Institutional Environment and Financial Inclusion in Sub-Saharan Africa

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Abstract

The purpose of this study is to analyze the effect of institutional factors on financial inclusion through the lens of the integration of mobile money. To achieve this objective, a multiple regression model is chosen, justified by the acceptance of the null hypothesis that the specified endogenous regressor, in our case GDP per capita, can indeed be treated as exogenous. The estimation of this model by Ordinary Least Squares (OLS) using data from the World Development Indicators (WDI) and the World Governance Indicators (WGI) databases reveals that the quality of regulation is, a priori, the only institutional factor affecting financial inclusion since it is a driver of financial inclusion in SSA. This result, which corroborates the theory of financial liberalization, makes it possible to identify economic policy implications supporting the implementation of incentive-based regulation in the banking system and the regulation of the mobile money sector.

Keywords

Financial Inclusion, Governance, Sub-Saharan Africa, Multiple Linear Regression Model

1. Introduction

As part of the fight against poverty, ensuring access to basic financial services for the 2.7 billion unbanked people across the world is an important driver for stimulating the global economy, with an estimated effect of $175 billion per year according to a report commissioned by the United Nations[1]. This is in line with the ideas supported by Beck et al. (2011), who considers the development of an efficient financial system, a source of economic development.

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[1]Barclays, CARE UK and Plan UK (2013): "Banking on Change: Breaking Barriers to Financial Inclusion", London.

Thus, in the presence of low rates of bank account ownership, i.e., 33% in Sub-Saharan Africa (BEI, 2018)[2], the recourse to financial inclusion was chosen to address this exclusion in this study because the sole purpose of financial inclusion is to enable the most disadvantaged populations to access basic financial services at a low cost. This purpose is reflected in the various definitions of financial inclusion (World Bank; Dabla-Norris et al., 2015; Hannig & Jensen, 2010).

In this vein, the Alliance for Financial Inclusion (AFI) has opted for the use of mobile money as a vehicle for inclusion (AFI, 2010). This method has been supported by Sekantsi and Motelle (2016), who argue that mobile payment is a solution to financial exclusion given the high operational costs of traditional financial services and physical infrastructure coupled with the low incomes of disadvantaged populations. The use of mobile money is justified by, on the one hand, the possibility to use the infrastructures and services offered by mobile telephony and, on the other hand, the low cost, low difficulty and speed of opening a cell phone account compared to a traditional bank account or a microfinance account (Sekantsi & Motelle, 2016).

In addition, with a penetration rate of 44% for 456 million unique subscribers in Sub-Saharan Africa[3] (GSMA, 2019), all mobile subscribers can enjoy the opportunity to access mobile money and therefore promote their financial inclusion since mobile money enables cell phone users to carry out routine transactions, such as sending remittances, paying bills, building up savings, and carrying out transactions with their bank accounts, similarly to mobile banking (Fanta et al., 2016).

However, despite this high cell phone penetration rate, the mobile money account rate can still be improved due to many disparities among the subregions making up Sub-Saharan Africa (GSMA, 2019). Therefore, while many authors have conducted work on the determinants of mobile money adoption using a microeconomic approach based on individual choices (Bidiasse & Mvogo, 2019; Fanta et al., 2016), this analysis would benefit from being the support of a macroeconomic approach to the factors influencing financial inclusion.

To carry out such an analysis, we consider the institutional environment surrounding the financial system and rely on the institutional variables developed by the World Bank. Thus, the objective of this study is to analyze the effect of institutional factors on financial inclusion. Given that the institutional environment constitutes a lubricant for the functioning of markets and the development of economic and financial activities (Beck et al., 2003; Demirgüç-Kunt et al., 2003), we argue that institutional factors promote financial inclusion.

The remainder of the study is presented as follows: an overview of the related literature in the following section, a presentation of the methodological framework in the third section, the interpretation and analysis of the results in the

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[2]EIB: European Investment Bank.
[3]Unique subscribers (GSMA, 2019): Individuals who have subscribed to a mobile service and may have multiple mobile connections (e.g., SIM cards), as calculated by GSMA Intelligence.

fourth section, and finally, the conclusion in the fifth section.

2. An Overview of the Literature

Our review of the literature follows two axes: first, the approach to financial inclusion and, second, the relationship between institutional variables and financial inclusion.

