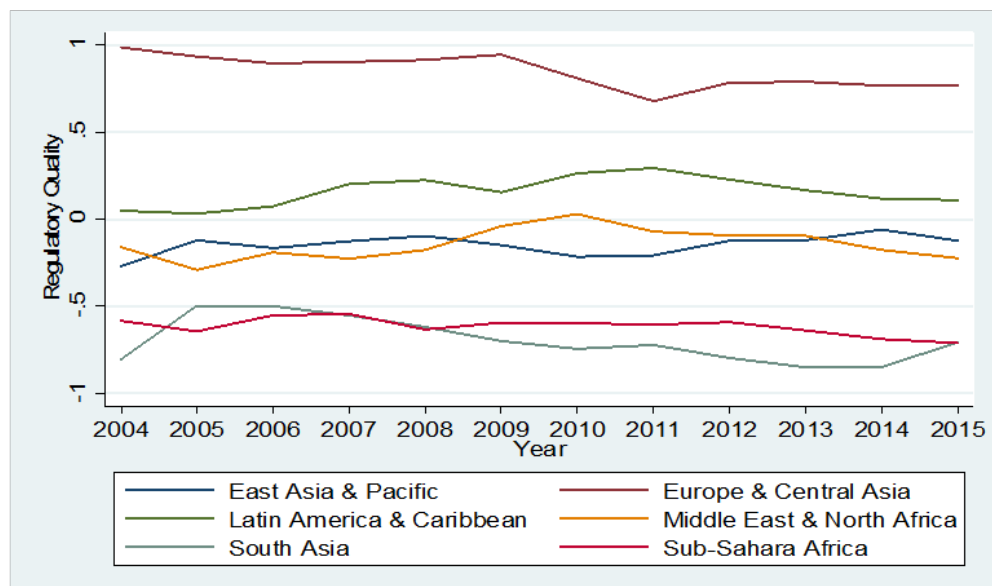
Figure 2: Rule of law



Source: World Bank (2016a), and calculation by author

The trend is almost replicated on the regulatory quality. While not surprising, financial inclusion in Europe and Central Asia has maintained the lead in terms of regulatory quality. SSA has lagged behind. Johnson and Williams (2016) observe that for financial inclusion to succeed in Pakistan, the central bank had to bypass the official regulations.

Figure 3: Regulatory quality



Source: World Bank (2016a), and calculation by author.

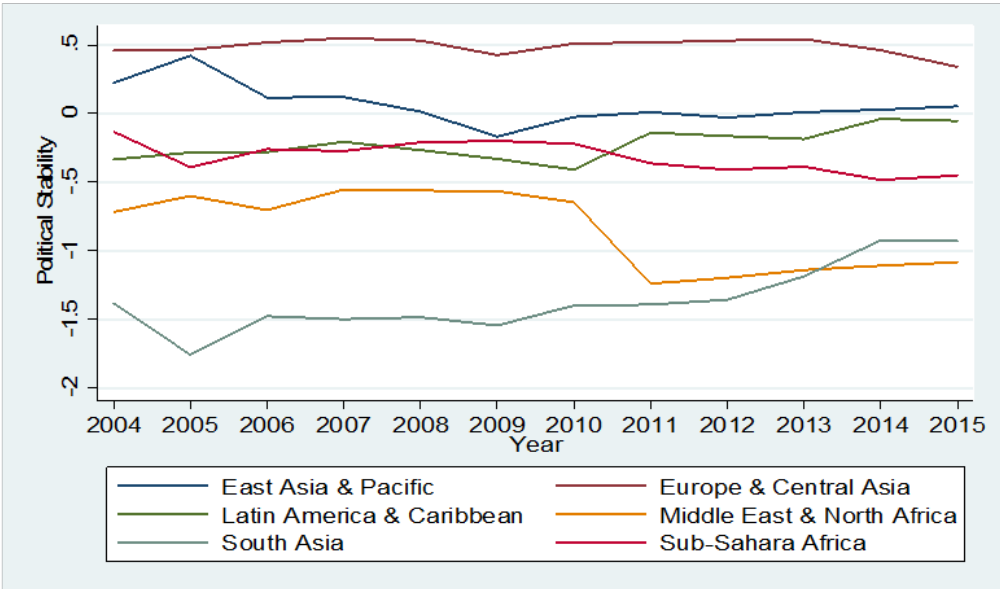
The uncertainty associated with an unstable political environment adversely affects financial inclusion by lowering the rates of financial innovations and banking infrastructure. Figure 4 shows that Europe and Central Asia have relatively been stable over time. As from the year 2010, Middle East and the North Africa have become politically unstable due to the Arab Spring revolution and the war in Syria and Yemen respectively.

Sub-Saharan Africa has also been on a downward trend since 2012, perhaps due to simmering conflicts, particularly in the fragile states. Political upheavals and conflicts in Burundi, Guinea-Bissau, Burkina Faso, Central African Republic, Mali, Togo, DRC, Guinea, Madagascar, South Sudan and politically instigated labour unrest in South Africa suggest that political risks associated with electoral processes remain a key challenge for the region. Security risks tied to Boko Haram insurgencies are significant for Cameroon, Chad, Niger, and Nigeria; while terrorist threats remain a concern for Kenya.

It may also be the case that some SSA countries use their political power to restrict entry or competition for continuous rents extraction. Different political institutions and power lead to disparate distribution of resources, which may affect performance of financial intermediaries because they influence the costs of transactions and the efficiency of production (Acemoglu and Robinson, 2008; Acemoglu and Johnson, 2005). Although a vast majority of these countries describe themselves as democracies and conduct elections at fairly regular intervals, their commitment to political pluralism, accountability, genuine electoral competition and civil liberties are wanting. For some

countries, e.g., Ethiopia, Uganda, Rwanda, Burundi, Sudan and Angola, democracy has little meaning beyond the ritual holding of elections where political space is severely constrained. These stylised facts demonstrate an intertwined relationship between financial inclusion and institutional quality measures.

