

IV.5. How does digitalisation influence financial inclusion in the emerging countries? – A cross-country comparison

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Abstract

This research paper examines the impact of financial technologies in the emerging countries, with a special focus on cross-country heterogeneity in terms of financial inclusion. Although the level of financial digitalisation and access to financial services are diverse in the emerging countries most of them experienced the recent trend of digitalization in the past decade. Financial inclusion has improved globally in recent years, but with large heterogeneity among regions, and sometimes within the same country as well. In order to assess the level of inclusion, two new indices have been developed: one for the traditional dimensions of financial inclusion, and one for digital advancements. The empirical contribution of the paper shows that improvement in digital financial solutions are significant primarily in countries where the traditional financial inclusion is better. Some countries, such as Kenya, Uganda, Iran and Mongolia outperform their peers, while other countries still have room for further expansion in financial technology.

Keywords: financial inclusion, financial development, emerging countries, Findex survey

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IV.5.1. Introduction

In previous decades, the financial sector was characterised by technological innovations that made transactions faster, cheaper, and more convenient. In the last 10 years, this change has continued more rapidly, although in a slightly different way. According to recent

academic findings at least three processes have influenced these recent trends.

The first one is the group of innovations that were delivered by non-banking firms, the so-called ‘fintech industry’, which has gained substantial importance all over the world, besides the innovations coming from traditional banks.

The second influence is based on the digital innovations that reached the B2C sector, as average people have become the primary users of these new technologies. Third, digital financial solutions shaped the way that we should regard financial inclusion and financial literacy, as more people are able to use financial services, including many of those who were unserved, or underserved in the emerging countries. Fintech solutions are cheaper than traditional banks, therefore they can provide services in less profitable business segments, and furthermore, they may be influential in emerging regions, where the entry-costs are too high for traditional banks.

The main causes and results of this rapid development is an element of professional debates. On one hand, it is a valid argument that the new wave of digitalisation, the third industrial revolution, hit the financial sector as one of the sectors that just mildly adapted new technologies. As Arner and others noted, emerging platforms, companies and technological solutions simply became ‘too large to ignore’, for policymakers and thereby they became an integral part of the economic ecosystem (ARNER, D. W. et al. 2015). However, in a way this is a similar argument to that of Ansart and

Monvoisin, who emphasised the importance of a crisis experience in the emergence of new financial approaches. The new megatrend was born after the global financial crisis, but the development is still ongoing and follows a different path in various countries and regions. I am going to show the most important differences, while analysing data retrieved from the World Bank and highlighting some positive examples of fintech success stories (ANSART, S. – MONVOISIN, V. 2017).

This paper is organised as follows. Chapter 2 provides a literature review on financial inclusion and development, and the problems related to their measurement. Chapter 3 summarises the current experiences based on the World Bank’s Fintech survey, while in Chapter 4 I am going to present a new methodology to assess the financial advancement of a given country, with specific regard to digital financial issues. Chapter V.5.5. concludes.

IV.5.2. Financial development and inclusion

Financial development is defined by the World Bank as the development of the countries’ financial system, the measurement of which consists

mainly of macro-level indicators. The four dimensions of financial developments are depth, access, efficiency and stability, and are measured by several indicators. For example, the depth of financial system is regarded as a proportion of credit compared to the GDP, or similarly the size of stock market capitalization and the amount of marketable government debt. Efficiency is regarded as the size of interest margins in case of credits, and among others, turnover in case of exchanged stocks. Stability is connected to the performance of the financial sector, as compared to others; therefore, it is described with indicators such as liquidity ratios, volatility or sensitivity to external shocks. The accessibility dimension of financial development is quite natural, and closer to a microeconomic approach. In case of financial institutions, the number of people that use financial services daily is the most important one, but similarly the number of ATM machines and commercial bank branches could be measured as well. This latter dimension comes closest to the concept of financial inclusion. At the same time the World Bank defines the following: 'Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs

– transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way' (PEARCE, D. – ORTEGA, C. R. 2012).

Financial development and inclusion are two different concepts but they definitely have an impact on each other. Financial inclusion is more user-oriented, though: policy goals usually state that more and more people should be involved, and not merely be provided with the possibility of financial inclusion. As the financial services offered by institutions could be regarded as supply, financial inclusion is the demand that can be defined on a micro-level. In the literature financial services usage is mostly connected to end-users such as the household, and in many cases also to micro, small, and medium-sized enterprises.