2.1. A Theoretical Approach to Financial Inclusion

The concept of financial inclusion can be linked to Mackinnon (1973) and Shaw (1973)[4], who developed the concept of financial repression based on the observation that financial markets in developing countries are virtually absent, implying that the banking sector plays a key role in the allocation of resources. For the authors, financial repression stems from the desire of governments to control the banking sector[5] to finance their budget deficit at low cost, which leads to a slowdown in economic growth. In this approach, the absence of organized financial markets leads to the self-financing of economic entities and consequently to the absence of lending or borrowing among them. This self-financing is based on the composition of savings, which can take two distinct forms, namely, real nonproductive assets or real money holdings, i.e., bank deposits. These bank deposits constitute a channel for the formation of capital, making capital and money complementary and nonsubstitutable in this respect. This represents a "reformulation of the demand for money" (Venet, 1994).

For Mackinnon/Shaw, financial repression reduces the volume of funds available for investment because of the decrease in bank deposits, which in turn impacts the quality of this investment by increasing risk aversion and the preference for liquidity. Consequently, financial liberalization, while increasing the volume of money holdings and thus allowing for an increase in investment, increases bank intermediation with a reduction in intermediation costs due to economies of scale, better risk diversification and easier access to funds. However, for Bencivenga & Smith (1990), in the absence of financial markets, an optimal degree of financial repression can be achieved.

The Mackinnon/Shaw approach has been questioned, however, by the neostructuralist school, which integrates into its approach the existence of informal financial markets and attributes them a certain level of efficiency in the allocation of resources. Thus, according to this approach, the informal sector is a lever of economic growth. To this end, the neostructuralist approach is based on five hypotheses (Fry, 1988): 1) wages are defined exogenously or institutionally through social conflicts; 2) inflation is dependent on the relative strength of capitalists and workers; 3) savings are defined as a portion of profits and not of wages; 4) a general price level is defined by fixed margins on labor costs, the financing of productive capital and imports; and finally 5) developing countries depend on

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[4]Now Mackinnon/Shaw.

[5]This is done by various means, such as setting interest rates that are disconnected from the market, setting reserve requirements or nationalizing banks.

imports of intermediate goods, capital equipment and raw materials.

In this neostructuralist conception, based on a Keynesian approach to adjustment mechanisms, the demands and offers of credit and money in the informal market are equalized by a market interest rate, and those in the goods and services market are equalized by quantities and not prices, while inflation is a function of costs. Therefore, the use of the Mackinnon/Shaw approach would necessarily lead to a deterioration of the economy. For neostructuralists, money holders play the role of financial intermediaries between savers and investors, making these markets competitive (Taylor, 1983). Households can thus choose between three financial assets: bank deposits, loans on the informal market, and gold or money. It should be noted that loans on the informal market constitute an alternative to bank deposits, which is supported by the supposed free movement of capital from one sector to another. The challenge is to define which of the two sectors best stimulates economic growth. Neostructuralists opt for the informal sector because of the compulsory reserves constituting portions of the deposits imposed on banks.

Despite the differences between these two schools of thought, they do not clash over financial liberalization but over the approach to achieving it. Indeed, for Mackinnon/Shaw, the focus is on the development of the banking sector, while for neostructuralists, the focus is on the development of the informal, market-based sector (Cho, 1990). However, the neostructuralists' perspective is reviewed by Kapur (1992), who postulates that the reserves held by official banks provide short-term liquidity, thus strengthening the security of the system. In the absence of this security, the informal sector may experience a liquidity risk, so it must also develop its own reserves. Consequently, according to Kapur (1992), there is complementarity between the two sectors, especially since the informal sector has three undeniable advantages: 1) a good geographical location in areas without a formal banking sector because of high costs; 2) an absence of information asymmetry because transactions are carried out between members of a community who know each other, which favors the rapid dissemination of information; and finally 3) a low risk of moral hazard because guilty parties may be excluded from the community.

Kapur's (1992) approach, in the complementarity of the two sectors, allows a more comprehensive approach to financial inclusion by associating banking with the informal sector. At this level, it should also be noted that another result of Kapur (1992), namely, the security of the system for the informal sector under penalty of liquidity risk, is taken into account by the choice of financial services through mobile telephony as a vector of financial inclusion, an option adopted by the Alliance for Financial Inclusion (AFI)[6]. Kapur's (1992) perspective was thus one of the options chosen by the World Bank to apprehend financial inclusion and is likewise used as a basis for this study.