Figure 4: Political stability and absence of violence/terrorism



Source: World Bank (2016a), and calculation by author.

### 3. Related literature

North (1990) defines institutions as the human constraints that structure political, economic and social interaction. From this perspective, the quality of institutions is likely to affect financial inclusion through the ability of the financial market to channel resources to finance productive activities. Whereas better institutions can facilitate access to finance by overcoming the effects of information and transaction cost, the converse can also be expected when institutions are weak.

While a large body of work has established significant relationship between account ownership and the roles of bank charges (Demirguc-Kunt et al., 2017; Allen et al., 2016; William and Suri, 2014), gender (Ghosh and Vinod, 2017; Aterido et al., 2013; Taylor and Boubakri, 2013; Demirguc-Kunt et al., 2013), shadow economy (Hajilee et al., 2017), population density (Cámara and Tuesta, 2015), education, industrialisation and employment levels (Wale and Makina, 2017; Zinsa and Weill, 2016; Alter and Yontcheva, 2015; Allen et al., 2014), and financial innovation (Beck et al., 2015) as the sources of financial inclusion, there is limited evidence on the role of institutional quality.

This study is related to an enormous literature on institutions and financial development<sup>4</sup>. We focus on a few key papers to enrich our study. Beck and Levine (2008) and Fergusson (2006) provide an excellent survey of the literature on legal institutions and financial development. More specifically, legal institutions contribute to financial sector development (Djankov et al., 2007; Huang, 2010). Financial constraints are more widespread in countries where the legal and judicial systems are broken (Love, 2003; Wurgler, 2000). For the case of Sub-Saharan Africa, Alter and Yontcheva (2015) find a significant relationship between financial development gap and the rule of law for all SSA countries, while government effectiveness and property rights applies to franc zone countries. This is consistent with Ahokpossi et al. (2013) who show that the difference in the rule of law explains the performance lag of financial sectors in the West African Economic and Monetary Union (WAEMU) countries. Similarly, legal institutions in SSA have deeper effects on financial development (McDonald and Schumacher, 2007). Based on cross-country evidence, Acemoglu and Johnson (2005) and Demirguc-Kunt and Maksimovic (2002) conclude that secure property rights and contract enforcement prevents government expropriation, thus facilitating a robust financial market.

Perhaps surprisingly are the conflicting findings on the relationships between legal origin and financial development. Beck et al. (2003) provide evidence which suggests

that law and finance hypothesis has some merit in explaining cross-country variations in financial development. Common law legal systems provide greater flexibility by adapting more easily to dynamic financial architecture. This has been the constraint to the development of mobile banking in Latin America. On the contrary, civil law systems may boost financial system development once laws are adopted as for the case of correspondent banking in Mexico (BFA, 2009).

Closely related to the rule of law is regulatory impediment. A growing literature shows that some countries have banking regulations that restrict competition to protect powerful elite, with implications for financial development (Haber et al., 2003; Acemoglu et al., 2001). Rigid regulations on bank entry and activities translate to an increase in the cost of financial intermediation (Demirgüç-Kunt et al., 2004). Central banks may, for example, control banks' branch expansion (Beck et al., 2010). While branchless banking has been in existence for many years in the wealthy nations, it is relatively nascent in the developing countries. Financial institutions may also face activity restrictions with implications on efficiency and economies of scope. Whereas Indonesia, Japan and many SSA countries impose severe restrictions on bank activity, Germany, Austria, United Kingdom and Switzerland impose minimal restrictions (Demirgüç-Kunt et al., 2004). Moreover, loan defaults are a major factor inhibiting bank lending but only when the quality of regulation is poor (Andrianova et al., 2015).

Regulation may also constrain the development of mobile money account penetration by limiting the operator's freedom in structuring the business model and service provision. Globally, Kenya has the highest outreach on mobile money accounts at almost 60% of the population (Beck, 2016; Ouma et al., 2017). The growth of MPESA has largely been attributed to relaxed regulation, where the central bank allowed Safaricom to operate M-PESA outside the provisions of the banking law (Mas and Radcliffe, 2011). Financial inclusion progress in Pakistan is partly attributed to the efforts of central bank which successfully bypassed regulations and established a financial inclusion unit (Johnson and Williams, 2016).

Few studies have examined the role of political stability in the financial intermediation process<sup>5</sup>. Demeatrides and Fielding (2012), for example, find political instability as one of the main challenges of financial development in eight West African countries. Roe and Siegel (2011) draws a link between political stability and financial development, which is consistent with the arguments advanced by Haber et al. (2003). Evidence on the possible influence of political stability on access to finance in many SSA economies is provided by Anayiotos and Toroyan (2009), while for the case of Asian countries, Gani and Ngassam (2008) and Zhang (2006) show that political stability influences stock market development.

These initial findings suggest that institutional reforms such as rule of law, regulatory quality, political stability and legal origin are important tools for enhancing financial development. Nevertheless, financial development does not necessarily translate to financial inclusion. A major drawback with these studies is that they rely on country-level proxies such as liquid liabilities of banks, private-sector credit and the stock market capitalisation to capture the various aspects of financial deepening.

There are few exceptions. Zulkhibri and Ghazal (2017) examine the links between financial inclusion, institutions and governance in Muslim and developing countries. Their findings suggest that governance positively influences the number of bank accounts and savings, but negatively impacts on borrowing behaviour. While investigating the determinants of financial inclusion using Gallup World Poll cross sectional data, Allen et al. (2016) establish that greater financial inclusion is associated with stronger legal rights, and more politically stable environments. These studies, however, have one limitation. Due to the cross-sectional nature of their data, the findings can only be interpreted as significant correlations, not causal relationships. It is therefore far from a foregone conclusion that what holds true for financial development will also hold for inclusive finance. This study sought to fill this gap.