As many authors argue, a financially more inclusive society could reduce poverty and decrease inequality (for examples DEMIRGÜC-KUNT, A. et al. 2018; OZILI, P. 2018). Increasing financial inclusion globally, and therefore providing access to financial services to more people around the world, is also one of the Sustainable Development Goals adopted by the United Nations.

Although financial inclusion is mostly measured in terms of accessibility to formal financial

services like bank deposits, loans or ATMs, or the number of bank accounts / debit cards per 1000 persons, digital financial services may open new horizons in financial inclusion and in financial development.

The IMF categorises digital financial services based upon the user needs it fulfils, and differentiates solutions connected to payment, saving, borrowing, risk management and advising areas (IMF 2019). The most visible and so far, most developed area of financial services is the payment infrastructure. Increase in mobile payments and P2P payments have rapidly grown recently, sometimes in line with the development of the classical bank services, sometimes autonomously. Virtual currencies are highly debated not only within professional circles, but among users as well. While many virtual currencies like Bitcoin, Ethereum, etc., are regarded as risky investments, the technology has advantages nonetheless, therefore many central banks are planning to introduce their own, legal, virtual currency, often called 'CBDC'. So, both in terms of payments and savings, traditional banking services are developing together with new fintech solutions, causing uncertainty at times. However, although the technology might

be similar in terms of various solutions, the business model and the legal position can largely differ, not only country-by-country, but also on the same market. As virtual currencies are highly volatile and difficult to regulate users are often discouraged from using them, but innovative payment systems are largely encouraged, especially if it shows a bank-like business model. Fintech solutions in borrowing are mostly used in credit evaluation by traditional banks, while in some regions issuing microcredit has grown in popularity over the past decade and shows a potential way forward for less-developed regions as well. Risk management and advising are areas that may have potential expansion both for traditional banks and new financial service providers too.

Ozili argues that there are five channels of digital financial improvement that may help to increase financial inclusion (OZILI, P. 2018).

1. Fintech services are cheaper and more affordable for poorer people.
2. As they are not burdened by as many regulations as banks, fintechs can focus on improving technology and security.
3. Fintech companies may help regular banks become more

sustainable and help them in data-driven processes.

4. Because of less regulation, it is easier for fintechs to access emerging funds.
5. Being location-free fintechs are not only convenient but enable people to access financial services anywhere.

From the viewpoint of fintech companies, developing and emerging countries are suitable places to expand market share, and for gaining new customers. Additionally, the regulative environment is usually supportive – or at least not as restrictive since these countries have less experience in regulating financial services.

At the same time, it must be added that these innovations are not free of risk or concerns for regulators of all kinds. As mentioned earlier these companies are not regulated like other banks, and since they provide mostly cross-border services this makes it more difficult to protect consumer rights. Regarding issues related to cyber security the landscape is quite unclear: although banks are obliged to protect their systems, fintech companies ‘cannot make mistakes’. In the event that a fintech company loses its credibility in protecting data and being resilient, their customers are more likely to

react by refraining from using their services.

The connection between financial innovation and financial inclusion, and in general the impact of financial inclusion has become one of the most dynamically growing fields in development economics. Regarding the respective literature, theoretical discussions on the topic mostly concluded that financial technology has a positive impact on emerging markets, offsetting the possible risks.

Among others, Philippon argues that financial technologies make financial services cheaper and therefore more affordable, meanwhile the usage of big data may enable the financial sector to reach a broader range of users. In his contribution he highlighted the usage of big data by robo-advisors that may help to overcome prejudices, but the fact that financial advice is provided by non-humans poses a challenge to regulators (PHILIPPON, T. 2020). This argument is close to those put forward by Thomason and others. They argued that the technology, and specifically the blockchain technology may provide an affordable digital identity for less creditworthy customers, thereby helping to overcome the current barriers (THOMASON, J. et al. 2018).

Looking at the empirical

findings of the respective literature it is hard to find evidence on the net impact of such technologies, for several reasons. Firstly, these trends are still ongoing and in most cases, they have not been fully developed; therefore we cannot be certain of the medium or long-term impact. Secondly, as has been shown, there is large heterogeneity among countries and many other factors also coexist at the same time. Thirdly, digital finance is not a stand-alone phenomenon; we also need to consider changes in the institutional, legal and economic environment.