Therefore, in the context of this study, seeing the effect of governance sup-

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[6]Alliance for Financial Inclusion Global Policy Forum 2011 in Riviera Maya, Mexico.

porting financial inclusion as a development of the financial system means analyzing the effect of institutional variables on banking and mobile money. To this end, it should be pointed out that the effectiveness of institutional factors as macroeconomic determinants of financial inclusion has been shown in the economic literature. Indeed, authors such as La Porta et al. (1997, 1998) with the theory of law and finance, North (1990) with new institutional economics and Pagano and Volpin (2001) with new political economy have all justified the effect of institutional factors on financial systems in general and access to them in particular.

In this respect, La Porta et al. (1997, 1998) postulate that the quality of the development of a financial system depends on its history, such that states with a common law legal system of British origin have a better basis for development than states with the legal system of German and Scandinavian civil law or, in last place, states with the legal system of French civil law. New institutional economics, supported by North (1990), analytically explains how institutions and institutional changes impact economies in the short or long term. For North (1990), institutions make it possible to set up a framework of incentives in an economy and thus ensure that agents benefit from them. Finally, new political economy (Pagano & Volpin, 2001) analyzes the impact of political decisions on the economy. In this approach, policy-makers are considered agents who react to political incentives.

2.2. An Empirical Look at the Relationship between Governance and Financial Inclusion

Several studies have been carried out on the effects of governance on financial inclusion. However, while the effects of institutional factors on traditional financial services, i.e., banking or markets, have been widely discussed in the literature (Beck et al., 2003), their effects on financial inclusion involving mobile money are much less addressed (Jacolin et al., 2019). Similarly, because of the high rate of bankization in developed countries, the need for financial inclusion in emerging or developing countries is evident. As Love (2003) shows, variations in the cost of capital are twice as high in countries with low financial development as in countries with medium financial development. Our analysis is thus carried out along these two lines.

For developed countries, financial sector development is not necessarily about financial inclusion but rather about improving the existing financial sector by removing barriers. Thus, Beck et al. (2003), investigating the power of banks in the access of firms to credit, conclude that the concentration of banks has negative effects, in particular through the high financing constraints faced mainly by economies with a low level of institutional development. The authors therefore recommend monitoring the institutional and regulatory environment to assess the effect of competitiveness. Noting that the strengthening of regulations on bank entry and activities increases the cost of financial intermediation, Demirgüç-Kunt et al. (2003) recommend that these regulations be taken not in isolation but through approaches addressing private ownership and competition.

The importance of regulation is highlighted by Hartarska & Nadolnyak (2007), who see regulation as an opportunity for microfinance institutions (MFIs) to improve their financial performance by enhancing their processing capacity and their access to external deposits and funding lines.

The legal factor is investigated by Love (2003), Demirgüç-Kunt and Maksimovic (2002), Wurgler (2000), Demetriades and Fielding (2011) and Gani and Ngassam (2008). Considering the impact of the financial sector on growth, Love (2003) highlights, in addition to the effect of size and economic cycles, the impact of the legal environment on financial development. Demirgüç-Kunt and Maksimovic (2002) analyze firms' access to external financing when the financial system is based on market or bank intermediation. They show that the development of a country's financial system depends on the development of its legal system, which affects the stock and banking markets differently. Concerning the improved allocation of resources supported by financial markets, Wurgler (2000) asserts that the efficient allocation of capital is negatively correlated with the weight of state participation in the economy but positively correlated with the protection of minority investors. This last result is corroborated by Demetriades and Fielding (2011), who argue that the rule of law is by far the factor with the greatest impact on banking volume. Finally, still on the subject of financial markets, Gani and Ngassam (2008) argue that political stability and the rule of law are determinants of the development of financial markets, while poor regulatory quality and government efficiency hamper financial market development.

