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Towards a new index of mobile money inclusion and the role of the regulatory environment

Godsway Koroku Tetteh¹, Micheline Goedhuys², Maty Konte³, and Pierre Mohnen⁴

Abstract

It is an undeniable fact that financial inclusion has become a global policy priority. Despite its popularity in the policy sphere, the concept of financial inclusion lacks a comprehensive measure to monitor and evaluate inclusive financial systems across the globe. To fill this gap, we combine macro-level data from the Financial Access Survey of the International Monetary Fund and the World Bank's Global Findex database to construct novel indices of financial inclusion. First, we compute new financial inclusion indices that incorporate access to financial services by groups prone to exclusion. Second, we account for the recent upsurge in mobile money adoption in the developing world by computing a novel mobile money inclusion index. We further relate the financial inclusion indices with legal origin to ascertain the role of initial conditions of the regulatory environment in countries' financial inclusion achievements. We find that whereas developed countries continue to lead in banking inclusion, developing countries in sub-Saharan Africa are at the frontiers of mobile money inclusion. Also, we find evidence suggesting that the regulatory environment matters for financial inclusion.

Keywords: Financial Inclusion, Banking Inclusion, Financial Innovation, Mobile Money Inclusion

JEL Classification: G21; O16; O35; O57

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1. Introduction

The promotion of inclusive financial systems has become a top policy priority on the global landscape. It is against this backdrop that the United Nations Sustainable Development Goals (SDGs) have made financial inclusion as an integral part of the global development agenda. Consequently, the World Bank and the G20 High-Level Principles for Digital Financial Inclusion, for example, seek to promote digital financial inclusion as a driver for inclusive financial systems. The emergence of mobile money, a mobile-phone-based financial innovation largely championed by Mobile Network Operators, has attracted the attention of both academics and policymakers primarily due to its potential to extend financial services to the financially excluded segment of society (Aker & Mbiti, 2010; Maurer, 2012). Mobile money has become a game-changer particularly in developing countries such as sub-Saharan Africa where a significant proportion of the adult population does not have bank accounts (Sy, Maino, Massara, Perez-Saiz, & Sharma, 2019). In fact in developing countries, mobile money is already gaining ground and enabling access to basic financial services (Demirgüç-Kunt, Klapper, Singer, Jake, & Hess, 2018).

From a policymaker perspective, it is desirable to monitor and evaluate the progress of financial inclusion (G20, 2016). However, while such a call is in the right direction, the concept of financial inclusion lacks a comprehensive measure to ascertain the extent of financial inclusion across the globe (Sarma, 2008). Although some progress has been made in the literature towards the measurement of financial inclusion (eg. Arora, 2014; Chakravarty & Pal, 2013; Gupte, Venkataramani, & Gupta, 2012; Mialou, Amidzic, & Massara, 2017; Sahay et al., 2020; Sarma, 2008; Sha'ban, Girardone, & Sarkisyan, 2020; Wang & Guan, 2017), the approaches adopted by previous studies do not reveal much on countries' achievements in extending financial services to groups prone to exclusion. Moreover, most studies view financial inclusion as synonymous with banking inclusion and do not provide a comprehensive measure for mobile money inclusion.

This study computes new financial inclusion indices using macro-level indicators from the Financial Access Survey of the International Monetary Fund and the World Bank's Global Findex database for the period 2014-2017. Based on a normalised inverse Euclidean distance approach, we construct novel indices of financial inclusion such as banking inclusion and mobile money inclusion to measure the extent of financial inclusion across the globe. This paper departs from previous studies in many ways. First, we employ factor analysis to objectively identify dimensions of financial

inclusion and indicator weights. Second, our indicators of financial inclusion incorporate access to financial services by groups susceptible to financial exclusion. Thus, our measures account for the extent to which females, the poor, those with primary education or less, the unemployed, rural residents, and young adults have access to financial services. Third, we account for the recent revolution in mobile-phone-based financial innovation in the developing world by computing a mobile money inclusion index.

Finally, this study examines the relationship between legal origin and finance from the perspective of financial inclusion. Previous studies reveal that colonial-era institutions continue to influence modern institutional environments (eg. Acemoglu, Johnson, & Robinson, 2001). Also, the law and finance literature suggests that modern legal systems are shaped by historical factors such as legal origin. For example, countries whose laws originate from English legal family are characterised by strong legal protection for investors and consequently high levels of financial development compared to countries whose legal origin is either French, German, Scandinavian, or Socialist (Ang & Fredriksson, 2018; Beck, Demirgüç-Kunt, & Levine, 2003b; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999, 1997, 1998). Accordingly, we investigate the relationship between our measures of financial inclusion and legal origin using a fractional probit model to ascertain whether the initial conditions of the regulatory environment matter for financial inclusion.

We find that whereas developed countries continue to lead in banking inclusion, developing countries in sub-Saharan Africa are at the frontiers of mobile money inclusion. We identify interesting patterns of financial inclusion and highlight countries that may require more effort to improve financial inclusion. We find evidence suggesting that the initial conditions of the regulatory environment matter for financial inclusion. Specifically, we find a positive and significant association between English legal origin and financial inclusion. A robustness test with an alternative measure of the regulatory environment suggests that the quality of law enforcement (proxied by rule of law indicator) is a significant determinant of financial inclusion.

The paper contributes to the literature on financial inclusion by advancing an alternative approach to the measurement of inclusive financial systems. The approach adopted by this study is more relevant for the monitoring and evaluation of inclusive financial systems given that disadvantaged groups are often the targets of financial inclusion policies. Consistent with the financial development literature, the paper also highlights the role of the regulatory environment in financial inclusion.

The rest of the paper is organised as follows: Section 2 reviews relevant literature, Section 3 describes the data and selection of indicators, Section 4 presents the methodology, Section 5 discusses the results, and Section 6 concludes with the main findings and policy implications.

2. Literature Review

2.1. Financial Exclusion

Financial exclusion is generally considered in the literature as an aspect of social exclusion (Kempson Elaine & Whyley Claire, 1999; Mylonidis, Chletsos, & Barbagianni, 2017; Simpson & Buckland, 2009). To Leyshon and Thrift (1995), financial exclusion refers to those processes that deprive disadvantaged groups such as the poor of gaining access to the financial system. This definition is further broadened to include “those processes by which individuals and households face difficulties in accessing financial services” (Leyshon, French, & Signoretta, 2008). Despite the lack of universally accepted definition for financial exclusion, there is now a recognition that it is a multi-dimensional concept which connotes “a complex set of barriers to accessing and using mainstream financial services” (Mylonidis et al., 2017).

According to Beck, Demirgüç-Kunt, and Honohan (2009) and Claessens (2006), financial exclusion can be classified into two broad categories. The first is voluntary exclusion and the second is involuntary exclusion. Voluntary exclusion is driven by the lack of demand as people may self-exclude themselves because they do not need financial services. The lack of demand may also be influenced by religious or cultural reasons, or because of indirect access to financial services through friends and family. In contrast to voluntary exclusion, the authors acknowledge that involuntary exclusion is driven by several factors. Thus, some firms and households are likely to be excluded from the mainstream financial system if they are not considered by financial institutions as bankable due to their low incomes or lending risks. Besides, involuntary exclusion may arise as a result of discriminatory policies, deficiencies in contractual and information frameworks, and the nature of products.

Geography or physical penetration of financial services also plays a crucial role in engendering access. For example, inadequate bank branches in some parts of the developing world can exclude firms and households from accessing financial services (Beck et al., 2009). Dysfunctional institutional environments including weak legal systems and an inefficient banking sector can equally contribute to involuntary exclusion (Claessens, 2006). Beck et al. (2009) note that voluntary

exclusion is not a major concern for policymakers, however, an involuntary exclusion is a major problem in the developing world and requires policy action. This is because the financially excluded minorities in society face multiple challenges and are often deprived of economic opportunities (Mylonidis et al., 2017; Sen, 2000).

The poor and other disadvantaged groups are more likely to be financially excluded because the financial system favours the socially powerful in society (Leyshon & Thrift, 1995). Moreover, financial institutions are more likely to locate near rich neighbourhoods compared to poor neighbourhoods and even where they are accessible, the poor have no collateral and therefore will not be able to access credit (Beck et al., 2009). Also, the poor may be excluded as a result of the lack of information about available financial services and the difficulties they are likely to face in filling out loan application forms due to no education (Beck et al., 2009). A study conducted by Simpson and Buckland (2009) reveals that family income and education are major determinants of financial exclusion. The study suggests that low income and low levels of education correspond to a high incidence of financial exclusion. Furthermore, in some societies, discriminatory social norms could engender financial exclusion particularly among women (Buvinić & O'Donnell, 2019; Johnson & Nino-Zarazua, 2011) who have unequal access to land which is one of the main collaterals used in the banking system.

A recent study by Demirgüç-Kunt et al (2018) shows that about 1.7 billion adults remain unbanked worldwide and the majority of those without bank accounts reside in developing countries. The evidence reveals that 56% of the unbanked population are women and half of the unbanked adults come from the poorest 40% of households. Likewise, the less educated, the unemployed, young adults, and rural residents account for a disproportionate share of the financially excluded population globally.

2.2. Financial Inclusion and Measurement

Financial inclusion in its broader sense is the opposite of financial exclusion and is defined as the extent to which households or firms have access to financial services and can use them (Beck, Demirguc-Kunt, & Peria, 2007; Chauvet & Jacolin, 2017; Wang & Guan, 2017). Although financial inclusion has gained popularity among policymakers and academics, the concept lacks a comprehensive measure to enable us to assess the extent of financial inclusion across countries (Sarma, 2008). The challenge within this research field is mostly attributed to data unavailability

(Demirgüç-Kunt, Beck, & Honohan, 2008; Mialou et al., 2017; Sarma, 2008). Nevertheless, some progress has been made in respect of measuring financial inclusion.

Beck et al (2007) present a set of indicators to measure banking sector outreach. They distinguish between access to financial services from the actual use of financial services. Access to financial services is measured with a set of macro-level indicators (Bank and ATM⁵ penetration) whereas usage of financial services is proxied by indicators of bank deposits and loans. This study provides a useful insight into the measurement of financial inclusion. However, using a set of separate indicators as proxies for financial inclusion can only provide a partial appraisal of inclusive financial systems (Sarma, 2008).

Sarma (2008) proposes a multi-dimensional index of financial inclusion. Subject to data constraints, the study identifies three dimensions of financial inclusion: accessibility, availability, and usage of the banking system. The accessibility dimension is computed using the number of bank accounts expressed as a percentage of the total population. The availability dimension is measured by the number of bank branches per 1000 population, and the usage dimension is made up of the volume of credit and deposit expressed as a percentage of Gross Domestic Product (GDP). Similarly, a three-dimensional approach, albeit with different indicators, is employed by Fan and Zhang (2017) to compute an index of financial inclusion for China.

Gupte et al (2012) consider outreach, usage, ease of transactions, and cost of transactions as the four main dimensions of financial inclusion. Subsequently, Arora (2014) develops a composite financial inclusion index based on four dimensions. These dimensions include the outreach dimension, ease dimension, procedures dimension, and cost dimension. The outreach dimension captures physical access to financial services whereas the ease, procedures, and cost dimensions show the ease, administrative difficulties and the cost that are associated with financial transactions, respectively. Recent studies also approach financial inclusion from a multi-dimensional perspective (eg. Anarfo, Abor, Osei, & Gyeke-Dako, 2019; Mialou et al., 2017; Pham, Nguyen, & Nguyen, 2019; Sha'ban et al., 2020; Wang & Guan, 2017; Yadav, Singh, & Velan, 2020). Wang and Guan (2017), for example, compute an index of financial inclusion based on access and usage dimensions.

An outstanding issue in the literature is the lack of consensus on the dimensions of financial inclusion. Also, previous studies do not reveal the extent to which the financially excluded

⁵ Automated Teller Machine

population is gaining access to mainstream financial systems. This paper seeks to fill this void by developing a measure that incorporates access to financial services by the disadvantaged segment of society. This approach will be useful in understanding countries financial inclusion standing across the globe (Arora, 2014).

2.3. Mobile Money and Financial Inclusion

Previous studies that attempt to measure financial inclusion focus primarily on banking inclusion. The over-reliance on banking inclusion as synonymous with financial inclusion is based on the premise that banks are the gateway to basic financial services and that they provide a leading role in extending access to finance (Beck et al., 2007; Sarma, 2008). However, it is worth noting that mobile money, which is not entirely a bank-led innovation, is gaining ground in the developing world as an enabler of financial inclusion. Mobile money enables users to conduct basic financial transactions using their mobile phones without the need to open an account with financial institutions (Beck, Pamuk, Ramrattan, & Uras, 2018).

This financial innovation has been heralded by policymakers and academics owing to its potential to penetrate low-income communities and extend financial services to households and firms that are excluded from the formal financial system (Aker & Mbiti, 2010; Maurer, 2012). The economic relevance of mobile money has also drawn the attention of policymakers. However, the channels through which mobile money affects the economy are many and complex (Aron, 2018). Nonetheless, some empirical studies suggest that this innovation improves household welfare, increases remittances, and holds great potential for private sector development (Aron, 2018; Beck et al., 2018; Jack & Suri, 2014; Suri, 2017; Sy et al., 2019).

While mobile money continues to occupy a central position in financial inclusion initiatives in developing countries, there are emerging concerns about the vulnerabilities and risks that come with such innovations (FATF, 2010). The lack of rigorous customer due diligence in mobile money operations, for example, makes transactions vulnerable to financial crimes such as money laundering and terrorist financing (FATF, 2010; Sy et al., 2019).

Given the emergence of mobile money and its central role in the provision of financial services, this paper computes a novel measure of mobile money inclusion as a starting point for monitoring and evaluating the progress of digital financial inclusion.

3. Data and Indicator Selection

The study draws on macro-level indicators from the 2019 edition of the International Monetary Fund's (IMF) Financial Access Survey (FAS) and the World Bank's Global Findex database. The FAS provides country-level information on access to and use of financial services and data is collected through Central Banks or financial regulators. The FAS has been available on an annual basis since 2004 and it covers a total of 189 countries across the globe. The Global Findex database provides comprehensive data on the use of financial services among the adult population globally. The data is collected every three years through nationally representative surveys covering about 150,000 adults in 140 countries and it is available for the period 2011, 2014, and 2017. At the macro-level, the Global Findex disaggregates access to financial services by gender, income group, education level, employment status, location, age group, among others. This data is therefore useful in selecting indicators that capture financial access by groups prone to financial exclusion.