On the other hand, many papers argue that technology may indeed have impacted parts of the financial sector. For example, Bayero found that awareness of technology, customer value, and infrastructure are associated with financial inclusion in a cohort of Nigerian adults. In his paper he used a survey-based approach, arguing that the business model of service providers is not significant, but that the customer approach toward technology and availability is indeed significant (BAYERO, M. A. 2015).

Using a quantitative general equilibrium model Beck and others found that mobile money has a positive impact on growth and macroeconomic

development. After building the model with market frictions, such as enforcement constraints, information asymmetries and theft, they calibrated the model for the Kenyan economy and used a firm-level survey showing that companies benefited from mobile money solutions (BECK, T. et al. 2018).

Regarding the reactions of the households I found two similar papers, with interesting contrasts. Using survey-data Jünger and Mietzner explained the factors that make it more likely for German households to use Fintech solutions, while Li, Wu and Xiao did the same for Chinese households. The first paper found that German households with a higher education and financially more literate were more sensitive to Fintech. In China, households with a lower income and less financial literacy gained more from using digital financial services (JÜNGER, M. – MIETZNER, M. 2019; LI, J. et al. 2019).

IV.5.3. Recent trends in financial inclusion

Regarding country-level data, the digitalisation of the financial sector is far from complete, but the rapid progress is worth further consideration. As mentioned earlier, the first level we can analyse is

rather the accessibility of financial services than financial inclusion. In this chapter I am going to use two databases that were published by the World Bank. In the Global Financial Development Database many variables are collected in connection with financial services and financial development. Nearly half of them are statistical data on the respective economy, or on the local financial markets; the other half are survey-based, connected to the Findex database, which is the other database I am going to use. This latter is a cross-country survey-based database that quantifies the level of financial inclusion of the respective countries at a given time. Participants in the Findex survey are asked to answer questions concerning how they use financial services, if they do. In the case that they do not use financial services – e.g. they do not have an account – the causes of being unserved are also investigated.

Although there are several good proxies for measuring the accessibility to conventional financial services, it is challenging to find suitable measures for the advancement in digital financial services. The fact that someone has a bank account is the basic indicator in measuring financial accessibility. Those who do not have access are called financially unserved or

underserved, and their integration into the financial system – either via traditional banks or other digital solutions – is an identified goal of many policymakers. Bank account ownership is quite similar to the approach of counting those people whose wages are transferred to their bank accounts. Therefore, the ratio of the people who have an account in a financial institution (among those older than 15-years-old), and the ratio of working people receiving their wage by transfer to a bank account are two indicators that show the general, classical approach to financial services. Regarding digital financial services, the ratio of people who made or received digital payments seems to be logical, and is therefore used. The ratio of people who use their mobile phones or the internet to access their accounts is considered to be a proxy of digital financial literacy, even though this accessibility belongs to the holding of a normal bank account, maintained at a financial institution. In the database there is an indicator, namely, the ratio of people who claimed to have a mobile money account, nevertheless these innovations are not widespread enough to draw meaningful cross-country conclusions.

Regarding global numbers, the majority of people already have

access to financial services: nearly 69 percent of the responding adult-age people said that he/she has an account at a financial market institution. This figure is a notable increase in the last decade as the same ratio was 51 percent in 2011, and 62 percent in 2014. Similar to earlier years there is some heterogeneity in the accessibility regarding users' gender and age. In 2017, 72 percent of male responders said they had a bank account, while 65 percent of the women responders did so. Older adults (above age 25) with a higher income and living in urban areas, had greater financial accessibility.

Beyond account ownership it is worth looking at the results from survey questions related to wages – whether the wage was received

in an account via the use of mobile banking and mobile payment. Account ownership and usage may be regarded as traditional proxies of financial inclusion, while usage of mobile banking and mobile payment capture the importance of the new, technology-driven digital involvement. There is heterogeneity among the regions in terms of the popularity of banking services (*Figure 25*). Those who have a bank account mostly use it to receive wages. Except for Sub-Saharan Africa and South Asia the majority of people with an account receive their wages via their account. Many people who qualify for a governmental subsidy have opened an account because it was required for receiving state funds.