## 4. Data and methodology

### Theoretical framework

The theoretical framework on the role of institutions on financial inclusion can be modelled from the different hypotheses explaining the theory of financial development. The legal institutions hypothesis posits that in countries where law enforcement is strong, contracts between creditors and debtors are observed. This gives depositors incentives to entrust their savings to financial institutions and increases banks' willingness to lend to smaller and riskier borrowers (Djankov et al., 2008; Huang, 2010). We therefore expect greater consumer protection to be positively related to ownership of a bank account.

The other hypothesis is on the regulatory quality. High quality regulation implies there are no excessive rules, and that rules are efficiency enhancing. Regulations should foster innovative finance such as mobile banking, branchless banking, and use of ATMs as they lower transaction costs and widen financial services usage (Beck, 2016). Burden of government regulation and challenging regulations will all translate to higher implicit costs on the growth of financial institutions. We predict a positive relationship between regulatory quality and financial inclusion.

The political institution hypothesis, as advanced by Levine (1997), posits that unstable governments cannot credibly commit to policies that encourage savings and the functioning of financial markets. Higher values of political stability impacts positively on financial inclusion, especially if financial institutions have relatively high loan loss provisions because of the inherent security costs associated with unstable political regimes. We therefore predict a positive relationship between political stability and financial inclusion.

More formally, the financial inclusion model is represented as:

$$FI = f(\text{INSTITUTIONS}, \text{SOCIO - ECONOMIC}, \text{MACRO}, \text{OTHER}) \quad (1)$$

Where, FI is financial inclusion, INSTITUTIONS represent a combination of legal, regulatory and political institutions hypotheses, while SOCIO-ECONOMIC represent

socio-economic indicators such as income levels and share of urban population, MACRO represents macroeconomic environment such as income and employment levels, while OTHER represents other important factors that may influence financial inclusion, such as technological advances.

## Model specification

The empirical specification seeks to explain the determinants of financial inclusion by testing the role of institutions. For the purpose of estimation, a general linear model is specified as follows:

$$Y_{it} = \alpha_0 + \beta_1 INS_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

Where,  $Y_{it}$  is endogenous variable for  $i$ th country at  $t$ th period.  $INS$  is institutional quality,  $\alpha_0$  is the intercept term and  $X_{it}$  is a matrix of control variables that includes macroeconomic, country-specific socio-economic indicators such as income levels, share of urban population, the subscripts  $i$  and  $t$  index countries and time, respectively. In addition, the specification also contains an unobservable country-specific effect  $\mu_i$  and the usual stochastic disturbance error-term  $\varepsilon_{it}$  following normal distribution with mean 0 and variance  $\sigma^2$ .

## Estimation and testing

The parameters of model (2) are estimated using unbalanced panel data regression. This is because data for some years is not available. Panel data controls for heterogeneity across cross-sections due to their inherent variations in characteristics. Additionally, they discount for time effects, which may occur due to changes in policy and other socio macroeconomic environments in turn having impact on the parameters of interest. Large degrees of freedom also help to derive more robust and consistent results with meaningful policy implications. Panel data also takes into consideration potential endogeneity of the regressors, while at the same time controlling for country-specific effects which cross-section regressions fails to take into account (Baltagi, 2013). Estimation bias is therefore lower with panel data than would have been the case with either time-series or cross-sectional data, while multicollinearity is less of a problem. Moreover, panel data circumvents errors in model specification, with improved efficiency of estimation.

An estimation issue we have to contend with is the choice between a Fixed Effect (FE) and a Random Effect (RE) model. We perform the traditional Hausman test, where we first estimate the fixed effects model, save the coefficients and compare them with the results of the random affects model. In the event that we

obtain Hausman test value which is larger than the critical chi-square, then the FE estimator is the appropriate choice.

## Measurement of variables

A fundamental problem in the financial inclusion literature is the meaning and validity of standard indicators. Existing literature offer various measures of financial inclusion at the bank level.

Studies using Global Findex database<sup>6</sup>, which is assembled by World Bank, consider account ownership, savings, frequency of use and bank charges. There are also studies that have used index of financial inclusion. These include Sarma (2008), Honohan (2008), Amidžić et al. (2014), among others. A major shortcoming of indices is that they are hampered by the absence of agreed indicators and the availability of reliable data (CGAP, 2009). For the purpose of this study, we use depositors with commercial banks per 1,000 adults. While this variable is an appropriate indicator of financial inclusion in the mainstream banking sector, it is nevertheless not a broad measure of inclusion since it excludes mobile money and microfinance institutions.

The way in which the institutional variables are measured is important for interpreting their effects. Literature provides different measures. One is subjective, in which opinions about institutions are evaluated through a survey and then aggregated into a quantitative index. The alternative is objective, based on statistical facts. Kaufmann et al. (2009) observe that virtually all measures of governance are subjective but perceptions matter because agents base their actions on their perceptions, impression and views. Researchers have used diverse measures to proxy institutional environment. These include Worldwide Governance Indicators; Heritage Foundation Index of Economic Freedom; Gallup World Poll (GWP), which is a cross-country household survey on governance; Doing Business Indicators, which capture ease of doing business; Country Policy and Institutional Assessment (CPIA) composite index, which captures governance; BERI disaggregated business risk indicators, which capture security of contract and property rights; ICRG disaggregated business risk indicators, which capture security of contract and property rights, among others.

For the purpose of this study, we use Worldwide Governance Indicators (WGI) which reports aggregate and individual governance indicators for over 212 countries and territories over the period 1996–2016, available at [www.govindicators.org](http://www.govindicators.org). Kaufmann et al. (2009) construct six different indicators, each representing a different dimension of governance. Not all governance indicators are relevant to financial inclusion. We have selected three institutional indicators that are closely related to financial inclusion as elucidated in the foregoing, and which are clearly established in the existing literature. They are measured as follows;

Rule of Law (RL)–captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.

Political Stability and Absence of Violence/Terrorism (PV)–captures perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

Regulatory Quality (RQ)–captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

The units in which WGI are measured follow a normal distribution with a mean of zero and a standard deviation of one in each period. The indicators are reported in their standard normal units, ranging from approximately -2.5 to 2.5, and in percentile rank terms from 0 to 100, with higher values corresponding to better outcomes<sup>7</sup>. This clustering of institutional indicators into different dimensions enables us to study whether some dimensions of governance matter for financial inclusion.