The selection of indicators is guided by the literature on financial inclusion. The literature on financial inclusion suggests that disadvantaged groups in society are prone to financial exclusion (Leyshon & Thrift, 1995). Groups such as the poor, the less educated, women, unemployed, rural residents, and young adults are found to be susceptible to financial exclusion (Demirgüç-Kunt et al., 2018; Simpson & Buckland, 2009). To account for countries' achievement in extending financial services to underserved groups, we measure financial inclusion in this case by incorporating the extent to which such groups have access to financial services.

We measure overall financial inclusion⁶ with 8 indicators. These indicators represent the proportion of the adult population that have accounts at the bank, or other financial institutions, or with mobile money service providers⁷. Specifically, we measure financial inclusion with account ownership by females, income poorest 40%, those with primary education or less, those out of the labour force, rural residents, and young adults (all expressed as a percentage of the adult population). Furthermore, we include outstanding deposits with commercial banks expressed as a percentage of

⁶ Overall financial inclusion is used in this paper to capture access to formal financial services including mobile money

⁷ These indicators measure account ownership in general including mobile money account ownership

Gross Domestic Product (GDP) and outstanding loans with commercial banks (% of GDP) to reflect the usage of banking services⁸.

To gain more insight into countries' financial inclusion standing, we focus on two additional indices of financial inclusion: banking inclusion and mobile money inclusion. The indicators used for the banking inclusion index⁹ are similar to those employed for the overall financial inclusion except that in this case, we select account ownership variables that reflect financial institution account ownership excluding mobile money accounts. These indicators capture financial institution account ownership by females, income poorest 40%, those with primary education or less, those out of the labour force, rural residents, and young adults (expressed as a percentage of the adult population). The deposit and loan indicators used for overall financial inclusion are also employed to compute the banking inclusion index. Further, we measure mobile money inclusion with 7 indicators. In addition to mobile money account ownership by groups prone to exclusion, we incorporate mobile money transaction value (% of GDP) as a proxy for mobile money usage (see Appendix A for the definition of indicators).

Subject to data availability we sampled a total of 118 countries for the computation of the overall financial inclusion and banking inclusion indices. For mobile money inclusion, we use a total of 31 countries. The study is restricted to 2014 and 2017 given that the Global Findex database, the main data source, has information on mobile money for this period. The sample for overall and banking inclusion is also restricted to this period. This is to ensure that there is a considerable number of countries in the sample for analysis¹⁰.

4. Methodology

First, we construct an overall financial inclusion index that encompasses access to formal financial services including mobile money. Second, we compute a banking inclusion index, and third, we account for the recent revolution in mobile-phone-based financial innovation in the developing world by computing a mobile money inclusion index for monitoring and evaluation purposes. The three financial inclusion indices are computed for the years for which data is available (2014, 2017). Since inclusive financial systems cannot be adequately captured by a single indicator (Sarma, 2008;

⁸ The usage indicators of outstanding deposits and outstanding loans with commercial banks (% of GDP) do not account for mobile money

⁹ The term banking inclusion reflects access to formal financial services without mobile money

¹⁰ Countries that have observations for the two period are included in the sample. This is to make the index comparable across countries.

Sarma & Pais, 2011), we combine multiple indicators into a composite index as it is often the case in measuring complex concepts (OECD, 2008). This paper follows the approach of Wang and Guan (2017) to compute the financial inclusion indices. The indicators of outstanding deposits with commercial banks (% of GDP) and outstanding loans with commercial banks (% of GDP) are winsorised at the 99th percentile before normalisation to minimise the influence of outliers. All indicators are normalised using the min-max method as given below:

$$x_{ij} = \frac{A_{ij} - \min_{ij}}{\max_{ij} - \min_{ij}} \quad (1)$$

where x_{ij} is the transformed value of indicator j in dimension i with values ranging between 0 and 1, A_{ij} is the actual value of indicator j , and \min_{ij} and \max_{ij} correspond to the observed minimum and maximum values of each indicator for the entire period under consideration (2014, 2017). In this case, the use of fixed minimum and maximum values, as also the case in the computation of the United Nations Human Development Index, is to make the index comparable across time. The normalised indicators are then aggregated using equation 2 and equation 3. The first stage aggregation is carried out as follows:

$$d_i = 1 - \frac{\sqrt{w_{ij1}^2(1-x_{ij1})^2 + w_{ij2}^2(1-x_{ij2})^2 + \dots + w_{ijn}^2(1-x_{ijn})^2}}{\sqrt{(w_{ij1}^2 + w_{ij2}^2 + \dots + w_{ijn}^2)}} \quad (2)$$

where d_i is the dimensional index, w_{ij} is the weight of each indicator in dimension, and x_{ij} is the normalised value of the indicator. Thus, formula (2) is based on the normalised inverse Euclidean distance approach proposed by Nathan et al (2008) and subsequently applied in other studies (eg. Sarma, 2008; Sarma & Pais, 2011; Wang & Guan, 2017). After computation, the values of d_i lies between 0 and 1 where higher values signify higher achievements.

The second stage aggregation follows the same approach as given below:

$$IFI = 1 - \frac{\sqrt{w_1^2(1-d_{i1})^2 + \dots + w_k^2(1-d_{ik})^2}}{\sqrt{(w_1^2 + \dots + w_k^2)}} \quad (3)$$

where IFI is the financial inclusion index; a higher value of IFI corresponds to higher financial inclusion ($0 \leq \text{IFI} \leq 1$); $d_{i1} \dots d_{ik}$ are the dimensions of financial inclusion; and $w_1 \dots w_k$ are the weights of the k dimensions.

4.1. Computation of Weight

The choice of weighting scheme for the construction of composite indicators is a fundamental challenge in the literature. Although equal weights have been widely applied in most studies, it has been heavily criticised for its arbitrariness (Decancq & Lugo, 2013). For this study, however, we objectively compute indicator weights based on factor analysis. Following OECD (2008) handbook on the construction of composite indicators, we retain factors that: (i) have associated eigenvalues¹¹ larger than 1 (ii) contribute individually to the explanation of overall variance by more than 10%; and (iii) contribute cumulatively to the explanation of the overall variance by more than 60%. Indicator weights are then derived from the matrix of factor loadings based on the proportion of variance explained by respective factors. Thus, indicator weights are normalised squared factor loadings which correspond to the portion of variance explained by each indicator. Dimensional weights, however, correspond to the proportion of variance explained by each factor.

Table 1 presents the rotated factor loadings and weights for the overall financial inclusion and banking inclusion indicators. By the factor retention criteria, two factors are identified for overall financial inclusion. Thus, variables Female, Poorest, Unemployed, Primary, Rural, and Young load highly on Factor 1 and have been assigned corresponding weights of 0.166, 0.167, 0.168, 0.159, 0.167, and 0.160, respectively. Factor 2 consists of variables Savings and Loan with corresponding weights of 0.471, and 0.442, respectively. Overall, Factor 1 constitutes the access dimension of overall financial inclusion since it consists of indicators that represent access to financial services. Factor 2, on the other hand, is comprised of usage indicators and hence can be classified as the usage dimension of financial inclusion. Based on the proportion of variance explained by each factor, we assign a weight of 0.740 and 0.260 to the access and usage dimensions, respectively. A similar loading pattern is observed for banking inclusion as well with indicator weights ranging between 0.467 and 0.159 as illustrated in Table 1.

¹¹ See Table A4, A5 and A6 in Appendix A for the eigenvalues

The computation of weights for mobile money inclusion indicators follows the same approach. For mobile money inclusion, as shown in Table 2, only one factor is retained. Based on the proportion of variance explained by respective indicators, we assign a weight of 0.153 each to MM_Female, MM_Poorest, and MM_Unemployed indicators while MM_Primary, MM_Rural, MM_Young, and MM_Transaction indicators attract the weights of 0.150, 0.154, 0.151, and 0.087, respectively. It is worth noting that for mobile money inclusion, aggregation is restricted to equation 2 since only one factor is identified and hence there is no need for aggregation at dimension level with equation 3.

5. Results

5.1. Overall financial inclusion and banking inclusion

Table 3 presents the composite indicators of overall financial inclusion and banking inclusion for the period 2014 and 2017. The growth rates and average scores of the financial inclusion indices are also computed to examine the performance of countries over time. Countries are classified into the top 10 and bottom 10 based on their average financial inclusion scores. The main source of variation between the overall financial inclusion and banking inclusion is the access dimension. Whereas the overall financial inclusion employs access indicators that reflect account ownership at financial institutions including mobile money, the banking inclusion index does not account for mobile money. The overall financial inclusion, therefore, provides a comprehensive measure for assessing inclusive financial systems.

We observe that about 75% and 73% of countries in our sample experience growth in overall financial inclusion and banking inclusion, respectively. This indicates a general improvement in financial inclusion from 2014 to 2017. On average, the index of overall financial inclusion suggests that Hong Kong is the most financially inclusive economy with a score of 0.89795. This is followed by Switzerland, New Zealand, United Kingdom, Netherlands, Malta, Australia, Japan, Cyprus, and Luxembourg. However, Afghanistan, Niger, Madagascar, Guinea, Pakistan, Chad, Iraq, Republic of Congo, Cameroon, and Egypt fall behind in overall financial inclusion.

A comparison between overall financial inclusion and banking inclusion reveals that developed countries occupy top positions on the financial inclusion scoreboard. Also, the ranking of the top-performing countries is mostly robust irrespective of the index of financial inclusion. Given that countries that occupy the top positions in banking inclusion are non-mobile money endemic countries, it is expected that their scores will not be affected significantly after accounting for mobile

money in the computation of the overall financial inclusion. What is interesting, however, is that most countries in sub-Saharan Africa have witnessed positive improvements in their rankings once mobile money has been accounted for as indicated in Figure 1. Côte d'Ivoire, Uganda, Zimbabwe, and Kenya, for example, move 27, 26, 26, and 24 places upward on the overall financial inclusion scoreboard, respectively. This evidence provides some indication that mobile money offers developing countries an opportunity to improve their overall financial inclusion.

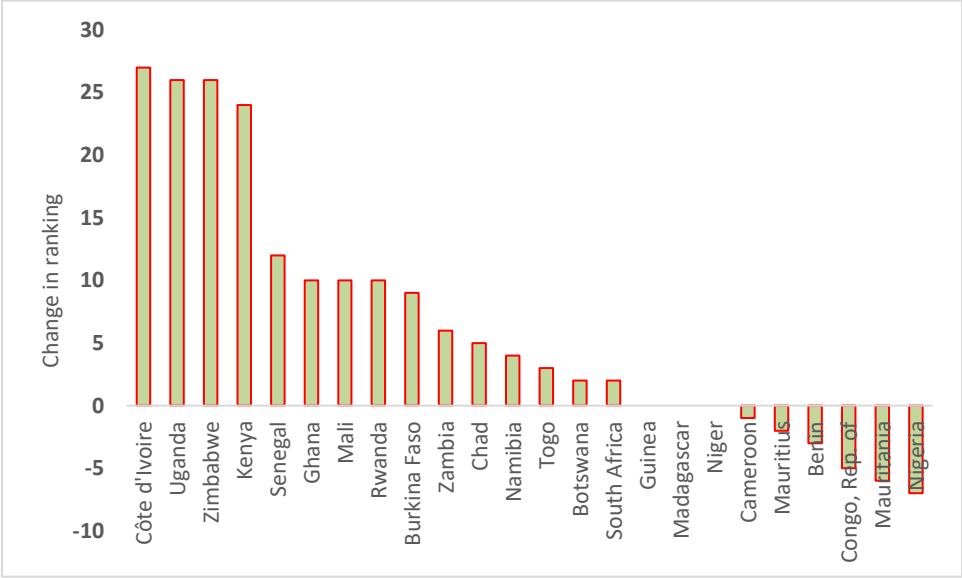


Figure 1. Change in the ranking of sub-Saharan Africa countries from banking inclusion to overall financial inclusion. Positive numbers correspond to an improvement in financial inclusion (ranking is based on average performance for 2014 and 2017)

5.2. Mobile Money Inclusion

This paper recognises mobile money as a financial innovation that has received much attention in the literature as an enabler of financial inclusion, particularly in developing countries. Accordingly, this study examines financial inclusion based on mobile money adoption to provide insight into the state of financial inclusion.

Table 4 presents the mobile money inclusion scores for a sample of 31 countries for the period 2014 and 2017. As evident in Table 4, Kenya leads the rest of the world in mobile money inclusion with an average score of 0.84592, followed by Uganda (0.55362), Zimbabwe (0.45102), Côte d'Ivoire (0.38191), Ghana (0.36428), Namibia (0.31621), Rwanda (0.29684), Mali (0.23580), Burkina Faso (0.23362), and Senegal (0.23316). Developing countries in sub-Saharan Africa dominate the top

positions of the mobile money inclusion scoreboard. The least achievement in mobile money inclusion is, however, recorded by Afghanistan.

Figure 2 compares the average mobile money inclusion scores with the average banking inclusion performance using a scatter plot to throw more lights on countries' financial inclusion achievements. The scatter plot is subdivided into four quadrants based on the sample average. This approach enables us to identify countries that perform relatively well in respect of the sample average of banking inclusion and mobile money inclusion (the quadrant at the top right), countries with relatively low banking inclusion scores but record above-average achievement in mobile money inclusion (the quadrant at the bottom right), countries with above-average performance for banking inclusion but score below average in mobile money inclusion (the quadrant at the top left), and countries that perform below average in both mobile money inclusion and banking inclusion (the quadrant at the bottom left). The countries that perform poorly in both mobile money and banking inclusion are Cambodia, Togo, Benin, Madagascar, Guinea, Cameroon, Pakistan, Niger, Philippines, Republic of Congo, Myanmar, and Afghanistan.