This shows that institutional factors do indeed influence the development of these two financial systems from which financial inclusion is derived. It is therefore appropriate to look at the studies focusing on poorly or moderately developed financial systems, particularly in Sub-Saharan Africa. In this regard, several authors have conducted studies on the effect of institutional factors on financial inclusion. Anayiotos and Toroyan (2009) show that institutional factors have a greater effect on access to financial services and financial depth than on quality and profitability. Similarly, Acemoglu and Johnson (2005), confirming that institutions strongly affect financial outcomes, place particular emphasis on the strong effect of property rights institutions on financial development. This argument is echoed by Allen et al. (2016), who state that the strengthening of legal rights and political stability affects financial inclusion. In a similar vein, McDonald and Schumacher (2007), seeking to explain the low development of some financial markets through the role of creditor rights, find that SSA states with stronger legal institutions have a more developed financial system. Still on the subject of strong institutions, Zulkhibri and Ghazal (2017) show that strong economic institutions coupled with strong economic governance significantly improve financial inclusion for the poor segment of society. The governance factor is also retained by Alter and Yontcheva (2015), who investigate the level of inclusion in CEMAC[7] and indicate that strong governance of the private and fi-

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[7]CEMAC: Economic and Monetary Community of Central Africa.

nancial sectors affects financial development through better financial inclusion.

In addition to these factors, the weight of regulation must be considered. Indeed, several authors have shown the importance of this factor for the development of financial inclusion. For example, Geourjon et al. (2013) note that as financial development involves new risks, it is appropriate to simultaneously strengthen financial supervision and regulation. Bourenane et al. (2011) show that strategies, particularly regarding prudential measures, must be adapted to the economic context of each state. This result is supported by Demirgüç-Kunt and Klapper (2012), who find that states with more competitive and well-regulated financial systems experience fewer obstacles for their populations. Regarding regulation, Demirgüç-Kunt et al. (2017) specify that it must foster innovation to make the financial system safe, reliable and stable through small, economically viable transactions.

This literature review highlights several important elements. Indeed, the theoretical review leads us to opt for an approach corresponding to that of Kapur (1992), which takes into account the two sectors of the financial system: the formal or official sector and the informal sector. Our empirical review shows that political stability, regulation and the rule of law are the three institutional variables that have the greatest impact on financial inclusion, following the example of Muriu (2020), whose study serves as a reference for this study.

3. Methodological Framework

This section is structured in two subsections. The first subsection addresses the methodology for assessing the effects of institutional quality on financial inclusion, variable selection and behavior, and the second subsection examines the expected signs, variable descriptions, and data sources.

3.1. Theoretical Model, Instrumental Variable Method and Choice of Variables

1) *Theoretical model*

Various studies have addressed the relationship between institutions and financial inclusion, as evidenced by the empirical review. However, not all of these studies are based on a single theoretical framework. Indeed, in the absence of a frame of reference, such as the model of Mankiw et al. (1992) for growth studies, the authors develop ad hoc models based on certain postulates. Our study is inspired by the approach of Muriu (2020) because of its relevance and the data available to us. Therefore, our estimates can be anchored by the following equation:

Financial inclusion

$$= f \left(\text{institutional factors, socioeconomic factors, macroeconomic factors and others} \right).$$

Assuming that the relationship between financial inclusion and institutional quality is linear, the specification of our model is based on the following equation:

$$Y = a_0 + a_1 INS + a_2 X + \varepsilon \qquad (1)$$

where Y is the explained variable (financial inclusion), INS is a vector of variables on the quality of institutions (three variables extracted from Kauffman in the World Bank database), X is the matrix of control variables (socioeconomic and macroeconomic), ε is the vector of error terms, a_2 is the matrix of parameters to be estimated, and a_0 and a_1 are the parameters to be estimated.

2) *Instrumental variable method*

The theoretical model presented above can face endogeneity issues. Indeed, just as financial inclusion can be explained by various factors (institutional, socioeconomic, macroeconomic, etc.), these factors can be influenced by financial inclusion. Under these conditions, errors can no longer be orthogonal to the matrix of these factors, and the application of OLS can lead to biased results. On the other hand, this problem can be solved using the instrumental variable method, which has been promoted by authors such as Durbin (1954) and Sargan (1958) and has the following variants: double least squares, triple least squares and the method of moments. In this work, we opt for the method of moments, notably the one introduced by Hansen (1982), because of its capacity to correct possible biases of endogeneity and deal with the problem of heteroskedasticity of unknown form often encountered in cross-sectional analysis.