A key advantage of WGI relative to other institutional measures is that the authors are explicit about the accompanying margins of error, whereas in most other cases, they are often ignored.<sup>8</sup> It is worth noting that over time, the standard errors have been reduced due to the increase in the number of sources utilised. WGI are sufficiently informative that many cross-country comparisons result in statistically significant differences in estimated governance. This highlights the fact that governance can and does change even over relatively short periods of time. Their wide coverage and usage allows for comparisons with the existing literature. Previous studies that have used WGI include Zulkhibri and Ghazal (2017), Alter and Yontcheva (2015), Demetriades and Fielding (2012) and Lensink et al. (2008).

## Data

This study used yearly financial inclusion data from International Monetary Fund's annual Financial Access Survey (IMF, 2016) and institutional data from WGI. Country-level control data was obtained from the World Development Indicators (WDI). The entire data set covered 1,500 observations (see Appendix) for the period 2004–2015. Not all variables for the study period are available, and therefore the panel is unbalanced. The country dimension covers 120 countries whose data for most of the financial inclusion and institutional variables are available, spanning six regions and distributed as East Asia and Pacific (9), Europe and Central Asia (32), Latin America and Caribbean (21), Middle East and North Africa (12), South Asia (7) and Sub-Saharan Africa (39). We use the regional distribution as mapped by the World Bank. The distribution of the countries is contained in Table 1.

## Endogenous variables

Previous studies have used a variant of endogenous variables to capture financial inclusion. Beck (2016), Kumar (2013) and Sarma (2008), for example, have used bank accounts per capita as an indicator of penetration of banking system, which is the ratio of deposit accounts to the population. The IMF data has two proxies that capture account penetration; depositors with commercial banks per 1,000 adults and deposit accounts with commercial banks per 1,000 adults (bank accounts per capita). It is however worth noting that the latter as used by Beck (2016) could overestimate the percentage of the population with an account because some clients may have several accounts, including with the same bank, or accounts may be owned by foreigners. To circumvent this problem, we use depositors with commercial banks per 1,000 adults (account ownership) as the proxy for financial inclusion, rather than the number of bank accounts. We are therefore able to capture the number of individuals who own a bank account/have access to a bank account. We focus on account ownership for several reasons. First, account ownership is comparable across countries. Second, using this variable circumvents aggregation problem that is common with indices. The source of these annual data is the IMF Financial Access Survey (2016).

## Exogenous variables

The institutional quality data sets are those assembled by Kaufmann et al. (2009). The study also considered a set of country-level characteristics that theoretical and empirical literature has identified as potential control variables that may explain financial inclusion. At the onset, time trend has been included as an independent variable to control for various policies implemented over time. The share of urban population as a percentage of total population is expected to positively influence access to financial services. In general, there are more establishments of financial institutions in urban centres relative to rural areas. Thus, we expect the share of urban population variable to have a positive impact on account penetration.

Income per capita has been included to capture each of the countries' economic position on penetration of the banking system. Higher income should be associated with more financial inclusion. Overall, we expect account ownership to increase with income.

Unemployment, measured as the number of unemployed individuals as a percentage of the total labour force, represents employment status of the country. Countries with higher unemployment levels are likely to witness more financial exclusion. We therefore expect unemployment rate to affect financial inclusion negatively.

To account for technological advances, the study considers two variables measuring the role of new technologies, namely mobile phone subscription and internet utilisation rates, on their association with financial inclusion. These are measured as mobile cellular subscriptions and fixed broadband subscriptions per 100 people, respectively. We expect these variables to enhance financial inclusion. Data for all the control variables is obtained from World Development Indicators.

## 5. Empirical findings and discussions

Table 4 presents summary statistics. There is a wide variation in per capita depositors across countries. The means and standard deviation are all within the expected range, but the minimum and maximum values suggest a wide range for each variable, prompting the use of robust regression methods as a check on robustness to outliers. It is evident from the summary statistics that there is a clear difference among countries. On average, there are 333 depositors with commercial banks per 1,000 adults. This translates to about 33% across the 120 countries under study.

When descriptive statistics are broken down into regions, we observe some interesting differences. Table 5 shows the number of depositors behind the total deposits in a country's banking system. While most countries have recorded an improvement in account penetration, progress has been very uneven. Europe and Central Asia have consistently reported higher financial inclusion compared to other regions. Adults in Europe and Central Asia are therefore about three times as likely to have a deposit account as those in Sub-Saharan Africa. It is the same narrative on the quality of institutions. Table 6 shows that SSA economies perform worse than the global average in terms of political stability, regulatory quality and the rule of law, which is consistent with low levels of financial inclusion.

Table 7 reports the correlations matrix. The institutional variables show very high bivariate correlations, which is consistent with Kaufmann et al. (2009). This correlation may be due to a causal impact from one variable to another in either direction. Roe and Siegel (2011) and Damania et al. (2004) show that political instability impairs the rule of law. Alence (2004) finds that democratic contestation and executive restraints affect regulatory quality. This perhaps explains the high correlations among the institutional variables and therefore good governance correlates with positive development outcomes. Thus, we fitted a series of regressions due to multicollinearity between these governance indicators.

The Hausman test showed a strong evidence that our specification follows a Fixed Effects model. This implies that the coefficients of interest are statistically different in the two estimations; hence we reject the random effects solution, both on substantive and statistical grounds. The estimation results in Table 8 enable us to examine how different country institutional characteristics are related to per capita deposit accounts. Based on a panel data set of 120 countries, what inferences can we draw from the regression coefficients? Interesting results appear in both significant and non-significant findings. We comment on all regressions together.