Figure 3 provides further analysis using the growth rates and the average scores of mobile money inclusion. Like the previous analysis, the scatter plot is subdivided into four quadrants based on the sample average. Countries such as Armenia¹², Togo, Benin, Guinea, Cameroon, Bangladesh, Myanmar, and Indonesia, for example, fall within the category of high growth but low mobile money inclusive countries (see the quadrant at the top left of Figure 3). These countries have good prospects for improving their overall financial inclusion through mobile money. However, low performing countries that have witnessed limited growth in mobile money inclusion over the period will require more effort to promote financial inclusion. Countries in the bottom left quadrant of Figure 3 that are neither good performers in banking inclusion nor mobile money inclusion such as Afghanistan, Niger, Madagascar, Pakistan, Philippines, Republic of Congo, and Cambodia can learn from leading countries in mobile money inclusion to enhance their overall financial inclusion.

¹² Armenia is removed from the scatter plot since it is an outlier. Its growth rate of 33.7 is way above the second highest, Benin (17.6). The average score of Armenia (0.081) is below the sample average of 0.185. It therefore falls within the top left quadrant of Figure 3

Table 1. Weights derived from factor analysis for the computation of the overall and banking financial inclusion indices

| Weight for overall financial inclusion indicators | | | | | Weight for banking inclusion indicators | | | | |
|---|-------------------------|---------------|--------------|--------------|---|-------------------------|---------------|--------------|--------------|
| Variable | Rotated factor loadings | | Weight | | Variable | Rotated factor loadings | | Weight | |
| | Factor 1 | Factor 2 | Access | Usage | | Factor 1 | Factor 2 | Access | Usage |
| Female | 0.9719 | 0.1731 | 0.166 | 0.015 | FI_Female | 0.9721 | 0.1798 | 0.165 | 0.016 |
| Poorest | 0.9763 | 0.1818 | 0.167 | 0.016 | FI_Poorest | 0.9761 | 0.1873 | 0.167 | 0.017 |
| Unemployed | 0.9795 | 0.1558 | 0.168 | 0.012 | FI_Unemployed | 0.9794 | 0.1621 | 0.168 | 0.013 |
| Primary | 0.9539 | 0.1779 | 0.159 | 0.016 | FI_Primary | 0.9544 | 0.1885 | 0.159 | 0.018 |
| Rural | 0.9761 | 0.1642 | 0.167 | 0.013 | FI_Rural | 0.9752 | 0.1741 | 0.166 | 0.015 |
| Young | 0.9555 | 0.1692 | 0.160 | 0.014 | FI_Young | 0.9568 | 0.1850 | 0.160 | 0.017 |
| Savings | 0.1023 | 0.9728 | 0.002 | 0.471 | Savings | 0.1112 | 0.9720 | 0.002 | 0.467 |
| Loan | 0.2501 | 0.9426 | 0.011 | 0.442 | Loan | 0.2609 | 0.9397 | 0.012 | 0.437 |
| Explained variance | 5.70606 | 2.00938 | | | | 5.71491 | 2.02157 | | |
| Proportion of variance explained by factor | 0.740 | 0.260 | | | | 0.739 | 0.261 | | |

Notes: The extraction method is based on principal components and rotation is by varimax rotation. Indicator weights are squared factor loadings normalised with the variance explained by the respective factor (Expl. Variance). Dimension weights correspond to the proportion of variance explained by each factor (variance explained by each factor divided by the total variance of the two factors). The Savings and Loan indicators are the same for overall financial inclusion and banking inclusion. These two indicators are sourced from the IMF Financial Access Survey. All other variables come from the World Bank's Global Findex Database.

Table 2. Weights derived from factor analysis for the computation of mobile money inclusion index

| Variable | Rotated factor loadings | |
|--------------------|-------------------------|--------------|
| | Factor 1 | Weight |
| MM_Female | 0.9846 | 0.153 |
| MM_Poorest | 0.9852 | 0.153 |
| MM_Unemployed | 0.9851 | 0.153 |
| MM_Primary | 0.9762 | 0.150 |
| MM_Rural | 0.9892 | 0.154 |
| MM_Young | 0.9797 | 0.151 |
| MM_Transaction | 0.7414 | 0.087 |
| Explained variance | 6.35128 | |

Notes: The extraction method is based on principal components and rotation is by varimax rotation. Indicator weights are squared factor loadings normalised with the variance explained by factor 1. The transaction value indicator is from the IMF Financial Access survey while all other indicators are sourced from the Global Findex Database (World Bank)

5.3. Does the regulatory environment matter for financial inclusion?

Consistent with the financial development literature, this paper further investigates whether the legal or regulatory environment matters for financial inclusion. Specifically, this study explores the role of initial conditions in countries' financial inclusion achievement from the perspective of the legal or regulatory environment.

The extant literature on financial development suggests that an enabling regulatory environment influences financial development positively (Ang & Fredriksson, 2018; La Porta et al., 1997; Levine, 1997). Investor protection is an important mechanism through which the regulatory environment affects financial development (La Porta et al., 1997). Investors are more willing to provide external finance, for example, if they are confident that their rights will be protected (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). However, the literature reveals that the nature of investor protection and the quality of legal institutions differ across countries due to certain historical factors such as legal origin (La Porta et al., 1998). The law and finance literature suggests that modern commercial laws originate from three main legal traditions. These traditions include the common law tradition which has an English origin, civil law tradition which is comprised of the French, German, and Scandinavian legal families, and the socialist legal tradition of the Soviet Union (La Porta et al., 1999, 1998).

Table 3. Index of overall financial inclusion and banking inclusion: the top ten and bottom ten countries.
Rank is based on average performance for 2014 and 2017

| Overall financial inclusion index | | | | | | Banking inclusion index | | | | | |
|-----------------------------------|---------|---------|-------------|---------|------|-------------------------|---------|---------|-------------|---------|------|
| Country | 2014 | 2017 | Growth rate | Average | Rank | Country | 2014 | 2017 | Growth rate | Average | Rank |
| Top 10 | | | | | | Top 10 | | | | | |
| Hong Kong | 0.92394 | 0.87195 | -0.05627 | 0.89795 | 1 | Hong Kong | 0.92491 | 0.87214 | -0.05706 | 0.89853 | 1 |
| Switzerland | 0.80729 | 0.81172 | 0.00549 | 0.80951 | 2 | Switzerland | 0.80642 | 0.81097 | 0.00563 | 0.80870 | 2 |
| New Zealand | 0.75879 | 0.77942 | 0.02720 | 0.76910 | 3 | New Zealand | 0.75757 | 0.77832 | 0.02740 | 0.76795 | 3 |
| United Kingdom | 0.77101 | 0.76232 | -0.01128 | 0.76666 | 4 | United Kingdom | 0.77001 | 0.76161 | -0.01091 | 0.76581 | 4 |
| Netherlands | 0.75549 | 0.75185 | -0.00483 | 0.75367 | 5 | Malta | 0.75549 | 0.74983 | -0.00749 | 0.75266 | 5 |
| Malta | 0.75633 | 0.75090 | -0.00718 | 0.75361 | 6 | Netherlands | 0.75429 | 0.75063 | -0.00485 | 0.75246 | 6 |
| Australia | 0.74831 | 0.75848 | 0.01358 | 0.75340 | 7 | Australia | 0.74707 | 0.75724 | 0.01362 | 0.75215 | 7 |
| Japan | 0.74334 | 0.76075 | 0.02342 | 0.75204 | 8 | Japan | 0.74267 | 0.75990 | 0.02321 | 0.75128 | 8 |
| Cyprus | 0.73556 | 0.75314 | 0.02390 | 0.74435 | 9 | Cyprus | 0.73543 | 0.75359 | 0.02469 | 0.74451 | 9 |
| Luxembourg | 0.73578 | 0.74894 | 0.01789 | 0.74236 | 10 | Luxembourg | 0.73480 | 0.74778 | 0.01766 | 0.74129 | 10 |
| Bottom 10 | | | | | | Bottom 10 | | | | | |
| Egypt | 0.05661 | 0.21610 | 2.81710 | 0.13636 | 109 | Cameroon | 0.02800 | 0.16348 | 4.83796 | 0.09574 | 109 |
| Cameroon | 0.02514 | 0.21314 | 7.47917 | 0.11914 | 110 | Mali | 0.06266 | 0.10571 | 0.68716 | 0.08418 | 110 |
| Congo, Rep. of | 0.06612 | 0.15521 | 1.34725 | 0.11067 | 111 | Senegal | 0.03834 | 0.12411 | 2.23696 | 0.08122 | 111 |
| Iraq | 0.05019 | 0.14576 | 1.90434 | 0.09797 | 112 | Côte d'Ivoire | 0.07253 | 0.08310 | 0.14574 | 0.07781 | 112 |
| Chad | 0.05122 | 0.12519 | 1.44432 | 0.08820 | 113 | Pakistan | 0.02978 | 0.08858 | 1.97452 | 0.05918 | 113 |
| Pakistan | 0.05633 | 0.10117 | 0.79613 | 0.07875 | 114 | Afghanistan | 0.03412 | 0.06655 | 0.95053 | 0.05034 | 114 |
| Guinea | 0.00370 | 0.14344 | 37.79539 | 0.07357 | 115 | Guinea | 0.00824 | 0.07990 | 8.69635 | 0.04407 | 115 |
| Madagascar | 0.03039 | 0.10454 | 2.43993 | 0.06747 | 116 | Madagascar | 0.01883 | 0.04776 | 1.53659 | 0.03329 | 116 |
| Niger | 0.02024 | 0.07241 | 2.57795 | 0.04632 | 117 | Niger | 0.01020 | 0.04452 | 3.36327 | 0.02736 | 117 |
| Afghanistan | 0.02501 | 0.05988 | 1.39413 | 0.04245 | 118 | Chad | 0.02809 | 0.02645 | -0.05849 | 0.02727 | 118 |

Notes: The table presents the state of overall financial inclusion and banking inclusion for the period 2014 and 2017. The indicators for access dimension come from the Global Findex database and the indicators for usage dimension come from the IMF Financial access survey. The difference between the overall financial inclusion and banking inclusion is that the former employs access indicators that measure financial institutions' account ownership including mobile money whereas the latter does not account for mobile money account ownership. The growth rate is the rate of change in financial inclusion from 2014 to 2017. The sample consists of 118 countries

Table 4. Index of mobile money inclusion. Countries are ranked based on the average performance for 2014 and 2017

| Country | 2014 | 2017 | Growth rate | Average | Rank | Country | 2014 | 2017 | Growth rate | Average | Rank |
|---------------|---------|---------|-------------|---------|------|----------------|---------|---------|-------------|---------|------|
| Kenya | 0.79050 | 0.90134 | 0.14021 | 0.84592 | 1 | Madagascar | 0.05244 | 0.15869 | 2.02622 | 0.10556 | 17 |
| Uganda | 0.42719 | 0.68005 | 0.59192 | 0.55362 | 2 | Guinea | 0.01341 | 0.18097 | 12.49822 | 0.09719 | 18 |
| Zimbabwe | 0.25304 | 0.64901 | 1.56485 | 0.45102 | 3 | Cameroon | 0.01457 | 0.17241 | 10.83391 | 0.09349 | 19 |
| Côte d'Ivoire | 0.32025 | 0.44357 | 0.38507 | 0.38191 | 4 | Armenia | 0.00454 | 0.15751 | 33.66893 | 0.08103 | 20 |
| Ghana | 0.18119 | 0.54736 | 2.02086 | 0.36428 | 5 | Pakistan | 0.07371 | 0.06590 | -0.10594 | 0.06981 | 21 |
| Namibia | 0.08728 | 0.54515 | 5.24621 | 0.31621 | 6 | Niger | 0.03865 | 0.09327 | 1.41325 | 0.06596 | 22 |
| Rwanda | 0.19761 | 0.39607 | 1.00424 | 0.29684 | 7 | Bolivia | 0.02211 | 0.09872 | 3.46444 | 0.06042 | 23 |
| Mali | 0.14917 | 0.32243 | 1.16149 | 0.23580 | 8 | Philippines | 0.06853 | 0.04310 | -0.37105 | 0.05582 | 24 |
| Burkina Faso | 0.03855 | 0.42869 | 10.11943 | 0.23362 | 9 | Congo, Rep. of | 0.02147 | 0.08023 | 2.73734 | 0.05085 | 25 |
| Senegal | 0.06258 | 0.40375 | 5.45210 | 0.23316 | 10 | Nigeria | 0.03050 | 0.04782 | 0.56797 | 0.03916 | 26 |
| Botswana | 0.20675 | 0.25223 | 0.22001 | 0.22949 | 11 | Indonesia | 0.00566 | 0.03719 | 5.57672 | 0.02142 | 27 |
| Zambia | 0.12565 | 0.32252 | 1.56678 | 0.22408 | 12 | India | 0.02080 | 0.01566 | -0.24710 | 0.01823 | 28 |
| Cambodia | 0.20784 | 0.10508 | -0.49444 | 0.15646 | 13 | Argentina | 0.00953 | 0.02151 | 1.25750 | 0.01552 | 29 |
| Togo | 0.01545 | 0.28766 | 17.62402 | 0.15155 | 14 | Myanmar | 0.00170 | 0.01035 | 5.08045 | 0.00603 | 30 |
| Bangladesh | 0.03525 | 0.25499 | 6.23379 | 0.14512 | 15 | Afghanistan | 0.00190 | 0.00613 | 2.23524 | 0.00401 | 31 |
| Benin | 0.01185 | 0.22093 | 17.63958 | 0.11639 | 16 | | | | | | |

Notes: The table presents the current state of mobile money inclusion based on a sample of 31 countries for which data is available (2014 and 2017). In the exception of the mobile money transaction indicator which comes from the IMF Financial Access Survey, all other indicators are sourced from the Global Findex database (World Bank).