3) *Choice of variables*

We present, first, the choice of our governance variables and, second, the control variables and the endogenous variable.

Governance variables

Like Zulkhibri & Ghazal (2017), Alter & Yontcheva (2015) and Muriu (2020), we adopt the World Governance Indicators (WGI), which present aggregate or individual governance data for more than 212 countries. Based on the six governance indicators constructed by Kaufmann et al. (2009), in accordance with our literature review, we select only three indicators that we consider relevant for financial inclusion, in line with Muriu (2020). These are the rule of law, political stability and regulatory quality. According to Kaufmann et al. (2009), although the measurement of institutional variables is subjective because it is based on agents' perceptions, the agents conceive their actions on the basis of their opinions, impressions and perceptions. Thus, perception is an important element in measuring the effect of an institutional variable.

Although previous studies have used many measures to assess the institutional environment (Muriu, 2020), we chose the WGIs because, different from the case for other indicators, their margins of error are clearly indicated. Moreover, due to the increase in the number of sources mobilized, their standard errors have reduced over time. These indicators are sufficiently informative to allow comparisons between countries that reflect statistically significant differences in the estimation of governance. As a result, changes in governance can be captured even over a very short period of time.

Rule of law: an indicator that captures agents' level of confidence in and re-

spect for the rules of society, particularly in the execution of contracts, the property rights of the police and the courts, and the likelihood of crime and violence.

Political stability: this indicator provides information on agents' perceptions of the probability of the destabilization or overthrow of governments by violent or unconstitutional means or of politically motivated terrorism.

Quality of regulation: an indicator of agents' perceptions of the government's ability to promote sound policies and regulations that foster private sector development.

Endogenous variable

Our variable for capturing financial inclusion is the percentage of the population aged 15 and older that holds an account at a financial institution or with a mobile money service provider. This variable allows us to capture both the formal sector, measured by banks and microfinance, and the informal sector, measured by mobile money. This is an improvement compared to Muriu (2020). It is an indicator of the World Bank's Findex 2017 database and allows us to capture the different aspects of financial inclusion. It is expressed as a percentage of the population having access to an account with a banking service provider.

Control variables

Five control variables were identified from the literature, as presented below:

Cell phone subscriptions (*per* 100 *inhabitants*) *and Internet users* (% *of the population*): these are two indicators that allow us to understand the role of new technologies in financial inclusion. These are the control variables in our study that should positively affect financial inclusion.

GDP per capita (*current US$*): this indicator is chosen because higher income should allow better access to financial services and therefore better financial inclusion. This variable should therefore positively affect financial inclusion.

Urban population (% *of total*): since the number of financial institutions is higher in urban areas than in rural areas, the urban population is more likely to have access to financial services than the rural population. Thus, it is expected that a high proportion of the urban population will have a positive effect on access to accounts.

Employment rate of the population aged 15 *and over*: using the World Bank's Findex 2017 database, employment is selected as one of the reasons for access to accounts, in the same way as GDP per capita. We thus expect a positive effect of this variable on financial inclusion.

3.2. Expected Signs, Description of Variables and Data Source

Data Sources

In this study, various statistical and econometric analyses are carried out using data from the World Development Indicators (WDI) and the World Governance Indicators (WGI) databases. These data cover all countries in Sub-Saharan Africa except Benin, Botswana, Burkina Faso, Cameroon, Côte d'Ivoire, Equatorial Guinea, Eritrea, Eswatini, Madagascar, Guinea-Bissau, Gambia, Somalia, Sudan,

South Sudan, Sao Tome and Principe, Senegal and Seychelles due to missing data. In other words, the size of our working sample is thirty-one (31) countries in Sub-Saharan Africa.

The choice of these two databases is justified by the fact that they are complementary (the first deals with issues of access to financial and other services, while the second focuses on institutions). Finally, since we do not have long series for each country, we consider only the situation in 2017.

For the countries not included in this work, this was done because we found that at their level, certain variables (urban population, holding an account in a financial institution or with a money service provider, mobile GDP per capita, etc.) due to missing values do not have the minimum number of observations required, i.e. thirty, to lend themselves to statistical inference. In other words, under the law of large numbers, these variables do not follow the normal law for these countries.