As predicted, the results indicate a positive and significant coefficient on the rule of law. Table 8 shows that account ownership is higher in countries with fair and efficient enforcement of the rule of law and respect for creditors' and debtors' rights. This confirms that financial constraints are more widespread in countries where the legal and judicial system is broken (Love, 2003). It further gives credence to our hypothesis that depositors have confidence in entrusting their savings to financial institutions when contracts between creditors and debtors are honoured. This result is, however, contrary to Beck (2016), who does not find evidence for any significant and consistent relationships between the rule of law and variations in account penetration. He nonetheless points that his work is premised on simple cross-sectional regressions that do not allow for any causal interpretation. Our finding is consistent with Ahokpossi et al. (2013) who find that the difference in the rule of law explains the performance lag of financial sectors in the WAEMU countries.

The hypothesis that regulatory quality may all translate to lower implicit costs on financial intermediation with improved financial inclusion is not supported here. Similarly, political stability is not significant in predicting financial inclusion. The conjecture that higher values of political stability impacts positively on financial inclusion because of the inherent security costs associated with unstable political regimes is not supported by the study findings.

Turning to control variables, the coefficient of income is positive and a statistically significant determinant of financial inclusion. The results suggest that higher economic growth/per capita incomes may enhance financial inclusion, which is consistent with Beck (2016), Allen et al. (2016) and Demirguc-Kunt et al. (2013). Estimation results also show that people staying in urban regions have higher deposit account(s) ownership compared to those residing in rural areas. Generally, there are more establishments of financial institutions in urban centres relative to rural areas. This lends support to Kumar (2013).

To account for technological advances, the study considered mobile phone subscriptions and internet utilisation rates, and assessed their association with financial inclusion. The estimated models predict that mobile phone subscriptions positively and significantly influences account penetration. This suggests that the likelihood of mobile money account is observed only conditional on having a deposit account. The coefficient estimates therefore provides evidence of the secondary effects of mobile money on deposit accounts. This points to the important role of technological innovation on mobile money and account penetration. We also find evidence for significant and consistent relationships between internet utilisation rates and changes in account penetration.

Contrary to Devlin (2005), our hypothesis that countries with higher unemployment levels are likely to witness more financial exclusion is not established. A potential explanation for the insignificant coefficient lies on the use of formal/wage-income data, which shows negligible variations during the study period. It may well be the case that the vast majority of the population in SSA work in the informal sector, but unlike in the developed economies, data may not be forthcoming. This conjecture, however, needs to be corroborated by further research.

## Interactive effects

The estimations results reported in Table 8 are based on the premise that all institutional indicators affect account penetration across the regions equally. In tables 5 and 6, and consistent with the stylised facts section, we observed that account penetration and institutional quality indicators are lower in SSA relative to other regions. Suppose we assume that institutional quality might have a different effect on financial inclusion in SSA relative to the other regions. This is a conditional hypothesis, which we can test with an interaction term. This can be regarded as an adjustment to the slope coefficient on each of the institutional variable for SSA. Adding interaction terms to a regression model can greatly expand our understanding of the relationships among the variables in the model and allows more hypotheses to be tested.

Using an interaction model, for example, implies that there is one effect of the rule of law on account penetration when SSA dummy= 0, and a different effect when SSA dummy=1. Thus the effect of a unit increase in the rule of law on account penetration when SSA dummy=0 is given by the coefficient of rule of law. The overall effect of a unit increase in the rule of law on account penetration when SSA dummy=1 is given by the coefficient of the rule of law plus the coefficient of the interaction term. On the contrary, if the effects are not different, then the interaction coefficient would be zero. This implies that we revert to the baseline regression without the interaction term.

Based on the estimation results, the coefficient on the interaction term for the rule of law is negative and statistically significant, implying that the impact of an extra unit of rule of law on account penetration is smaller among SSA economies than in the rest of the World. This is consistent with Anayiotos and Toroyan (2009) who concludes that financial sectors across SSA economies operate within weak institutional environments. Interestingly, the regulatory quality coefficient, which was not significant for the baseline regression, turns out to be statistically significant when interacted with SSA dummy. This suggests that the impact is similarly less than for the other regions. Financial institutions and depositors in SSA may therefore be operating in an environment characterised by excessive or challenging regulations, where rules are not efficiency enhancing. Thus, the ability of financial markets to mobilise funds may be strongly undermined by lack of depositors' confidence. Indeed, Demirguc-Kunt et al. (2004) shows that many SSA countries impose severe restrictions on bank activity with implications on efficiency and economies of scope.

It's important to point out that fixed effects do not eliminate the unobservable country-specific effects. Similarly, they do not deal with possible endogeneity in the regressors or reverse causality, for example, on income and account ownership. Despite these shortcomings, we view this data compilation effort and the subsequent empirical analysis as a useful and important first step towards developing more accurate indicators of determinants of financial inclusion.

## 6. Conclusion

Although the frontier of knowledge in financial inclusion is shifting towards providing answers as to why some countries are more inclusive than others, empirical evidence on the role of institutions remains relatively thin. Using cross-country data for 120 countries for the period 2004-2015, this study sought to understand the country institutional characteristics associated with the ownership of deposit accounts. In addition, it sought to establish what policies are especially effective in fostering financial inclusion. For this purpose, a standard regression model was estimated using fixed effects panel data techniques along a financial inclusion proxy and three measures of institutional quality. We provide the first empirical justification for the hypothesis that financial inclusion is non-negligibly driven by the institutional context.

We find that greater financial inclusion is associated with a better enabling environment to access financial services, specifically the rule of law. Therefore, the rule of law may create a stable environment for banks to flourish with implications on higher uptake of bank accounts. However, the magnitude and direction of the effect is sensitive to regions. The impact of an extra unit of rule of law and regulatory quality on account penetration is smaller among SSA economies than in the rest of the world. Upholding the rule of law implies that greater consumer protection may be positively related to ownership of a bank account. Well-developed legal systems, strong law enforcement and efficiency enhancing regulations may actually make it less costly for financial inclusion to be realised in SSA. Rigid regulations on bank entry and activities may also translate to an increase in the cost of financial intermediation. This is consistent with the arguments that favour relaxed regulations for financial intermediation. However, a number of developing countries face challenges in this regard. Very few developing countries are ranked above global averages, particularly on measures of institutional quality (Holmes et al., 2014).