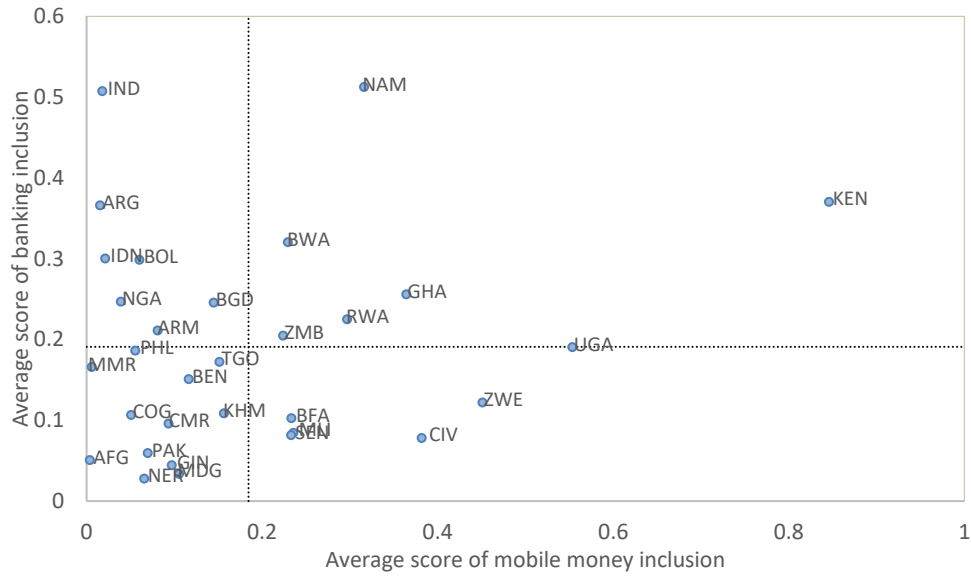


Figure 2. A quadrant plot showing countries' average achievements in mobile money inclusion and banking inclusion (the dotted lines are the sample averages)

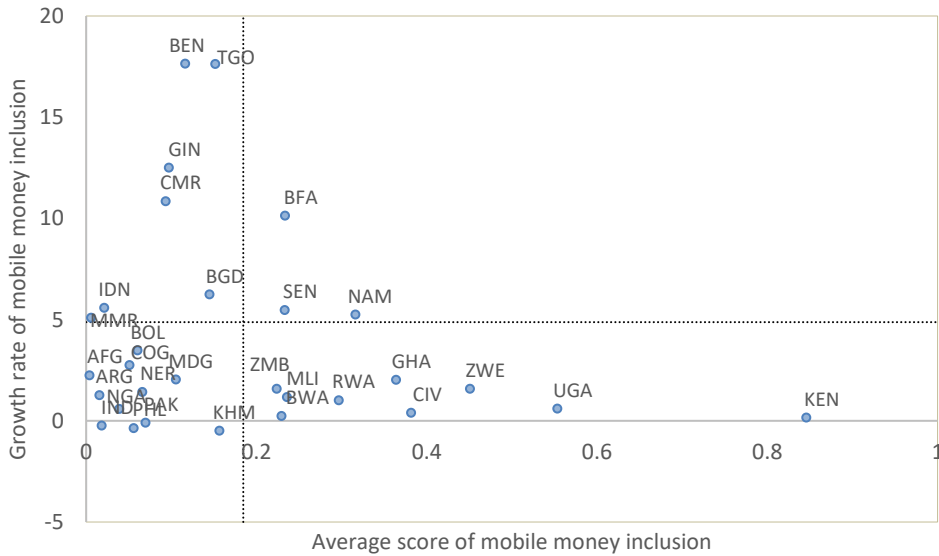


Figure 3. Evolution of mobile money inclusion: analysis for 2014 and 2017

Historical accounts indicate that the civil law tradition and the socialist legal tradition are characterised by institutions that promote state power over private property rights while common law tradition places more emphasis on private property rights than state power (Beck et al., 2003b; La Porta et al., 1999). Institutions that reflect the power of the state at the expense of private property rights, for example, can lead to interference in financial markets and inhibit financial development (Beck et al., 2003b)¹³. Empirical evidence reveals that countries whose laws originate from English legal family or tradition (common-law countries) exhibit strong protection for investors and consequently high levels of financial development compared to countries whose legal origin is either French, German, Scandinavian, or socialist (Beck, Demirgüç-Kunt, & Levine, 2003a; La Porta et al., 1999, 1998). Thus legal origin influences legal rules which in turn shape financial development (La Porta et al., 2000). Recent studies have shown that the legal environment equally affects financial inclusion. Beck et al (2007), for example, find that financial inclusion has a positive association with institutional quality albeit there is limited evidence in favour of legal origin. Additional evidence from sub-Saharan Africa suggests that countries with English legal origin experience better financial inclusion outcomes compared to countries with alternative legal origins (Yermack, 2018).

As a contribution to previous studies, we relate our novel indicators of financial inclusion with legal origin to ascertain whether the initial legal environment matters for financial inclusion. This is in line with a study by Levine (1998) that employs legal origin as an exogenous historical variable to explain the relationship between the legal environment, banking development, and economic growth. Based on the evidence in the literature, we capture the initial condition of the regulatory environment with a variable that measures whether a legal tradition is conducive for the protection of investors or otherwise. Specifically, we measure the legal environment with a dummy variable equals 1 if a country's law originates from the English legal family (common law) and 0 otherwise. The legal origin variable is obtained from La Porta et al (1999). Given that the main dependent variables, financial inclusion indices, fall between 0 and 1, the use of a linear regression model will lead to inconsistent estimates. Thus, the predicted values of a linear model may fall outside the boundaries of 0 and 1 (Faria, Rebelo, & Gouveia, 2020). Following Papke and Wooldridge (1996, 2008), this

¹³ For an elaborate review on why legal origin matter for financial development including the adaptability of legal traditions see Beck et al (2003b)

paper employs a fractional probit model to account for the bounded nature of the dependent variables using the following baseline specification:

$$\text{financial inclusion}_i = \beta_0 + \beta_1 \text{common law}_i + \beta_2 X_i + \varepsilon_i$$

where financial inclusion corresponds to the three outcome variables: overall financial inclusion achievement, banking inclusion, and mobile money inclusion of country i for the period 2014 and 2017 (the period for which the indices are computed). Common law is the legal origin variable and ε_i is the error term. X_i is a vector of controls which include absolute latitude to capture initial endowment¹⁴, the log of Gross National Income per capita (PPP, current international \$), the log of urban population, and the log of secondary enrolment. For the mobile money inclusion estimates, we also control for telecommunication infrastructure with the log of mobile cellular subscriptions per 100 people. The selection of the control variables follows the financial development literature and in the exception of the latitude variable which is obtained from La Porta et al (1999), all other controls are sourced from the World Bank's World Development Indicator database.

5.3.1. Econometric results

Table 5 presents the estimates for the relationship between the legal origin variable and the three indices of financial inclusion. The first three columns present the results for the overall financial inclusion. In columns 1 and 2, we estimate the results separately for each year before finally presenting the pooled estimates in columns 3. As evident in Table 5, the coefficients on the legal origin variable is positive and statistically significant. The evidence suggests that the initial condition of the legal environment is a significant determinant of overall financial inclusion. This is consistent with previous studies which show that the common law legal tradition matters for financial development because it provides an enabling environment for the legal protection of investors (Beck et al., 2003b, 2003a; La Porta et al., 1998). The results also show that income and education are important determinants of financial inclusion.

In columns 4, 5, and 6, we follow the same empirical strategy to examine the relationship between legal origin and banking inclusion. The results are consistent with our earlier estimates. The evidence suggests that there is a positive and significant association between English legal origin and banking

¹⁴ Previous studies suggest that geographical endowment is a significant determinant of financial development. Thus, countries in temperate regions have high levels of financial development than those along the equator (Beck et al., 2003a)

inclusion. Further, column 7 presents the pooled estimates for the relationship between legal origin and mobile money inclusion. The results are positive and statistically significant indicating that the legal environment matters for mobile money inclusion. As expected, mobile cellular subscription affects mobile money inclusion positively. The evidence further reveals that Latitude and GNI per capita are negatively associated with mobile money inclusion.

5.3.2. Robustness

One may argue that our sample is comprised of countries that can be classified as originators of the legal traditions as well as countries that inherited these traditions either through colonisation, conquest, or imitation (for an elaborate account on legal origin see La Porta et al., 1998). The inclusion of both the origin and the recipient countries in the sample can be a potential source of bias. Following Beck et al (2003b), we test for the robustness of the results by eliminating origin countries from the sample based on the classification of Berkowitz, Pistor, and Richard (2003). The United Kingdom, France, Germany, Switzerland, Denmark, Sweden, Austria, Finland, Norway, and the United States of America¹⁵ are excluded from the sample. Since the mobile money inclusion sample does not have any of these countries, we restrict the analysis to overall financial inclusion and banking inclusion. Table 6 presents the pooled estimates including regional¹⁶ fixed effect dummies to further check for the robustness of the results. As evident in Table 6, the British common law variable is still positive and statistically significant at the 5% significant level.

Levine (1998) notes that although the legal origin dummy is considered as the most preferred variable to measure the conditions of the legal environment because it is less prone to endogeneity problems, it does not provide enough guidance on the specific characteristics of the legal environment that are crucial for financial development. Accordingly, we test for the robustness of the estimations using an alternative measure of the legal environment. We measure the legal environment with the rule of law indicator obtained from the World Bank's Worldwide Governance indicator database.

¹⁵The United States, for example, although its legal origin can be traced to the English legal family, the country has developed legal systems that deviate sharply from the British common law; it is, therefore, classified as an origin country for the purposes of robustness check (see Berkowitz et al., 2003).

¹⁶ The regions include: East Asia and Pacific; Europe and Central Asia; Latin America and the Caribbean; Middle East and North Africa; North America; South Asia; and Sub-Saharan Africa.

Table 5. Relationship between financial inclusion and legal origin (baseline results). The table reports marginal effect estimates with robust standard errors in parentheses. The dependent variables are the indices of overall financial inclusion, banking inclusion, and mobile money inclusion

| | Overall financial inclusion | | | Banking inclusion | | | Mobile money inclusion |
|----------------------------|-----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------------|
| | 2014 | 2017 | Pooled Estimates | 2014 | 2017 | Pooled Estimates | Pooled Estimates |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Common law | 0.103*** (0.025) | 0.087*** (0.031) | 0.092*** (0.021) | 0.101*** (0.024) | 0.081*** (0.028) | 0.089*** (0.019) | 0.199*** (0.033) |
| Log of GNI per capita | 0.215*** (0.026) | 0.146*** (0.029) | 0.179*** (0.020) | 0.211*** (0.024) | 0.158*** (0.025) | 0.184*** (0.018) | -0.127*** (0.035) |
| Log of urban population | -0.100* (0.060) | -0.069 (0.063) | -0.086* (0.045) | -0.109* (0.056) | -0.089 (0.056) | -0.100** (0.040) | -0.067 (0.059) |
| Log of secondary enrolment | 0.067 (0.058) | 0.076 (0.061) | 0.076* (0.041) | 0.116** (0.057) | 0.138*** (0.051) | 0.130*** (0.038) | |
| Latitude | -0.032 (0.076) | 0.045 (0.086) | 0.004 (0.059) | -0.031 (0.071) | 0.040 (0.075) | 0.002 (0.053) | -0.376* (0.213) |
| Log of mobile subscription | | | | | | | 0.248*** (0.054) |
| Year fixed effect | NO | NO | YES | NO | NO | YES | YES |
| Wald χ^2 | 305.15 | 172.46 | 416.1 | 409.45 | 305.37 | 640.19 | 88.15 |
| Probability > χ^2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| No. of observations | 88 | 87 | 175 | 88 | 87 | 175 | 61 |

Notes: Values of the dependent variables fall between 0 and 1 where high values correspond to high financial inclusion. The variable common law equals 1 if the country has English legal origin, 0 otherwise. The estimations are conducted using fractional probit regression. The results for mobile money inclusion are restricted to the pooled estimates owing to the small sample size. The education variable is also not included in the mobile money inclusion estimations because it reduces the observations even further. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The rule of law variable captures the quality of law enforcement including contract enforcement and property rights protection where high values indicate strong performance. In line with the estimation strategy, we also employ the lagged values of the rule of law variable to account for initial conditions.

Table 7 presents the estimates for the overall financial inclusion based on the full sample. Columns 1 to 5 relate the rule of law variable with overall financial inclusion using different lagged values of the rule of law variable. While in Columns 2, 3, and 4 we respectively take 1 to 3-year lag of the main independent variable, in column 5, we introduce a 10-year lag with regional fixed effect to test for the sensitivity of the results. Consistent with the earlier results, the coefficient on the rule of law variable is positive and statistically significant. In Table 8, we repeat the analysis for banking inclusion and mobile money inclusion. Like the previous estimations, the results for banking inclusion are statistically significant and robust to the inclusion of the lagged values of the rule of law variable and regional fixed effect. Mobile money inclusion also shows a positive association with the rule of law variable in the first two columns. However, the result becomes insignificant once we increase the lags from 1 to 2 years. This is potentially due to the limited number of observations for the mobile money inclusion sample.

The estimates suggest that countries with favourable regulatory environments are characterised by inclusive financial systems. Favourable regulation environments, for example, will enable financial service providers such as Banks, non-bank financial institutions, and Mobile Network Operators to remain in business and offer financial services to consumers. Unfavourable regulatory environment, however, may stifle business operations of financial service providers leading to high transaction costs and other barriers of financial inclusion (Beck, Demirguc-Kunt, & Maksimovic, 2005; Claessens, 2006). Although the issue of endogeneity cannot be completely ruled out in our empirical strategy, the choice of legal origin, a historical variable, as the main independent variable of interest helps to mitigate the problem of reverse causality. Given that the study is limited to 2014 and 2017 due to data unavailability, we interpret the result as an association with no causal implications.

Table 6. Relationship between financial inclusion and legal origin: a robustness test by excluding legal origin countries

| | Overall financial inclusion | Banking inclusion |
|------------------------|-----------------------------|--------------------|
| | (1) | (2) |
| Common law | 0.056** (0.027) | 0.060** (0.027) |
| Controls | YES | YES |
| Year fixed effect | YES | YES |
| Regional fixed effect | YES | YES |
| Wald χ^2 | 592.04 | 803.21 |
| Probability > χ^2 | 0.000 | 0.000 |
| No. of observations | 156 | 156 |

Notes: The table reports marginal effect estimates with robust standard errors in parentheses. The dependent variables are the indices of overall financial inclusion and banking inclusion. Values of the dependent variables fall between 0 and 1 where high values correspond to high financial inclusion. The variable common law equals 1 if the country has English legal origin, 0 otherwise. The estimations are conducted using pooled fractional probit regression for the period 2014 and 2017. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Conclusion

As a departure from existing composite indices of financial inclusion, this paper advances the measurement of financial inclusion using an alternative strategy that accounts for the extent to which the financially excluded segments of society are gaining access to formal financial services. Drawing inspiration from the literature on financial exclusion, we argue that the approach adopted by this study is more beneficial for the monitoring and evaluation of inclusive financial systems given that such disadvantaged groups are often the targets of financial inclusion policies globally.