Table 1 below presents the expected signs and descriptive statistics of the variables mobilized for our study.

Expected signs and description of variables

In line with Beck et al. (2003) and Demirgüç-Kunt and Maksimovic (2002), governance variables are expected to strengthen financial inclusion, which justifies their positive sign here. Moreover, the perception of the population of Sub-Saharan Africa of these three dimensions tends to be negative, except for political stability, which can be positive, on average. Therefore, on average, the inhabitants of Sub-Saharan Africa perceive that in their respective countries, the regulatory quality is poor, and there is neither rule of law nor political stability.

The percentage of Internet users is on average 21,397%. This low rate, which is almost non-existent in some areas, particularly Burundi (2.66%), Central African Republic (4.33%) and Chad (6.44%), shows that there is considerable room for improvement in the popularization of this tool. Consequently, it suggests

Table 1. Signs of the estimated parameters and descriptive statistics.

Variables	Signs	Mean	Standard deviation	Minimum	Maximum	Obs
Rule of law	+	−0.606	0.591	−1.731	0.681	31
Political stability	+	−0.622	0.864	−2.351	0.970	31
Quality of regulation	+	−0.619	0.530	−1.480	0.995	31
Cell phone subscriptions (% of population)	+	81.008	34.652	25.574	155.232	31
Internet users (% of population)	+	21.397	15.825	2.660	57.162	31
GDP per capita (current US$)	+	1962.547	2355.005	292.9976	10,484.91	31
Urban population (% of total)	+	40.814	17.929	12.706	88.976	31
Employment rate of the population aged 15 and over	+	49.59	10.33	24.42	77.76	31

Source: Authors, based on the literature and WDI data.

increased financial inclusion.

GDP per capita shows large gaps between the minimum and the maximum, which also leaves plenty of room for progress in reducing this discrepancy and thereby increasing financial inclusion.

The proportion of urban populations is on average 40.814% with a minimum of 12.7% for Burundi or 16.35% for Niger, which means that there is an effort to be made with rural populations following the example of Rwanda (17.12%), within the framework of access to financial services in order to increase financial inclusion.

The employment rate of the population aged 15 and over averages 49.59% with a minimum of 24.42%, which highlights that on average, one out of every two people aged 15 and over is employed. This rate can drop to as much as one person in four in some areas, notably 24.42% in Niger, 32% in Togo and 36.85% in Mauritania. In view of this, it is necessary to implement intensive employment policies to increase financial inclusion.

The average subscription rate for mobile telephony subscribers aged 15 and older is 81%, with a minimum of 25,574 and a maximum of 155,232. This indicates that, on average, 8 out of 10 people aged 15 and over have a telephone subscription and some people have several subscriptions, which is a good factor of access to mobile money. The minimum value indicates that there are areas with room to increase the subscription rate and therefore enhance the access to mobile money for greater financial inclusion. In these areas, it is necessary to intensify policies in favor of better access to mobile telephony.

4. Presentation, Interpretation and Discussion of Results

4.1. Presentation of Results

The results of our estimates are presented in Table 2 below.

Table 2 shows that the model with instrumental variables (Model 1) has fairly good fit. Indeed, its Fisher statistic is significant at the 5% threshold. This means that there is at least one nonzero coefficient. These two coefficients of determination are on the order of 60% and 90%, thus testifying to the high explanatory power of the model. On the other hand, Hansen's test is not conclusive, and above all, the null hypothesis that the specified endogenous regressor, in our case GDP per capita, can indeed be treated as exogenous is accepted. Specifically, in our model, GDP per capita is instrumented by certain variables, notably "Internet users"; this explains why no coefficient is associated with it. Consequently, we cannot interpret the results of this model. However, the results of the multiple linear regression model (model 2) can be interpreted since, in this configuration, the estimation by the ordinary least squares method is valid and yields results of much better quality. Therefore, we can move on to the presentation of the results.

The estimates of this model show that the coefficient of the Fisher statistic has a probability greater than 0.05. This indicates that there is at least one significant

Table 2. Estimation results of the instrumental variable (1) and linear regression (2) models.