By taking institutional characteristics into account, the analysis reported in this paper provides interesting insights for policy reforms, particularly in Sub-Saharan Africa. Efforts should be targeted at improving the set of institutions relevant to the financial system for free flow of information, enforcing contracts and property rights protection. This may ultimately create conducive climate for financial inclusion. This study could be extended with a focus on country-specific studies that may provide country-level policy conclusions or region-specific analysis involving countries with homogeneity in economic fundamentals, culture and history for relevant policy implications.

## Notes

1. <https://www.afi-global.org>
2. The advantage of these data is that they comprise of globally comparable indicators that assess geographic outreach and the use of financial services, and are available on higher frequency than household survey data.
3. <http://data.worldjusticeproject.org>
4. See, for example, Law and Demetriades (2006), Gani and Ngassam (2008), Law and Habibullah (2009), Law and Azman-Saini (2012) and Becerra et al. (2012).
5. Political economies that have embraced electoral democracy have better performing financial sectors than the closed authoritarian economies with centralised power (Voghouei et al., 2013; Enowbi-Batuo and Kupukile, 2010; Girma and Shortland, 2008; Siegle et al., 2004).
6. See, e.g., Demirguc-Kunt et al. (2013), Rojas-Suarez and Amado (2014), Allen et al. (2016), Zinsa and Weill (2016), Beck (2016), Mohammed et al. (2017), Wale and Makina (2017), among others.
7. These boundaries correspond to the 0.005 and 0.995 percentiles of the standard normal distribution. For a handful of cases, individual country ratings can exceed these boundaries when scores from individual data sources are particularly high or low.
8. The only other governance-related indicators that we are aware of that now report margins of error are the Transparency International Corruption Perceptions Index and the Global Integrity Index.

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# Appendix

Table 1: List of countries

|                        |                            |                          |
|------------------------|----------------------------|--------------------------|
| East Asia & Pacific    | Latin America & Caribbean  | Sub-Saharan Africa       |
| China                  | Argentina                  | Angola                   |
| Fiji                   | Bahamas, The               | Burundi                  |
| Hong Kong              | Belize                     | Benin                    |
| Japan                  | Bolivia                    | Burkina Faso             |
| Korea, Rep.            | Brazil                     | Botswana                 |
| Myanmar                | Chile                      | Central African Republic |
| Philippines            | Colombia                   | Cape Verde               |
| Thailand               | Costa Rica                 | Cameroon                 |
| Vietnam                | Ecuador                    | Congo, Dem. Rep.         |
|                        | Honduras                   | Congo, Rep.              |
| Europe & Central Asia  | Haiti                      | Comoros                  |
| Armenia                | Jamaica                    | Cote d'Ivoire            |
| Austria                | Mexico                     | Djibouti                 |
| Azerbaijan             | Nicaragua                  | Equatorial Guinea        |
| Belgium                | Panama                     | Ethiopia                 |
| Bulgaria               | Peru                       | Gabon                    |
| Bosnia and Herzegovina | Paraguay                   | Ghana                    |
| Croatia                | El Salvador                | Guinea                   |
| Czech Republic         | Trinidad and Tobago        | Kenya                    |
| Spain                  | Uruguay                    | Liberia                  |
| Estonia                | Venezuela, RB              | Lesotho                  |
| Finland                |                            | Madagascar               |
| Georgia                | Middle East & North Africa | Mali                     |
| Greece                 | Algeria                    | Mozambique               |
| Hungary                | Egypt, Arab Rep.           | Mauritania               |
| Ireland                | Israel                     | Mauritius                |
| Italy                  | Kuwait                     | Malawi                   |
| Kyrgyz Republic        | Lebanon                    | Namibia                  |
| Latvia                 | Libya                      | Niger                    |

continued next page

Table 1 Continued

|                         |                              |                    |
|-------------------------|------------------------------|--------------------|
| Europe and Central Asia | Middle East and North Africa | Sub-Saharan Africa |
| Macedonia, FYR          | Morocco                      | Nigeria            |
| Moldova                 | West Bank and Gaza           | Senegal            |
| Malta                   | Saudi Arabia                 | Sierra Leone       |
| Montenegro              | Tunisia                      | Swaziland          |
| Netherlands             | United Arab Emirates         | Togo               |
| Norway                  | Yemen, Rep.                  | Tanzania           |
| Poland                  |                              | Uganda             |
| Portugal                | South Asia                   | South Africa       |
| Sweden                  | Afghanistan                  | Zambia             |
| Switzerland             | Bangladesh                   | Zimbabwe           |
| Tajikistan              | Bhutan                       |                    |
| Turkey                  | India                        |                    |
| Ukraine                 | Maldives                     |                    |
| Uzbekistan              | Nepal                        |                    |
|                         | Pakistan                     |                    |

Table 2: Data description and sources

| Variable in the empirical model                                                    | Empirical counterparts                                                                                                         | Observed Counterpart       | Availability (sample period) | Source of data                      |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------|-------------------------------------|
| Endogenous variable                                                                |                                                                                                                                |                            |                              |                                     |
| DEP<br>Measured as the number of depositors with commercial banks per 1,000 adults | CAPDEPO<br>= number of depositors with accounts/ pop                                                                           | Deposit accounts ownership | 2004-2015, annual data       | Annual Financial Access Survey, IMF |
| Exogenous variables                                                                |                                                                                                                                |                            |                              |                                     |
| PS<br>Political Stability                                                          | PS=the likelihood of violent threats or changes in government                                                                  | Political stability        | 2002-2015, annual data       | WGI                                 |
| RQ<br>Regulatory Quality                                                           | RQ=the incidence of market-friendly policies                                                                                   | Regulation                 | 2002-2015, annual data       | WGI                                 |
| RL<br>Rule of Law                                                                  | RL=A proxy for the quality of contract enforcement, the police and the courts, as well as the likelihood of crime and violence | Commercial justice         | 2002-2015, annual data       | WGI                                 |
| continued next page                                                                |                                                                                                                                |                            |                              |                                     |