Our novel index of mobile money inclusion also highlights the state of digital financial inclusion in the developing world. While both the banking system and mobile money services are important for financial inclusion, the evidence in sub-Saharan Africa suggests that mobile money offers an opportunity for developing countries to improve their financial inclusion performance. Developing countries that have made limited progress in both banking and mobile money inclusion can draw some lessons from leading mobile money economies such as Kenya to enhance their overall financial inclusion.

We find evidence indicating that the legal or regulatory environment matters for financial inclusion. This evidence, albeit with no causal implications, suggests that developing countries that wish to promote financial inclusion should improve the quality of their legal institutions and rectify any historical factors that may inhibit the proper functioning of the regulatory environment. An enabling

business regulatory environment, for example, will not only attract investors in the financial services sector but facilitate smooth operations of service providers that are at the forefront of financial inclusion such as mobile money agents.

It is worth noting that new payment systems such as mobile money are not entirely free from money laundering and terrorist financing risks (FATF, 2010). However, with enhanced customer due diligence, mobile money inclusion can facilitate traceability of financial transactions which is fundamental in the fight against money laundering and terrorist financing (Aron, 2018). Financial inclusion initiatives, therefore, should be supported by appropriate legal or regulatory frameworks to mitigate potential risks.

Overall, this paper makes a major contribution to the literature on financial inclusion. However, our study is not immune to the limitations associated with the computation of composite indicators. Primarily, indicator selection, normalisation and aggregation criteria, and the weighting regime employed have implications for the resultant index (Decancq & Lugo, 2013). In our case, we partly address some of these concerns by objectively computing indicator weights through factor analysis. While the indicators considered for our study may not be exhaustive owing to data constraints, the approach adopted by this paper enables us to assess countries' efforts in providing financial services to groups vulnerable to financial exclusion. More research will be required to build a consensus on the dimensions of financial inclusion and the weighting regime to adopt.

Table 7. Relationship between overall financial inclusion and rule of law: a robustness test with an alternative measure of the legal environment. The dependent variable is the index of overall financial inclusion

| | (1) | (2) | (3) | (4) | (5) |
|----------------------------|---------------------|----------------------|----------------------|----------------------|---------------------|
| Rule of law | 0.081*** (0.015) | | | | |
| Rule of law (1-year lag) | | 0.090*** (0.015) | | | |
| Rule of law (2-year lag) | | | 0.095*** (0.014) | | |
| Rule of law (3-year lag) | | | | 0.098*** (0.014) | |
| Rule of law (10-year lag) | | | | | 0.080*** (0.015) |
| Log of GNI per capita | 0.121*** (0.023) | 0.105*** (0.022) | 0.100*** (0.022) | 0.096*** (0.022) | 0.109*** (0.022) |
| Log of urban population | -0.086** (0.037) | -0.102*** (0.035) | -0.133*** (0.034) | -0.136*** (0.033) | -0.068 (0.042) |
| Log of secondary enrolment | 0.105*** (0.037) | 0.130*** (0.037) | 0.153*** (0.042) | 0.160*** (0.042) | 0.171*** (0.044) |
| Latitude | -0.098* (0.054) | -0.096* (0.055) | -0.108* (0.059) | -0.105* (0.059) | -0.211** (0.083) |
| Year fixed effect | YES | YES | YES | YES | YES |
| Regional fixed effect | NO | NO | NO | NO | YES |
| Wald χ^2 | 683.4 | 672.69 | 596.1 | 581.25 | 657.61 |
| Probability > χ^2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| No. of observations | 173 | 155 | 135 | 135 | 135 |

Notes: The table reports marginal effect estimates with robust standard errors in parentheses. The estimations are conducted using pooled fractional probit model for the period 2014 and 2017. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8. Relationship between financial inclusion and rule of law. Robustness test with an alternative measure of the regulatory environment. The dependent variables are the indices of banking inclusion and mobile money inclusion

| | Banking inclusion | | | | | Mobile money inclusion | | | |
|----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------------|--------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Rule of law | 0.061*** (0.014) | | | | | 0.115** (0.045) | | | |
| Rule of law (1-year lag) | | 0.067*** (0.014) | | | | | 0.099** (0.049) | | |
| Rule of law (2-year lag) | | | 0.075*** (0.013) | | | | | 0.075 (0.051) | |
| Rule of law (3-year lag) | | | | 0.077*** (0.013) | | | | | 0.058 (0.051) |
| Rule of law (10-year lag) | | | | | 0.073*** (0.015) | | | | |
| Log of GNI per capita | 0.145*** (0.021) | 0.132*** (0.020) | 0.125*** (0.020) | 0.121*** (0.020) | 0.121*** (0.023) | -0.079* (0.046) | -0.075 (0.052) | -0.075 (0.052) | -0.069 (0.052) |
| Log of urban population | -0.111*** (0.036) | -0.131*** (0.033) | -0.162*** (0.031) | -0.165*** (0.031) | -0.114*** (0.039) | -0.095 (0.075) | -0.097 (0.081) | -0.084 (0.085) | -0.085 (0.086) |
| Log of secondary enrolment | 0.148*** (0.037) | 0.178*** (0.037) | 0.207*** (0.040) | 0.212*** (0.040) | 0.213*** (0.045) | | | | |
| Latitude | -0.086* (0.051) | -0.085* (0.051) | -0.101* (0.055) | -0.099* (0.054) | -0.166** (0.077) | -0.354 (0.235) | -0.402 (0.276) | -0.489 (0.317) | -0.514 (0.314) |
| Log of mobile subscription | | | | | | 0.150** (0.064) | 0.157** (0.069) | 0.150* (0.084) | 0.148* (0.086) |
| Year fixed effect | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Regional fixed effect | NO | NO | NO | NO | YES | NO | NO | NO | NO |
| Wald χ^2 | 863.55 | 828.84 | 735.53 | 736.27 | 740.170 | 60.26 | 47.030 | 42.61 | 39.82 |
| Probability > χ^2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| No. of observations | 173 | 155 | 135 | 135 | 135 | 61 | 57 | 53 | 53 |

Notes: The table reports marginal effect estimates with robust standard errors in parentheses. The estimations are conducted using pooled fractional probit models for the period 2014 and 2017. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Appendix A

Table A1. Indicators of overall financial inclusion

| Indicator | Description |
|------------|--|
| Female | Account, female (% age 15+) |
| Poorest | Account, income, poorest 40% (% ages 15+) |
| Unemployed | Account, out of labour force (% age 15+) |
| Primary | Account, primary education, or less (% ages 15+) |
| Rural | Account, rural (% age 15+) |
| Young | Account, young adults (% ages 15-24) |
| Savings | Outstanding deposits with commercial banks (% of GDP). |
| Loan | Outstanding loans with commercial banks (% of GDP). |

Notes: Indicators on the proportion of account ownership by various groups come from the Global Findex database (World Bank) whereas indicators on deposits and loans with commercial banks come from the 2019 Financial Access Survey (IMF). Indicators are for the period 2014 and 2017.

Table A2. Indicators for banking inclusion

| Indicator | Description |
|---------------|--|
| FI_Female | Financial institution accounts, female (% age 15 +) |
| FI_Poorest | Financial institution accounts, income poorest 40% (% age 15 +) |
| FI_Unemployed | Financial institution accounts, out of labour force (% age 15 +) |
| FI_Primary | Financial institution accounts, primary education or less (% age 15 +) |
| FI_Rural | Financial institution accounts, rural (% age 15 +) |
| FI_Young | Financial institution accounts, young adults (% age 15 +) |
| Savings | Outstanding deposits with commercial banks (% of GDP) |
| Loan | Outstanding loans with commercial banks (% of GDP) |

Notes: Indicators on the proportion of account ownership by various groups come from the Global Findex database (World Bank) whereas indicators on deposits and loans with commercial banks come from the 2019 Financial Access Survey (IMF). Indicators are for the period 2014 and 2017.

Table A3. Indicators of mobile money inclusion

| Indicator | Description |
|----------------|--|
| MM_Female | Mobile money account, female (% age 15+) |
| MM_Poorest | Mobile money account, income, poorest 40% (% age 15+) |
| MM_Unemployed | Mobile money account, out of labour force (% age 15+) |
| MM_Primary | Mobile money account, primary education, or less (% age 15+) |
| MM_Rural | Mobile money account, rural (% age 15+) |
| MM_Young | Mobile money account, young adults (% age 15-24) |
| MM_Transaction | Mobile money transaction value (% of GDP) |

Notes: Mobile money indicators on the proportion of account ownership by various groups come from the Global Findex Database (World Bank) whereas the indicator on mobile money transaction values comes from the 2019 Financial Access Survey (IMF). Indicators are for the years 2014 and 2017.

Table A4. Factor analysis of the indicators of overall financial inclusion: factors and their associated eigenvalues

| Factor | Eigenvalue | Difference | Proportion | Cumulative |
|----------|------------|------------|------------|------------|
| Factor 1 | 6.1321 | 4.5487 | 0.7665 | 0.7665 |
| Factor 2 | 1.5834 | 1.4892 | 0.1979 | 0.9644 |
| Factor 3 | 0.0941 | 0.0090 | 0.0118 | 0.9762 |
| Factor 4 | 0.0852 | 0.0221 | 0.0106 | 0.9868 |
| Factor 5 | 0.0631 | 0.0406 | 0.0079 | 0.9947 |
| Factor 6 | 0.0226 | 0.0113 | 0.0028 | 0.9976 |
| Factor 7 | 0.0113 | 0.0031 | 0.0014 | 0.9990 |
| Factor 8 | 0.0082 | . | 0.001 | 1 |

Note: The extraction method is based on principal components and rotation is by varimax rotation.

Table A5. Factor analysis of the indicators of banking inclusion: factors and their associated eigenvalues

| Factor | Eigenvalue | Difference | Proportion | Cumulative |
|----------|------------|------------|------------|------------|
| Factor 1 | 6.1835 | 4.6305 | 0.7729 | 0.7729 |
| Factor 2 | 1.5530 | 1.4599 | 0.1941 | 0.9671 |
| Factor 3 | 0.0931 | 0.0177 | 0.0116 | 0.9787 |
| Factor 4 | 0.0754 | 0.0182 | 0.0094 | 0.9881 |
| Factor 5 | 0.0572 | 0.0368 | 0.0071 | 0.9953 |
| Factor 6 | 0.0203 | 0.0100 | 0.0025 | 0.9978 |
| Factor 7 | 0.0103 | 0.0031 | 0.0013 | 0.9991 |
| Factor 8 | 0.0073 | . | 0.0009 | 1 |

Note: The extraction method is based on principal components and rotation is by varimax rotation.

Table A6. Factor analysis of the indicators of mobile money inclusion: factors and their associated eigenvalues

| Factor | Eigenvalue | Difference | Proportion | Cumulative |
|----------|------------|------------|------------|------------|
| Factor 1 | 6.3513 | 5.8546 | 0.9073 | 0.9073 |
| Factor 2 | 0.4967 | 0.4360 | 0.0710 | 0.9783 |
| Factor 3 | 0.0607 | 0.0215 | 0.0087 | 0.9869 |
| Factor 4 | 0.0391 | 0.0111 | 0.0056 | 0.9925 |
| Factor 5 | 0.0280 | 0.0124 | 0.0040 | 0.9965 |
| Factor 6 | 0.0157 | 0.0070 | 0.0022 | 0.9988 |
| Factor 7 | 0.0086 | . | 0.0012 | 1 |

Note: The extraction method is based on principal components and rotation is by varimax rotation.

Table A7. Descriptive statistics for variables employed for the fractional probit estimations

| Variable | Sample for overall and banking financial inclusion estimation | | | | | | Sample for mobile money inclusion | | | | | Data source |
|-----------------------------------|---|------|-----------|-------|-------|--|-----------------------------------|-------|----------|-------|-------|--|
| | Obs | Mean | Std. Dev. | Min | Max | | Obs | Mean | Std. Dev | Min | Max | |
| Overall financial inclusion index | 236 | 0.43 | 0.23 | 0.00 | 0.92 | | | | | | | Index computed based on data from the Global Findex database and IMF Financial Access Survey |
| Banking inclusion index | 236 | 0.42 | 0.24 | 0.01 | 0.92 | | | | | | | Index computed based on data from the Global Findex database and IMF Financial Access Survey |
| Mobile money inclusion index | | | | | | | 62 | 0.18 | 0.21 | 0.00 | 0.90 | Index computed based on data from the Global Findex database and IMF Financial Access Survey |
| Common law | 230 | 0.23 | 0.42 | 0 | 1 | | 62 | 0.35 | 0.48 | 0 | 1 | La Porta et al. (1999) |
| Rule of law | 232 | 0.11 | 1.00 | -1.64 | 2.10 | | 62 | -0.59 | 0.49 | -1.57 | 0.63 | Worldwide Governance Indicators (World Bank) |
| Log of GNI per capita | 235 | 9.48 | 1.08 | 7.02 | 11.24 | | 61 | 8.27 | 0.72 | 7.02 | 10.04 | World development indicators database (World Bank) |
| Log of urban population | 236 | 4.09 | 0.39 | 2.85 | 4.62 | | 62 | 3.70 | 0.40 | 2.85 | 4.53 | World development indicators database (World Bank) |
| Log of secondary enrolment | 181 | 4.47 | 0.38 | 2.96 | 5.10 | | | | | | | World development indicators database (World Bank) |
| Latitude | 230 | 0.34 | 0.19 | 0.01 | 0.71 | | 62 | 0.19 | 0.14 | 0.01 | 0.67 | La Porta et al (1999) |
| Log of mobile subscription | | | | | | | 62 | 4.49 | 0.34 | 3.56 | 5.11 | World development indicators database (World Bank) |

Notes: The regression analysis examines the relationship between financial inclusion indices and the regulatory environment. Estimates cover the period 2014 and 2017