Model variables	Model 1		Model 2	
	Coef	Prob	Coef	Prob
• Rule of law	8.429	0.231	5.946	0.573
• Political stability	−3.116	0.355	−5.315	0.252
• Quality of regulation	11.838	0.367	23.309	0.049*
• Cell phone subscriptions (% of population)	−9.317	0.147	−8.587	0.372
• Internet users (% of population)	--		−0.118	0.770
• GDP per capita (current US$)	0.004	0.128	0.003	0.100**
• Urban population (% of total)	0.023	0.906	0.168	0.298
• Employment rate of the population aged 15 and over	0.105	0.662	0.201	0.517
Constant	45.476	0.001*	44.428	0.034*
F-stat	17.59	0.000*	11.54	0.00
R^2 censored	0.603			
R^2 uncensored	0.938			
R^2			0.636	
Root MSE	11.74		13.355	
Hansen over-idenification test	6.336	0.042		
Test of endogeneity of the variable Pib/habitants, implemented using the "endog" option.	0.047	0.828		

Source: Authors, using data from the WDI and Stata software. *significant at the 5% threshold, **significant at the 10% threshold.

explanatory variable. The coefficient of determination, which shows the extent to which the explanatory variables explain financial inclusion, has a value of 63.60%, which is a very high value. Overall, this model has good properties, and we can therefore proceed to the interpretation and discussion of the results of our study, namely, that the quality of regulation reinforces financial inclusion.

4.2. Interpretation and Discussion of Results

The results of our study allow us to show that regulatory quality is an accelerator of financial inclusion in Sub-Saharan Africa.

This lesson stems from the fact that the coefficient associated with the variable "quality of regulation" is positive and significant at the 5% threshold. In other words, good regulation leads to improved financial inclusion. From a theoretical point of view, this result supports the predictions of new institutional economics, as suggested by North (1990), by confirming the positive effect of this institutional factor on the improvement in financial inclusion. It can also be compared with the results of Muriu (2020) and Demirgüç-Kunt & Klapper (2012). However, unlike the case in Muriu's (2020) study, the rule of law and political stability are not significant here for the same field of investigation. Several rea-

sons can justify this difference from the results of Muriu (2020) and the implications of this result for our field of investigation.

1) *A difference in approach to the framework*

Regarding the difference in results with Muriu (2020), it is worth noting, first, the difference in the choice of the endogenous variable. Indeed, he chose to work with formal finance in the case of financial intermediation, such that his approach considered only that of Mackinnon/Shaw (1973). In contrast, the approach used in this study combines those of Kapur (1992), Mackinnon/Shaw (1973) and Taylor (1983) and thus accounts for both the formal and informal sectors when addressing mobile money. In fact, since the banking sector is highly regulated, it should be emphasized that the agreements or contracts signed are respected for the proper functioning of the financial system. In the event of risk or deviant behavior, a good legal framework must protect both credit subscribers and investors (Demirgüç-Kunt & Maksimovic, 2002; Mcdonald & Schumacher, 2007) and ensure that the decisions made are properly implemented (Demetriades & Fielding, 2011).

In the framework of our study, the inclusion of mobile money in financial inclusion allows the integration of a part of the financially excluded informal sector (Demirgüç-Kunt et al., 2018). As the informal sector is much larger than the formal sector with regard to the rate of banking, and therefore, the volume of mobile money users is much larger than the volume of bank account users (Demirgüç-Kunt et al., 2018), the effect of the informal sector becomes greater than that of the banking sector for this indicator. Thus, the dominant effect is that of mobile money, for which contractualization is not as complex as it is in the banking sector and for which the important factor is the Bahia & Muthiora regulation.

2) *The quality of regulation in this field of investigation*

Financial inclusion is achieved, as we have pointed out, through banking and mobile money; therefore, the quality of regulation must have positive effects on these two modes of access to financial services.