| Table 2 Continued                                                             |                                                          |                               |                              |                |
|-------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------|------------------------------|----------------|
| Variable in the empirical model                                               | Empirical counterparts                                   | Observed Counterpart          | Availability (sample period) | Source of data |
| Control variables                                                             |                                                          |                               |                              |                |
| GDP<br>Measured as<br>GDP per capita<br>(constant 2010 US\$)                  | INCOME<br>= GDP/POP                                      | Per capita GDP                | 2004-2015, annual<br>data    | WDI            |
| URBAN<br>Measured as urban<br>as a % of total<br>population                   | URBANPOP<br>= urban<br>population/total<br>population    | Urban<br>population           | 2004-2015, annual<br>data    | WDI            |
| UNEMPLOY<br>Measured as<br>Unemployed /total<br>labour force                  | UNEMPRATIO<br>= Unemployed /<br>total labour force       | Employment<br>status          | 2004-2015, annual<br>data    | WDI            |
| MOBILE Measured<br>as mobile cellular<br>subscriptions (per<br>100 people)    | MOBRATIO<br>= Phone<br>subscription/ per<br>100 people   | Mobile phone<br>subscriptions | 2004-2015, annual<br>data    | WDI            |
| INTERNET<br>Measured as<br>fixed broadband<br>subscriptions per<br>100 people | INTERNET<br>=internet<br>subscription/ per<br>100 people | Internet<br>utilisation       | 2004-2015, annual<br>data    | WDI            |

Table 3: Expected sign of each explanatory variable on the dependent variable

| Variable                           | Endogenous variable                               |                          |                                      |
|------------------------------------|---------------------------------------------------|--------------------------|--------------------------------------|
|                                    | Depositors with commercial banks per 1,000 adults |                          |                                      |
| Explanatory variable / determinant | Expected sign                                     | Sign predicted by theory | Sign from previous empirical studies |
| Institutional environment          |                                                   |                          |                                      |
| Political Stability                | Positive                                          | Positive                 | Positive                             |
| Regulatory Quality                 | Positive                                          | Positive                 | Positive                             |
| Rule of Law                        | Positive                                          | Positive                 | Positive                             |
| Control variables                  |                                                   |                          |                                      |
| GDP                                | Positive                                          | Indeterminate            | Indeterminate                        |
| Urban population                   | Positive                                          | Positive                 | Positive                             |
| Unemployment                       | Negative                                          | Negative                 | Negative                             |
| Mobile cellular                    | Positive                                          | Positive                 | Positive                             |
| Fixed broadband                    | Positive                                          | Positive                 | Positive                             |

Table 4: Descriptive statistics

| Variable                         | Notation | Obs   | Mean    | Standard<br>Deviation | Minimum | Maximum |
|----------------------------------|----------|-------|---------|-----------------------|---------|---------|
| Depositors with commercial banks | DEP      | 1,016 | 333.2   | 292.0                 | 0.409   | 999.9   |
| Log GDP per capita               | GDP      | 1,493 | 8.262   | 1.504                 | 5.323   | 11.43   |
| Population density               | POP      | 1,499 | 244.8   | 873.2                 | 1.607   | 7807    |
| Urban population                 | URB      | 1,499 | 55.47   | 22.77                 | 8.445   | 100     |
| Unemployment                     | UNEM     | 1,458 | 8.944   | 6.486                 | 0.100   | 37.60   |
| Mobile cellular subscriptions    | MOB      | 1,495 | 78.74   | 46.87                 | 0.185   | 235.6   |
| Fixed broadband subscriptions    | INTERN   | 1,365 | 7.394   | 10.25                 | 0       | 45.11   |
| Political Stability              | PS       | 1,496 | -0.258  | 0.936                 | -2.806  | 1.590   |
| Regulatory Quality               | RQ       | 1,497 | -0.0788 | 0.904                 | -2.345  | 2.263   |
| Rule of Law                      | RL       | 1,498 | -0.196  | 0.925                 | -1.991  | 2.120   |

Table 5: Depositors with commercial banks per 1,000 adults, 2004-2015

| Region | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| SSA    | 128.0 | 131.1 | 153.9 | 153.8 | 190.3 | 199.4 | 216.5 | 215.5 | 252.6 | 285.8 | 257.0 | 318.9 |
| ECA    | 533.2 | 537.7 | 624.8 | 725.8 | 681.7 | 647.0 | 699.0 | 730.2 | 829.7 | 839.1 | 837.1 | 863.4 |
| MENA   | 471.4 | 467.7 | 457.3 | 487.8 | 615.4 | 695.8 | 635.8 | 582.7 | 596.6 | 625.4 | 502.2 | 514.0 |
| EAP    | 317.4 | 360.1 | 222.9 | 355.6 | 340.8 | 354.3 | 304.5 | 362.1 | 305.2 | 347.2 | 378.8 | 409.5 |
| SA     | 370.8 | 381.8 | 404.2 | 426.1 | 454.0 | 487.5 | 477.8 | 555.8 | 373.2 | 496.3 | 418.5 | 457.6 |
| LAC    | 586.7 | 423.5 | 466.3 | 520.3 | 597.3 | 648.3 | 659.2 | 675.9 | 634.1 | 564.0 | 677.0 | 603.3 |

Source: Financial Access Survey, IMF (2016) and computation by author.

SSA=Sub-Saharan Africa; ECA=Eastern Europe and Central Asia; MENA=Middle East and North Africa; EAP=East Asia and the Pacific; SA=South Asia; LAC=Latin America and the Caribbean.