Supplementary data

Table A8. Index of overall financial inclusion

| Economy | iso3 | 2014 | | | 2017 | | | 2014-2017 | | |
|----------------|------|----------|----------|----------|----------|----------|----------|-------------|----------|----------------------|
| | | Access | Usage | Index | Access | Usage | Index | Growth rate | Average | Rank base on average |
| Hong Kong | HKG | 0.919381 | 1 | 0.92394 | 0.905227 | 0.723498 | 0.871953 | -0.05627 | 0.897946 | 1 |
| Switzerland | CHE | 0.962496 | 0.428528 | 0.807289 | 0.95065 | 0.449657 | 0.811721 | 0.00549 | 0.809505 | 2 |
| New Zealand | NZL | 0.986644 | 0.273317 | 0.758785 | 0.980541 | 0.336888 | 0.779422 | 0.027197 | 0.769104 | 3 |
| United Kingdom | GBR | 0.958129 | 0.319568 | 0.771013 | 0.910277 | 0.329992 | 0.762317 | -0.01128 | 0.766665 | 4 |
| Netherlands | NLD | 0.991789 | 0.262765 | 0.755494 | 0.996549 | 0.251462 | 0.751849 | -0.00483 | 0.753671 | 5 |
| Malta | MLT | 0.924546 | 0.296982 | 0.756329 | 0.963558 | 0.255715 | 0.750896 | -0.00718 | 0.753612 | 6 |
| Australia | AUS | 0.977095 | 0.243536 | 0.748313 | 0.99184 | 0.271765 | 0.758478 | 0.013583 | 0.753396 | 7 |
| Japan | JPN | 0.892997 | 0.288134 | 0.743339 | 0.930734 | 0.305696 | 0.76075 | 0.023423 | 0.752044 | 8 |
| Cyprus | CYP | 0.84228 | 0.340539 | 0.735559 | 0.821188 | 0.456317 | 0.753138 | 0.0239 | 0.744348 | 9 |
| Luxembourg | LUX | 0.930094 | 0.228143 | 0.735777 | 0.966666 | 0.248597 | 0.748943 | 0.017895 | 0.74236 | 10 |
| Belgium | BEL | 0.959949 | 0.216957 | 0.737696 | 0.971904 | 0.226336 | 0.742175 | 0.006071 | 0.739936 | 11 |
| Canada | CAN | 0.984869 | 0.199739 | 0.734341 | 0.978406 | 0.229377 | 0.743738 | 0.012797 | 0.73904 | 12 |
| Korea, Rep. of | KOR | 0.906891 | 0.194518 | 0.718915 | 0.886755 | 0.201943 | 0.714695 | -0.00587 | 0.716805 | 13 |
| Estonia | EST | 0.939546 | 0.140027 | 0.709281 | 0.953766 | 0.143519 | 0.712757 | 0.004901 | 0.711019 | 14 |
| Sweden | SWE | 0.992435 | 0.125314 | 0.709966 | 0.986349 | 0.129156 | 0.711104 | 0.001513 | 0.710503 | 15 |
| Portugal | PRT | 0.821708 | 0.257037 | 0.701755 | 0.866092 | 0.220107 | 0.712258 | 0.014967 | 0.707007 | 16 |
| Denmark | DNK | 1 | 0.118277 | 0.707721 | 0.999074 | 0.110662 | 0.705196 | -0.00357 | 0.706458 | 17 |
| Slovenia | SVN | 0.939815 | 0.129197 | 0.705809 | 0.956773 | 0.114954 | 0.703799 | -0.00285 | 0.704804 | 18 |
| Norway | NOR | 1 | 0.098163 | 0.701054 | 0.992835 | 0.108339 | 0.70435 | 0.004701 | 0.702702 | 19 |
| Iran | IRN | 0.885886 | 0.088784 | 0.679331 | 0.91941 | 0.134049 | 0.70305 | 0.034915 | 0.691191 | 20 |
| Ireland | IRL | 0.86083 | 0.172351 | 0.695845 | 0.893314 | 0.10166 | 0.685662 | -0.01463 | 0.690753 | 21 |
| Mauritius | MUS | 0.743149 | 0.28679 | 0.661449 | 0.842163 | 0.284785 | 0.720029 | 0.088564 | 0.690739 | 22 |

Table A8: continued

| | | | | | | | | | | |
|----------------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----|
| Finland | FIN | 1 | 0.091407 | 0.698814 | 0.994808 | 0.027843 | 0.677706 | -0.03021 | 0.68826 | 23 |
| Mongolia | MNG | 0.871249 | 0.112627 | 0.681754 | 0.885353 | 0.115357 | 0.687441 | 0.008341 | 0.684598 | 24 |
| Germany | DEU | 0.967197 | 0.04794 | 0.682892 | 0.983543 | 0.051103 | 0.685071 | 0.003192 | 0.683981 | 25 |
| Austria | AUT | 0.940404 | 0.058714 | 0.682951 | 0.960143 | 0.052981 | 0.683832 | 0.00129 | 0.683392 | 26 |
| Israel | ISR | 0.797312 | 0.208812 | 0.675419 | 0.815784 | 0.211334 | 0.686068 | 0.015766 | 0.680744 | 27 |
| France | FRA | 0.880116 | 0.076484 | 0.673641 | 0.836368 | 0.086334 | 0.660056 | -0.02017 | 0.666848 | 28 |
| United States | USA | 0.814971 | 0.117199 | 0.659251 | 0.825842 | 0.124699 | 0.666556 | 0.01108 | 0.662904 | 29 |
| Latvia | LVA | 0.814609 | 0.101766 | 0.654675 | 0.839506 | 0.091583 | 0.662946 | 0.012633 | 0.65881 | 30 |
| Italy | ITA | 0.768463 | 0.14414 | 0.641939 | 0.830853 | 0.143388 | 0.674274 | 0.050372 | 0.658107 | 31 |
| Malaysia | MYS | 0.711759 | 0.278689 | 0.637889 | 0.778719 | 0.258653 | 0.677547 | 0.062171 | 0.657718 | 32 |
| China | CHN | 0.722055 | 0.285588 | 0.646663 | 0.733373 | 0.320624 | 0.662369 | 0.024288 | 0.654516 | 33 |
| Greece | GRC | 0.741067 | 0.251887 | 0.651894 | 0.732524 | 0.216036 | 0.637762 | -0.02168 | 0.644828 | 34 |
| Thailand | THA | 0.695318 | 0.182949 | 0.60505 | 0.761242 | 0.177521 | 0.646341 | 0.068245 | 0.625696 | 35 |
| Croatia | HRV | 0.724698 | 0.160484 | 0.619333 | 0.688707 | 0.146951 | 0.592304 | -0.04364 | 0.605818 | 36 |
| United Arab Emirates | ARE | 0.656618 | 0.237107 | 0.589017 | 0.686398 | 0.289598 | 0.621854 | 0.055749 | 0.605435 | 37 |
| Poland | POL | 0.640624 | 0.104869 | 0.54944 | 0.727931 | 0.109212 | 0.608745 | 0.107937 | 0.579093 | 38 |
| Kenya | KEN | 0.65165 | 0.088283 | 0.553512 | 0.69975 | 0.074749 | 0.582491 | 0.052355 | 0.568001 | 39 |
| Serbia | SRB | 0.784209 | 0.097787 | 0.638209 | 0.546945 | 0.098341 | 0.478427 | -0.25036 | 0.558318 | 40 |
| Czech Rep. | CZE | 0.671868 | 0.135526 | 0.578151 | 0.565099 | 0.14094 | 0.500553 | -0.13422 | 0.539352 | 41 |
| Saudi Arabia | SAU | 0.630718 | 0.115937 | 0.544736 | 0.593096 | 0.136097 | 0.521057 | -0.04347 | 0.532896 | 42 |
| South Africa | ZAF | 0.591044 | 0.12597 | 0.517496 | 0.63162 | 0.12598 | 0.547526 | 0.05803 | 0.532511 | 43 |
| Kuwait | KWT | 0.618644 | 0.144391 | 0.541858 | 0.573435 | 0.209522 | 0.519766 | -0.04077 | 0.530812 | 44 |
| Lithuania | LTU | 0.542013 | 0.088065 | 0.472662 | 0.697701 | 0.091504 | 0.585227 | 0.238152 | 0.528944 | 45 |
| Namibia | NAM | 0.454478 | 0.101972 | 0.405434 | 0.744544 | 0.209784 | 0.644047 | 0.588538 | 0.52474 | 46 |
| Belarus | BLR | 0.50914 | 1 | 0.536893 | 0.586054 | 0.076802 | 0.503839 | -0.06156 | 0.520366 | 47 |
| Chile | CHL | 0.514271 | 0.18461 | 0.467962 | 0.64304 | 0.185219 | 0.568297 | 0.214409 | 0.51813 | 48 |
| Russian Federation | RUS | 0.528009 | 0.098865 | 0.463786 | 0.671 | 0.097862 | 0.568983 | 0.226824 | 0.516384 | 49 |

Table A8: continued

| | | | | | | | | | | |
|------------------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----|
| Hungary | HUN | 0.579641 | 0.080409 | 0.499793 | 0.618517 | 0.071486 | 0.526426 | 0.053289 | 0.513109 | 50 |
| North Macedonia | MKD | 0.55431 | 0.120088 | 0.488249 | 0.615568 | 0.121341 | 0.53483 | 0.095405 | 0.51154 | 51 |
| Slovak Rep. | SVK | 0.517058 | 0.104402 | 0.456179 | 0.655103 | 0.124251 | 0.563931 | 0.236205 | 0.510055 | 52 |
| Brazil | BRA | 0.590181 | 0.084604 | 0.508499 | 0.590054 | 0.078293 | 0.507111 | -0.00273 | 0.507805 | 53 |
| India | IND | 0.423589 | 0.135402 | 0.385279 | 0.74897 | 0.128148 | 0.626347 | 0.625699 | 0.505813 | 54 |
| Costa Rica | CRI | 0.554566 | 0.11032 | 0.486595 | 0.599325 | 0.120609 | 0.522637 | 0.074071 | 0.504616 | 55 |
| Turkey | TUR | 0.454225 | 0.11838 | 0.40793 | 0.535249 | 0.134115 | 0.475934 | 0.166705 | 0.441932 | 56 |
| Montenegro | MNE | 0.444257 | 0.118349 | 0.399729 | 0.540309 | 0.121491 | 0.477601 | 0.194812 | 0.438665 | 57 |
| Bulgaria | BGR | 0.432047 | 0.1521 | 0.394918 | 0.524473 | 0.14325 | 0.469025 | 0.187651 | 0.431972 | 58 |
| Romania | ROU | 0.472236 | 0.068384 | 0.414085 | 0.437241 | 0.061727 | 0.384667 | -0.07104 | 0.399376 | 59 |
| Ukraine | UKR | 0.389768 | 0.122625 | 0.35498 | 0.492359 | 0.06681 | 0.429848 | 0.210909 | 0.392414 | 60 |
| Bosnia and Herzegovina | BIH | 0.401284 | 0.121166 | 0.364437 | 0.446657 | 0.126208 | 0.402973 | 0.105743 | 0.383705 | 61 |
| Uruguay | URY | 0.339826 | 0.071904 | 0.305314 | 0.509857 | 0.073212 | 0.444821 | 0.456928 | 0.375067 | 62 |
| Dominican Rep. | DOM | 0.419183 | 0.038454 | 0.366065 | 0.427654 | 0.043342 | 0.373782 | 0.021081 | 0.369923 | 63 |
| Kazakhstan | KAZ | 0.393492 | 0.063937 | 0.349068 | 0.438224 | 0.055948 | 0.384496 | 0.101492 | 0.366782 | 64 |
| Argentina | ARG | 0.426314 | 0.020077 | 0.368758 | 0.414299 | 0.026386 | 0.360069 | -0.02356 | 0.364414 | 65 |
| Uganda | UGA | 0.321619 | 0.021967 | 0.282546 | 0.490606 | 0.023475 | 0.420557 | 0.488457 | 0.351551 | 66 |
| Botswana | BWA | 0.392424 | 0.063674 | 0.348141 | 0.396961 | 0.05663 | 0.350781 | 0.007583 | 0.349461 | 67 |
| Ghana | GHA | 0.314577 | 0.031006 | 0.277951 | 0.48387 | 0.032112 | 0.416855 | 0.499747 | 0.347403 | 68 |
| Panama | PAN | 0.30789 | 0.311004 | 0.308232 | 0.359257 | 0.28105 | 0.350203 | 0.136167 | 0.329217 | 69 |
| Georgia | GEO | 0.27638 | 0.085566 | 0.253025 | 0.446852 | 0.117953 | 0.401802 | 0.587991 | 0.327414 | 70 |
| Algeria | DZA | 0.377676 | 0.099059 | 0.341272 | 0.314724 | 0.11368 | 0.289844 | -0.1507 | 0.315558 | 71 |
| Bolivia | BOL | 0.270272 | 0.066823 | 0.24523 | 0.429532 | 0.092656 | 0.383447 | 0.563622 | 0.314338 | 72 |
| Ecuador | ECU | 0.324537 | 0.065015 | 0.291356 | 0.36416 | 0.07527 | 0.32633 | 0.120037 | 0.308843 | 73 |
| Nepal | NPL | 0.26508 | 0.125765 | 0.248508 | 0.394128 | 0.176881 | 0.366602 | 0.475213 | 0.307555 | 74 |
| Indonesia | IDN | 0.253738 | 0.08162 | 0.232934 | 0.407089 | 0.081779 | 0.363164 | 0.559084 | 0.298049 | 75 |
| Rwanda | RWA | 0.259106 | 0.02754 | 0.230246 | 0.418209 | 0.030688 | 0.363973 | 0.5808 | 0.29711 | 76 |