Quality of regulation and banking

With regard to banking services in Sub-Saharan Africa, there are disparities in the rates observed, with particularly low rates for the WAEMU[8] and CEMAC zones, with 19.3% (BCEAO, 2019)[9] and approximately 20% (BEI, 2018), respectively, compared with the overall rate of 33% in Sub-Saharan Africa (BEI, 2018). This finding supports the theories of law and finance (La Porta et al., 1998) and financial liberalization. Indeed, the countries of these two subregional zones are former French colonies and are therefore governed by French civil law. Similarly, they have lower rates of bankization than the other countries of Sub-Saharan Africa, which are former British colonies governed by common law, in the cases of Nigeria and Ghana, or by Germanic or Scandinavian civil law, in the cases of Ethiopia and South Africa (BEI, 2018). This may reflect poor regulation of the banking system, inadequate protection of financial institutions, or a lack of in-

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[8]WAEMU: West African Economic and Monetary Union.
[9]Central Bank of West African States.

centives for financial institutions to develop their business in a market economy, in accordance with Mackinnon/Shaw (1973). This therefore presupposes government control over the banking sector in these areas as well as regulations that are not conducive to the granting of credit and the mobilization of savings by banks. According to Muriu (2020) and Tchouassi & Tamchap (2017), good regulation would increase financial inclusion.

Regulatory quality and mobile money

The inclusion of mobile money in the analysis of financial inclusion increases the level of financial inclusion in Sub-Saharan Africa. This means that Sub-Saharan Africa is experiencing, in the context of our study, the positive effects of the quality of regulation. Here, it is again worth noting significant disparities between the different subregions. Indeed, according to the GSMA (2019), the rate of mobile money account holders in Sub-Saharan Africa varies across the different subregions, with 53.8%, 33.8% and 9.6% in East Africa, West Africa and Central Africa, respectively (GSMA, 2019). South Africa, with a low rate of 2.8%, is a special case due to the strong development of its financial system. Here, we note that Central Africa and West Africa are the areas with the lowest rates; however, the rate in West Africa is strongly driven by Ghana and Nigeria, which along with Kenya and Ethiopia are the four countries with the highest rates of mobile money account holders in Sub-Saharan Africa. Thus, CEMAC and WAEMU are the subregions with the lowest levels of banking services and the lowest rates of mobile money use, so increasing the level of financial inclusion also means raising the level of use in these two areas.

It should be noted that in these two subregions, mobile money activity is subject to banking partnerships. Indeed, in these two areas, regulations do not authorize telephone operators to issue electronic money. This situation has two effects: the lack of support by banks, which do not see the interest of access to financial services among the poorest populations, and the lack of encouragement for telephone operators to fully invest in an activity with limited profitability. This is illustrated by the case of Ghana, where the central bank, after noting a decline in mobile money activity when such activity was tied to a bank, decided in 2018 to submit the operators no longer to the banks but to itself, thus reviving its activity by making it one of the major user countries of mobile money. Bearing in mind that the use of mobile payment is a means of developing the financial system of the informal sector, we observe that the attachment of mobile money to a bank for its exploitation corresponds to a type of financial repression that should be lifted to achieve better development. While adopting appropriate regulation for the survival of the system in accordance with Kapur (1992), it is nevertheless essential to adopt incentive-based regulation adapted to the context of each zone (Demirgüç-Kunt et al., 2003) for an adequate level of financial liberalization.

5. Conclusion

The objective of this paper was to analyze the effects of institutional factors on

financial inclusion in Sub-Saharan Africa. We hypothesized that institutional factors influence financial inclusion in Sub-Saharan Africa. By estimating a multiple linear regression model using ordinary least squares, we showed that the quality of regulation does influence financial inclusion.

This result supports the theory of financial liberalization with, however, the acceptance of a degree of financial liberalization according to the context of states, which implies an effect of institutional factors on this adequate level of this liberalization. In this respect, the proven effect of regulation on financial inclusion supports the theories of law and finance (La Porta et al., 1997) and the new institutional economy (North, 1990).

According to the notable results of the study, increasing the level of financial inclusion in SSA is closely related to the existing regulations. For this, an adequate level of financial liberalization is necessary, with regulations adapted to the context of each zone and accepted by the respective populations.

Certain policy recommendations can be made. For example, banking regulation should encourage competition in the banking sector through the provision of a supportive environment, regulation of the mobile money sector should support financial inclusion, and financial liberalization should correspond to a fixed objective that can be reached thanks to specific policies adapted to the context. The main limitation of this study is the lack of data for many countries, which does not allow a refinement of the results. However, this limitation opens up new research perspectives, regarding the appropriate regulation for supporting the proper development of the mobile money sector and especially the monetary policy of central banks in response to this new situation.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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