Table 6: Financial inclusion and institutional indicators: Mean values, 2004-2015

| Region | Depositors | Institutional indicators |       |       |
|--------|------------|--------------------------|-------|-------|
|        |            | RL                       | RQ    | PS    |
| SSA    | 217        | -0.66                    | -0.62 | -0.46 |
| ECA    | 693        | 0.51                     | 0.66  | 0.29  |
| MENA   | 579        | -0.19                    | -0.19 | -0.79 |
| EAP    | 340        | 0.06                     | 0.16  | -0.06 |
| SA     | 446        | -0.64                    | -0.73 | -1.11 |
| LAC    | 588        | -0.41                    | -0.06 | -0.25 |

Source: Financial Access Survey, IMF (2016), World Bank (2016a)[ and computation by author.

RL=Rule of law; RQ=Regulatory quality; PS=Political stability.

Table 7: Correlations matrix

|       | DEP     | GDP    | POP     | URB     | UNEM    | MOB    | INTER  | PS     | RQ     | RL |
|-------|---------|--------|---------|---------|---------|--------|--------|--------|--------|----|
| DEP   | 1       |        |         |         |         |        |        |        |        |    |
| GDP   | 0.6083  | 1      |         |         |         |        |        |        |        |    |
| POP   | -0.0183 | 0.1772 | 1       |         |         |        |        |        |        |    |
| URB   | 0.4954  | 0.7294 | 0.2352  | 1       |         |        |        |        |        |    |
| UNEM  | -0.0289 | 0.0198 | -0.1352 | -0.0046 | 1       |        |        |        |        |    |
| MOB   | 0.3489  | 0.6059 | 0.2653  | 0.4893  | 0.0097  | 1      |        |        |        |    |
| INTER | 0.6589  | 0.6549 | 0.2886  | 0.5838  | -0.0432 | 0.5639 | 1      |        |        |    |
| PS    | 0.4315  | 0.6427 | 0.1608  | 0.4232  | 0.0173  | 0.4485 | 0.5585 | 1      |        |    |
| RQ    | 0.5747  | 0.6723 | 0.2799  | 0.5968  | 0.0307  | 0.5316 | 0.6438 | 0.7273 | 1      |    |
| RL    | 0.6174  | 0.6774 | 0.2655  | 0.5546  | -0.0091 | 0.4843 | 0.6728 | 0.7387 | 0.9131 | 1  |

Table 8: The impact of institutions on financial inclusion

| Variable                      | Variant model specifications |                       |                       |                       |                       |                       |                       |
|-------------------------------|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                               | Notation                     | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Intercept                     |                              | -2.8212***<br>(-7.17) | -2.9521***<br>(-7.22) | -2.6262***<br>(-6.81) | -2.5261***<br>(-6.57) | -2.4661***<br>(-6.41) | -2.4207***<br>(-6.32) |
| Log GDP per capita            | GDP                          | 0.2945***<br>(5.59)   | 0.3161***<br>(5.67)   | 0.2617***<br>(5.28)   | 0.2378***<br>(4.76)   | 0.2470***<br>(5.11)   | 0.2345***<br>(4.85)   |
| Urban population              | URB                          | 0.0160***<br>(3.98)   | 0.0154***<br>(3.77)   | 0.0176***<br>(4.48)   | 0.0185***<br>(4.74)   | 0.0171***<br>(4.44)   | 0.0178***<br>(4.62)   |
| Unemployment                  | UNEM                         | 0.0048<br>(1.36)      | 0.0043<br>(1.23)      | 0.0045<br>(1.27)      | 0.0045<br>(1.28)      | 0.0049<br>(1.40)      | 0.0058<br>(1.60)      |
| Mobile cellular subscriptions | MOB                          | 0.0008***<br>(3.27)   | 0.0008***<br>(3.22)   | 0.0008***<br>(3.35)   | 0.0008***<br>(3.70)   | 0.0008***<br>(3.45)   | 0.0008***<br>(3.59)   |
| Fixed broadband               | INTER                        | 0.0070***<br>(3.99)   | 0.0069***<br>(3.89)   | 0.0071***<br>(4.02)   | 0.0068***<br>(3.87)   | 0.0071<br>(4.02)      | 0.0068***<br>(3.85)   |
| Political Stability           | PS                           | -0.0157<br>(-1.04)    | -0.0356<br>(-1.58)    |                       |                       |                       |                       |
| Political StabilityXSSA       | PSXSSA                       |                       | 0.0335<br>(1.18)      |                       |                       |                       |                       |
| Regulatory Quality            | RQ                           |                       |                       | 0.0164<br>(0.53)      | 0.0650*<br>(1.84)     |                       |                       |

continued next page

Table 8 Continued

| Variable                   | Variant model specifications |                                                                                        |        |        |                       |                    |                       |
|----------------------------|------------------------------|----------------------------------------------------------------------------------------|--------|--------|-----------------------|--------------------|-----------------------|
|                            | Notation                     | 1                                                                                      | 2      | 3      | 4                     | 5                  | 6                     |
| Regulatory Quality         | XSSA                         | RQXSSA                                                                                 |        |        | -0.1838***<br>(-2.70) |                    |                       |
| Rule of Law                | RL                           |                                                                                        |        |        |                       | 0.0611**<br>(1.98) | 0.1282***<br>(3.19)   |
| Rule of law                | XSSA                         | RLXSSA                                                                                 |        |        |                       |                    | -0.1561***<br>(-2.59) |
| R2                         |                              | 0.4798                                                                                 | 0.4815 | 0.4789 | 0.4875                | 0.4832             | 0.4910                |
| Observations               |                              | 512                                                                                    | 512    | 512    | 512                   | 512                | 512                   |
| Hausman specification test |                              | chi2(7) = 22.03<br>Prob>chi2 = 0.0000<br>Ho: difference in coefficients not systematic |        |        |                       |                    |                       |

This table presents regression results conducted to determine the influence of institutional variables on financial inclusion. Estimations were performed using fixed effects estimation. T-Statistics are in parentheses and significance at the 10%, 5%, and 1% level is denoted by \*, \*\*, and \*\*\*, respectively. A detailed description of the definition and sources of the variables is given in Table 2.



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