Table A8: continued

| | | | | | | | | | | |
|---------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|-----|
| Lebanon | LBN | 0.274511 | 0.397643 | 0.287 | 0.28012 | 0.424212 | 0.294512 | 0.026173 | 0.290756 | 77 |
| Zimbabwe | ZWE | 0.212755 | 0.024736 | 0.189958 | 0.441721 | 0.051237 | 0.386535 | 1.034849 | 0.288247 | 78 |
| Guatemala | GTM | 0.296599 | 0.06936 | 0.268171 | 0.340834 | 0.071237 | 0.306068 | 0.141319 | 0.28712 | 79 |
| Bangladesh | BGD | 0.22245 | 0.107226 | 0.208968 | 0.386593 | 0.106916 | 0.34995 | 0.674661 | 0.279459 | 80 |
| Colombia | COL | 0.249834 | 0.086893 | 0.230241 | 0.337974 | 0.099439 | 0.307732 | 0.336565 | 0.268987 | 81 |
| Uzbekistan | UZB | 0.314203 | 0.025546 | 0.276828 | 0.26873 | 0.059884 | 0.242959 | -0.12235 | 0.259893 | 82 |
| Zambia | ZMB | 0.246253 | 0.027325 | 0.219189 | 0.340487 | 0.023799 | 0.29866 | 0.362569 | 0.258924 | 83 |
| Honduras | HND | 0.217118 | 0.119874 | 0.20585 | 0.335767 | 0.120616 | 0.308842 | 0.50033 | 0.257346 | 84 |
| Côte d'Ivoire | CIV | 0.254662 | 0.047678 | 0.229195 | 0.316435 | 0.06541 | 0.284532 | 0.24144 | 0.256863 | 85 |
| Albania | ALB | 0.259902 | 0.129658 | 0.244491 | 0.269598 | 0.11907 | 0.251576 | 0.028976 | 0.248033 | 86 |
| Mexico | MEX | 0.287196 | 0.037573 | 0.255661 | 0.260779 | 0.043975 | 0.23395 | -0.08492 | 0.244805 | 87 |
| Nigeria | NGA | 0.302923 | 0.028117 | 0.267666 | 0.247168 | 0.023144 | 0.219401 | -0.18032 | 0.243534 | 88 |
| Vietnam | VNM | 0.228551 | 0.265775 | 0.232553 | 0.209226 | 0.341664 | 0.222674 | -0.04248 | 0.227614 | 89 |
| Jordan | JOR | 0.139797 | 0.238512 | 0.150083 | 0.305173 | 0.249754 | 0.298869 | 0.991353 | 0.224476 | 90 |
| Armenia | ARM | 0.075783 | 0.077872 | 0.076012 | 0.395041 | 0.091103 | 0.354605 | 3.665132 | 0.215308 | 91 |
| Togo | TGO | 0.08979 | 0.107975 | 0.091771 | 0.368951 | 0.11052 | 0.335619 | 2.657149 | 0.213695 | 92 |
| El Salvador | SLV | 0.249059 | 0.103579 | 0.231725 | 0.192645 | 0.110324 | 0.183194 | -0.20943 | 0.207459 | 93 |
| Philippines | PHL | 0.215305 | 0.075672 | 0.198771 | 0.227218 | 0.095136 | 0.211621 | 0.064651 | 0.205196 | 94 |
| Peru | PER | 0.148454 | 0.067812 | 0.139223 | 0.289106 | 0.071542 | 0.262056 | 0.882269 | 0.20064 | 95 |
| Tunisia | TUN | 0.170189 | 0.162192 | 0.169307 | 0.216467 | 0.172842 | 0.211555 | 0.249539 | 0.190431 | 96 |
| Kyrgyz Rep. | KGZ | 0.099256 | 0.036758 | 0.092178 | 0.306201 | 0.040767 | 0.272284 | 1.953885 | 0.182231 | 97 |
| Burkina Faso | BFA | 0.063198 | 0.070352 | 0.063981 | 0.320834 | 0.092518 | 0.292135 | 3.565968 | 0.178058 | 98 |
| Senegal | SEN | 0.054441 | 0.062788 | 0.055354 | 0.332506 | 0.075936 | 0.299701 | 4.414249 | 0.177528 | 99 |
| Mali | MLI | 0.115432 | 0.049994 | 0.108007 | 0.260095 | 0.059143 | 0.235427 | 1.179747 | 0.171717 | 100 |
| Benin | BEN | 0.07889 | 0.070166 | 0.077927 | 0.285321 | 0.071058 | 0.258742 | 2.320306 | 0.168334 | 101 |
| Cambodia | KHM | 0.173773 | 0.126966 | 0.168501 | 0.151466 | 0.18405 | 0.154985 | -0.08021 | 0.161743 | 102 |
| Myanmar | MMR | 0.15832 | 0.028014 | 0.143032 | 0.19649 | 0.049453 | 0.179044 | 0.251775 | 0.161038 | 103 |

Table A8: continued

| | | | | | | | | | | |
|---------------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|-----|
| Azerbaijan | AZE | 0.180146 | 0.050336 | 0.164895 | 0.172923 | 0.0389 | 0.157153 | -0.04695 | 0.161024 | 104 |
| Mauritania | MRT | 0.125233 | 0.568293 | 0.162377 | 0.108636 | 0.723498 | 0.154054 | -0.05126 | 0.158216 | 105 |
| Haiti | HTI | 0.100152 | 0.057546 | 0.095372 | 0.212802 | 0.059821 | 0.19457 | 1.04012 | 0.144971 | 106 |
| Nicaragua | NIC | 0.081412 | 0.067999 | 0.079929 | 0.218841 | 0.08177 | 0.202626 | 1.535083 | 0.141277 | 107 |
| West Bank and Gaza | PSE | 0.137635 | 0.103492 | 0.133817 | 0.139113 | 0.144593 | 0.139714 | 0.044061 | 0.136765 | 108 |
| Egypt, Arab Rep. of | EGY | 0.050132 | 0.110865 | 0.056614 | 0.223119 | 0.16143 | 0.216103 | 2.817098 | 0.136359 | 109 |
| Cameroon | CMR | 0.025535 | 0.021919 | 0.025137 | 0.238746 | 0.03031 | 0.213138 | 7.479174 | 0.119137 | 110 |
| Congo, Rep. of | COG | 0.069609 | 0.03835 | 0.066123 | 0.169162 | 0.04969 | 0.155207 | 1.347253 | 0.110665 | 111 |
| Iraq | IRQ | 0.053686 | 0.022293 | 0.050185 | 0.161441 | 0.027982 | 0.145756 | 1.904343 | 0.097971 | 112 |
| Chad | TCD | 0.056445 | 0.009882 | 0.051217 | 0.140091 | 0.012736 | 0.12519 | 1.444322 | 0.088203 | 113 |
| Pakistan | PAK | 0.057909 | 0.043626 | 0.056329 | 0.10811 | 0.046846 | 0.101174 | 0.796134 | 0.078751 | 114 |
| Guinea | GIN | 0.002171 | 0.016148 | 0.003697 | 0.160513 | 0.015982 | 0.143438 | 37.79539 | 0.073568 | 115 |
| Madagascar, Rep. of | MDG | 0.031726 | 0.019645 | 0.030391 | 0.114602 | 0.026892 | 0.104544 | 2.439927 | 0.067468 | 116 |
| Niger | NER | 0.019387 | 0.027151 | 0.020237 | 0.077528 | 0.031925 | 0.072407 | 2.577948 | 0.046322 | 117 |
| Afghanistan | AFG | 0.026799 | 0.010659 | 0.025012 | 0.066097 | 0.01098 | 0.059882 | 1.394129 | 0.042447 | 118 |

Notes: Overall financial inclusion index uses access indicators that measure account ownership in general. This includes financial institutions' account ownership as well as mobile money account ownership. The computation is based on data from the Global Findex database and the IMF Financial Access Survey. Access and Usage correspond to the dimensions of overall financial inclusion identified through factor analysis

Table A 9. Index of banking inclusion

| Country | iso3 | 2014 | | | 2017 | | | 2014-2017 | | |
|----------------|------|----------|----------|----------|----------|----------|----------|-------------|---------------|----------------------|
| | | Access | Usage | Index | Access | Usage | Index | Growth rate | Average based | Rank base on average |
| Hong Kong | HKG | 0.920368 | 1 | 0.924913 | 0.906003 | 0.723266 | 0.872138 | -0.05706 | 0.898526 | 1 |
| Switzerland | CHE | 0.962861 | 0.428318 | 0.806424 | 0.951174 | 0.449457 | 0.810966 | 0.005632 | 0.808695 | 2 |
| New Zealand | NZL | 0.986702 | 0.272996 | 0.757568 | 0.980758 | 0.336575 | 0.778322 | 0.027395 | 0.767945 | 3 |
| United Kingdom | GBR | 0.958589 | 0.319413 | 0.770012 | 0.911133 | 0.329846 | 0.761613 | -0.01091 | 0.765812 | 4 |
| Malta | MLT | 0.92522 | 0.296975 | 0.755491 | 0.963889 | 0.25577 | 0.749828 | -0.00749 | 0.752659 | 5 |
| Netherlands | NLD | 0.991875 | 0.262525 | 0.754286 | 0.996579 | 0.251235 | 0.750625 | -0.00485 | 0.752456 | 6 |
| Australia | AUS | 0.977381 | 0.243195 | 0.747068 | 0.991916 | 0.271398 | 0.757241 | 0.013618 | 0.752154 | 7 |
| Japan | JPN | 0.89385 | 0.288124 | 0.742667 | 0.931378 | 0.3057 | 0.759901 | 0.023205 | 0.751284 | 8 |
| Cyprus | CYP | 0.843799 | 0.340033 | 0.73543 | 0.822877 | 0.455949 | 0.753587 | 0.024689 | 0.744509 | 9 |
| Luxembourg | LUX | 0.930885 | 0.228078 | 0.734802 | 0.966941 | 0.248426 | 0.747777 | 0.017658 | 0.74129 | 10 |
| Belgium | BEL | 0.960402 | 0.216922 | 0.73656 | 0.972199 | 0.226284 | 0.741007 | 0.006038 | 0.738783 | 11 |
| Canada | CAN | 0.985067 | 0.199556 | 0.733064 | 0.978458 | 0.229183 | 0.7425 | 0.012871 | 0.737782 | 12 |
| Korea, Rep. of | KOR | 0.907833 | 0.194358 | 0.71798 | 0.887695 | 0.201779 | 0.71386 | -0.00574 | 0.71592 | 13 |
| Estonia | EST | 0.940042 | 0.139866 | 0.708032 | 0.954168 | 0.143391 | 0.711477 | 0.004865 | 0.709754 | 14 |
| Sweden | SWE | 0.992509 | 0.125218 | 0.708594 | 0.986397 | 0.129085 | 0.709684 | 0.001538 | 0.709139 | 15 |
| Portugal | PRT | 0.823288 | 0.256784 | 0.701632 | 0.867341 | 0.21995 | 0.71168 | 0.01432 | 0.706656 | 16 |
| Denmark | DNK | 1 | 0.118238 | 0.706355 | 0.999078 | 0.110657 | 0.703829 | -0.00358 | 0.705092 | 17 |
| Slovenia | SVN | 0.940288 | 0.129095 | 0.704556 | 0.957072 | 0.114911 | 0.702481 | -0.00295 | 0.703519 | 18 |
| Norway | NOR | 1 | 0.09807 | 0.699639 | 0.992868 | 0.108236 | 0.702948 | 0.00473 | 0.701294 | 19 |
| Mauritius | MUS | 0.74558 | 0.286952 | 0.662453 | 0.840507 | 0.285004 | 0.718375 | 0.084417 | 0.690414 | 20 |
| Ireland | IRL | 0.861444 | 0.172176 | 0.694927 | 0.894154 | 0.101597 | 0.684606 | -0.01485 | 0.689767 | 21 |
| Iran | IRN | 0.88595 | 0.088773 | 0.678051 | 0.913326 | 0.134068 | 0.70027 | 0.032768 | 0.68916 | 22 |
| Finland | FIN | 1 | 0.091274 | 0.697376 | 0.994845 | 0.027778 | 0.676194 | -0.03037 | 0.686785 | 23 |
| Mongolia | MNG | 0.872055 | 0.112485 | 0.680766 | 0.88625 | 0.115282 | 0.686455 | 0.008358 | 0.68361 | 24 |

Table A9: continued

| | | | | | | | | | | |
|----------------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----|
| Germany | DEU | 0.967512 | 0.047914 | 0.68146 | 0.983727 | 0.051081 | 0.683618 | 0.003168 | 0.682539 | 25 |
| Austria | AUT | 0.940993 | 0.058669 | 0.681618 | 0.960504 | 0.05294 | 0.682419 | 0.001174 | 0.682018 | 26 |
| Israel | ISR | 0.799231 | 0.208772 | 0.675551 | 0.817498 | 0.211308 | 0.685996 | 0.015462 | 0.680773 | 27 |
| France | FRA | 0.8811 | 0.076409 | 0.672629 | 0.837865 | 0.086259 | 0.65946 | -0.01958 | 0.666045 | 28 |
| United States | USA | 0.815726 | 0.117169 | 0.658493 | 0.826684 | 0.12467 | 0.665813 | 0.011117 | 0.662153 | 29 |
| Latvia | LVA | 0.816035 | 0.101638 | 0.654176 | 0.840824 | 0.091506 | 0.66227 | 0.012373 | 0.658223 | 30 |
| Italy | ITA | 0.770864 | 0.144026 | 0.642316 | 0.832719 | 0.143318 | 0.674007 | 0.049339 | 0.658162 | 31 |
| Malaysia | MYS | 0.714299 | 0.278512 | 0.639026 | 0.778587 | 0.258458 | 0.676626 | 0.058841 | 0.657826 | 32 |
| China | CHN | 0.724692 | 0.285601 | 0.647879 | 0.735725 | 0.320641 | 0.663429 | 0.024001 | 0.655654 | 33 |
| Greece | GRC | 0.743952 | 0.251634 | 0.653012 | 0.735504 | 0.215805 | 0.63889 | -0.02163 | 0.645951 | 34 |
| Thailand | THA | 0.698104 | 0.182846 | 0.606188 | 0.751461 | 0.17742 | 0.639498 | 0.054949 | 0.622843 | 35 |
| Croatia | HRV | 0.72705 | 0.160392 | 0.619975 | 0.691475 | 0.146911 | 0.593378 | -0.0429 | 0.606676 | 36 |
| United Arab Emirates | ARE | 0.645583 | 0.236982 | 0.580181 | 0.67876 | 0.289451 | 0.615626 | 0.061094 | 0.597904 | 37 |
| Poland | POL | 0.643574 | 0.104777 | 0.550744 | 0.730037 | 0.109128 | 0.609084 | 0.105928 | 0.579914 | 38 |
| Serbia | SRB | 0.786314 | 0.097698 | 0.638214 | 0.551308 | 0.098274 | 0.481181 | -0.24605 | 0.559698 | 39 |
| Czech Rep. | CZE | 0.674233 | 0.135498 | 0.579002 | 0.568368 | 0.140912 | 0.502513 | -0.13211 | 0.540757 | 40 |
| Saudi Arabia | SAU | 0.634419 | 0.115899 | 0.546665 | 0.59692 | 0.136048 | 0.523309 | -0.04272 | 0.534987 | 41 |
| Kuwait | KWT | 0.621795 | 0.144269 | 0.543506 | 0.576767 | 0.209322 | 0.521885 | -0.03978 | 0.532696 | 42 |
| Lithuania | LTU | 0.545746 | 0.087995 | 0.474923 | 0.700027 | 0.091437 | 0.58581 | 0.233484 | 0.530367 | 43 |
| Belarus | BLR | 0.513072 | 1 | 0.540866 | 0.588917 | 0.076723 | 0.505242 | -0.06587 | 0.523054 | 44 |
| South Africa | ZAF | 0.579312 | 0.125799 | 0.507958 | 0.615821 | 0.125828 | 0.53527 | 0.053769 | 0.521614 | 45 |
| Russian Federation | RUS | 0.531871 | 0.098761 | 0.466221 | 0.673745 | 0.097799 | 0.56999 | 0.222575 | 0.518105 | 46 |
| Chile | CHL | 0.518162 | 0.184405 | 0.470668 | 0.637355 | 0.184993 | 0.563432 | 0.197089 | 0.51705 | 47 |
| Hungary | HUN | 0.583117 | 0.080324 | 0.501684 | 0.62196 | 0.071454 | 0.528105 | 0.052666 | 0.514894 | 48 |
| North Macedonia | MKD | 0.558393 | 0.120029 | 0.490818 | 0.619245 | 0.121283 | 0.536827 | 0.09374 | 0.513823 | 49 |
| Namibia | NAM | 0.453304 | 0.10187 | 0.404023 | 0.709651 | 0.209787 | 0.620257 | 0.535201 | 0.51214 | 50 |
| Slovak Rep. | SVK | 0.520447 | 0.104328 | 0.458303 | 0.657628 | 0.124144 | 0.56492 | 0.232634 | 0.511612 | 51 |

Table A9: continued

| | | | | | | | | | | |
|------------------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----|
| Brazil | BRA | 0.594259 | 0.084515 | 0.510799 | 0.594013 | 0.078218 | 0.509309 | -0.00292 | 0.510054 | 52 |
| Costa Rica | CRI | 0.558682 | 0.110237 | 0.489157 | 0.603345 | 0.120516 | 0.524954 | 0.073181 | 0.507055 | 53 |
| India | IND | 0.426353 | 0.135363 | 0.38723 | 0.751352 | 0.128124 | 0.626806 | 0.618691 | 0.507018 | 54 |
| Montenegro | MNE | 0.449404 | 0.118252 | 0.403544 | 0.544389 | 0.12143 | 0.480227 | 0.190024 | 0.441885 | 55 |
| Turkey | TUR | 0.458665 | 0.118262 | 0.411131 | 0.528219 | 0.133993 | 0.469843 | 0.142806 | 0.440487 | 56 |
| Bulgaria | BGR | 0.437194 | 0.152021 | 0.39886 | 0.528466 | 0.143225 | 0.471706 | 0.182634 | 0.435283 | 57 |
| Romania | ROU | 0.476205 | 0.068327 | 0.416734 | 0.441949 | 0.061693 | 0.388016 | -0.06891 | 0.402375 | 58 |
| Ukraine | UKR | 0.395044 | 0.122456 | 0.359072 | 0.496869 | 0.066731 | 0.432848 | 0.205461 | 0.39596 | 59 |
| Bosnia and Herzegovina | BIH | 0.407075 | 0.121045 | 0.368929 | 0.451769 | 0.126105 | 0.406771 | 0.102573 | 0.38785 | 60 |
| Uruguay | URY | 0.343052 | 0.0719 | 0.307725 | 0.514758 | 0.073217 | 0.44809 | 0.456141 | 0.377908 | 61 |
| Kazakhstan | KAZ | 0.399129 | 0.063841 | 0.353317 | 0.443173 | 0.055904 | 0.38802 | 0.098222 | 0.370668 | 62 |
| Kenya | KEN | 0.431154 | 0.088238 | 0.383645 | 0.400903 | 0.074707 | 0.356522 | -0.0707 | 0.370084 | 63 |
| Dominican Rep. | DOM | 0.423133 | 0.038401 | 0.368796 | 0.4188 | 0.043285 | 0.366091 | -0.00734 | 0.367443 | 64 |
| Argentina | ARG | 0.432528 | 0.02005 | 0.373254 | 0.412382 | 0.026359 | 0.358023 | -0.0408 | 0.365638 | 65 |
| Georgia | GEO | 0.28376 | 0.085452 | 0.259146 | 0.45199 | 0.117807 | 0.405592 | 0.565112 | 0.332369 | 66 |
| Panama | PAN | 0.310712 | 0.310921 | 0.310735 | 0.359381 | 0.280941 | 0.350215 | 0.127052 | 0.330475 | 67 |
| Algeria | DZA | 0.384303 | 0.09903 | 0.346497 | 0.321878 | 0.113606 | 0.295737 | -0.1465 | 0.321117 | 68 |
| Botswana | BWA | 0.376268 | 0.063609 | 0.334314 | 0.343619 | 0.056563 | 0.305906 | -0.08497 | 0.32011 | 69 |
| Nepal | NPL | 0.272839 | 0.125738 | 0.255092 | 0.400581 | 0.176824 | 0.371824 | 0.457607 | 0.313458 | 70 |
| Ecuador | ECU | 0.330979 | 0.064946 | 0.296498 | 0.366298 | 0.075192 | 0.32777 | 0.105471 | 0.312134 | 71 |
| Indonesia | IDN | 0.259399 | 0.08157 | 0.237629 | 0.406413 | 0.081728 | 0.362203 | 0.524237 | 0.299916 | 72 |
| Bolivia | BOL | 0.27063 | 0.066814 | 0.245308 | 0.391857 | 0.092623 | 0.351824 | 0.434215 | 0.298566 | 73 |
| Lebanon | LBN | 0.281526 | 0.397974 | 0.293493 | 0.287116 | 0.424554 | 0.301025 | 0.025662 | 0.297259 | 74 |
| Guatemala | GTM | 0.298248 | 0.069314 | 0.269314 | 0.341101 | 0.07119 | 0.305972 | 0.136119 | 0.287643 | 75 |
| Colombia | COL | 0.248797 | 0.086814 | 0.229153 | 0.333332 | 0.099347 | 0.303496 | 0.324427 | 0.266325 | 76 |
| Uzbekistan | UZB | 0.32095 | 0.025487 | 0.282161 | 0.276132 | 0.059764 | 0.249056 | -0.11733 | 0.265609 | 77 |
| Ghana | GHA | 0.252954 | 0.030983 | 0.225196 | 0.324342 | 0.032098 | 0.286009 | 0.270048 | 0.255602 | 78 |

Table A9: continued

| | | | | | | | | | | |
|--------------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|-----|
| Albania | ALB | 0.267423 | 0.1297 | 0.250899 | 0.269235 | 0.119123 | 0.251102 | 0.000808 | 0.251001 | 79 |
| Honduras | HND | 0.210426 | 0.119745 | 0.199862 | 0.320997 | 0.120494 | 0.29594 | 0.480721 | 0.247901 | 80 |
| Nigeria | NGA | 0.305406 | 0.028097 | 0.269444 | 0.252813 | 0.023116 | 0.22398 | -0.16873 | 0.246712 | 81 |
| Bangladesh | BGD | 0.215428 | 0.107197 | 0.202701 | 0.313956 | 0.106866 | 0.288013 | 0.420879 | 0.245357 | 82 |
| Mexico | MEX | 0.288108 | 0.037537 | 0.256146 | 0.256194 | 0.043935 | 0.229765 | -0.10299 | 0.242956 | 83 |
| Jordan | JOR | 0.148714 | 0.238541 | 0.158203 | 0.308188 | 0.249725 | 0.301463 | 0.905541 | 0.229833 | 84 |
| Vietnam | VNM | 0.235276 | 0.265689 | 0.238589 | 0.207239 | 0.341537 | 0.220991 | -0.07376 | 0.22979 | 85 |
| Rwanda | RWA | 0.219124 | 0.027515 | 0.195621 | 0.287002 | 0.030652 | 0.254215 | 0.299529 | 0.224918 | 86 |
| Armenia | ARM | 0.083932 | 0.077742 | 0.083243 | 0.3758 | 0.091002 | 0.338146 | 3.062153 | 0.210694 | 87 |
| Peru | PER | 0.157021 | 0.067744 | 0.14666 | 0.289573 | 0.071475 | 0.2622 | 0.787812 | 0.20443 | 88 |
| Zambia | ZMB | 0.210291 | 0.027314 | 0.187963 | 0.248951 | 0.023805 | 0.220768 | 0.17453 | 0.204365 | 89 |
| El Salvador | SLV | 0.232452 | 0.103492 | 0.217102 | 0.187443 | 0.110243 | 0.178523 | -0.1777 | 0.197813 | 90 |
| Tunisia | TUN | 0.177786 | 0.162053 | 0.176026 | 0.22421 | 0.172693 | 0.21833 | 0.240323 | 0.197178 | 91 |
| Uganda | UGA | 0.178309 | 0.021937 | 0.159532 | 0.249671 | 0.023451 | 0.221336 | 0.38741 | 0.190434 | 92 |
| Philippines | PHL | 0.186354 | 0.075689 | 0.173351 | 0.212677 | 0.095135 | 0.19879 | 0.146754 | 0.18607 | 93 |
| Kyrgyz Rep. | KGZ | 0.108446 | 0.036716 | 0.100209 | 0.298422 | 0.040729 | 0.265373 | 1.648195 | 0.182791 | 94 |
| Togo | TGO | 0.093505 | 0.107941 | 0.095095 | 0.268248 | 0.110493 | 0.249117 | 1.619665 | 0.172106 | 95 |
| Azerbaijan | AZE | 0.18841 | 0.05024 | 0.171949 | 0.181657 | 0.038893 | 0.16462 | -0.04262 | 0.168285 | 96 |
| Myanmar | MMR | 0.165639 | 0.028029 | 0.14928 | 0.200032 | 0.049453 | 0.181964 | 0.218951 | 0.165622 | 97 |
| Benin | BEN | 0.084072 | 0.070144 | 0.082517 | 0.239204 | 0.071036 | 0.218767 | 1.651178 | 0.150642 | 98 |
| Mauritania | MRT | 0.1083 | 0.568199 | 0.146991 | 0.103846 | 0.723266 | 0.149988 | 0.020389 | 0.148489 | 99 |
| West Bank and Gaza | PSE | 0.146949 | 0.103552 | 0.142028 | 0.147712 | 0.144622 | 0.147369 | 0.037602 | 0.144698 | 100 |
| Egypt | EGY | 0.056919 | 0.110963 | 0.062759 | 0.225414 | 0.161532 | 0.218072 | 2.474754 | 0.140416 | 101 |
| Nicaragua | NIC | 0.085512 | 0.067943 | 0.083547 | 0.199156 | 0.081697 | 0.185295 | 1.217843 | 0.134421 | 102 |
| Haiti | HTI | 0.096932 | 0.057578 | 0.092483 | 0.187223 | 0.059873 | 0.172133 | 0.861241 | 0.132308 | 103 |
| Zimbabwe | ZWE | 0.092438 | 0.024701 | 0.084679 | 0.173253 | 0.051262 | 0.158851 | 0.875933 | 0.121765 | 104 |
| Cambodia | KHM | 0.084668 | 0.126885 | 0.089253 | 0.120955 | 0.183959 | 0.127718 | 0.430964 | 0.108485 | 105 |

Table A9: continued

| | | | | | | | | | | |
|----------------|-----|----------|----------|----------|----------|----------|----------|----------|----------|-----|
| Congo, Rep. of | COG | 0.074234 | 0.038356 | 0.070186 | 0.155105 | 0.049648 | 0.14277 | 1.034148 | 0.106478 | 106 |
| Burkina Faso | BFA | 0.063412 | 0.070298 | 0.064173 | 0.146592 | 0.092484 | 0.140423 | 1.188205 | 0.102298 | 107 |
| Iraq | IRQ | 0.063723 | 0.022301 | 0.059039 | 0.156118 | 0.027987 | 0.140965 | 1.387643 | 0.100002 | 108 |
| Cameroon | CMR | 0.028769 | 0.021882 | 0.028003 | 0.181612 | 0.030281 | 0.163478 | 4.837961 | 0.09574 | 109 |
| Mali | MLI | 0.064251 | 0.049966 | 0.062656 | 0.111697 | 0.059104 | 0.105712 | 0.687162 | 0.084184 | 110 |
| Senegal | SEN | 0.03534 | 0.062743 | 0.038341 | 0.13031 | 0.075887 | 0.124107 | 2.236962 | 0.081224 | 111 |
| Côte d'Ivoire | CIV | 0.075678 | 0.047655 | 0.072528 | 0.085333 | 0.065373 | 0.083098 | 0.145738 | 0.077813 | 112 |
| Pakistan | PAK | 0.028065 | 0.043632 | 0.029779 | 0.093918 | 0.046846 | 0.088578 | 1.974515 | 0.059178 | 113 |
| Afghanistan | AFG | 0.037083 | 0.010682 | 0.03412 | 0.073713 | 0.01101 | 0.066551 | 0.95053 | 0.050335 | 114 |
| Guinea | GIN | 0.00726 | 0.016138 | 0.00824 | 0.08819 | 0.015979 | 0.079902 | 8.69635 | 0.044071 | 115 |
| Madagascar | MDG | 0.018728 | 0.019632 | 0.018828 | 0.050396 | 0.026881 | 0.047759 | 1.536586 | 0.033294 | 116 |
| Niger | NER | 0.008112 | 0.027121 | 0.010202 | 0.046103 | 0.031882 | 0.044515 | 3.363275 | 0.027359 | 117 |
| Chad | TCD | 0.030387 | 0.009852 | 0.028088 | 0.028174 | 0.0127 | 0.026445 | -0.05849 | 0.027267 | 118 |

Notes: Banking inclusion index uses access indicators that measure account ownership, but this does not include mobile money account ownership. The computation is based on data from the Global Findex database and the IMF Financial Access Survey. Access and Usage correspond to the dimensions of banking inclusion identified through factor analysis

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