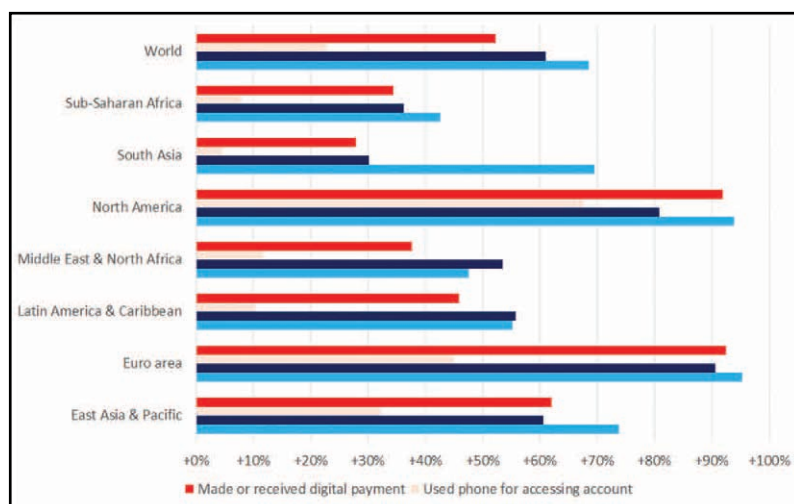


Figure 25: Regional differences in using different types of financial services
 Source: Global Findex Database, own calculation

In recent years traditional banks started to develop online banking applications, and the Findex survey has undertaken to investigate their popularity. Although a mobile phone and internet connection is required to access online banking platforms, it is closely connected to traditional banking services as they build on a normal bank account, therefore having a traditional account in a financial institution is a prerequisite. This is in line with survey results showing that in regions with high incomes the popularity of online banking is greater. Digital solutions such as digital wallets in Sub-Saharan Africa, or innovative digital payment systems in East Asia, are independent from traditional services, and they represent the new wave of fintech services.

The popularity of digital solutions might be proxied mostly by the usage of digital payments. A small majority of people used digital payments in 2016, but also with a large heterogeneity among regions. In poorer regions, digital payment usage is also smaller, but a more detailed analysis would be needed in order to assess the difference between emerging and advanced countries.

In general, we may say that classical banking solutions may largely correlate with modern financial ones, but there are some results worth noting. In East Asia & the Pacific region it appears that the difference in usage between traditional and new financial solutions is smaller, but in regions like Sub-Saharan Africa and South Asia it is still large.

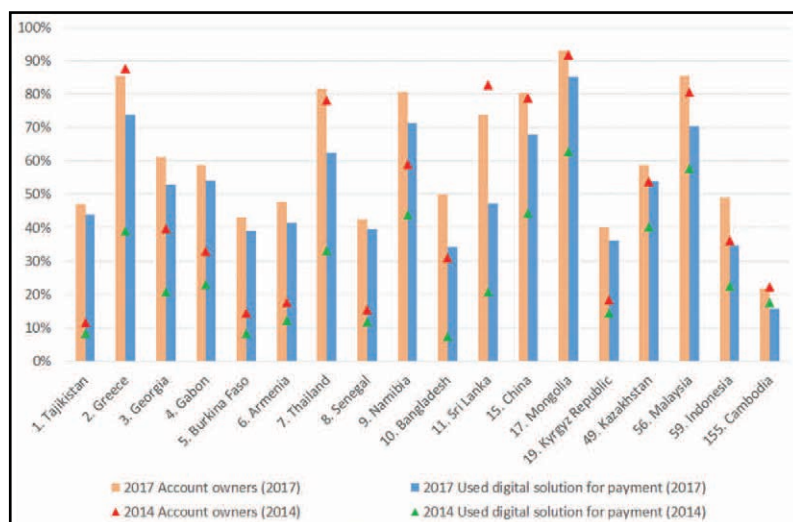


Figure 26: Change in popularity of chosen financial services in various countries

Source: Global Findex Database, own calculation

Regarding trends there are many countries that made a significant improvement between 2014 and 2017 (Figure 26). In most cases the improvement was a jump from a very low base – in Tajikistan, Armenia, Senegal neither traditional banking – proxied by bank account usage, nor the more innovative digital solutions were very popular in 2014, but an improvement was visible in the abovementioned 3 years. In some countries, and these cases are the more important, the change was smaller in absolute terms but the outcome is more visible. In China in 2014, 42 people of 100 said that they used digital solutions for payment purposes compared to 2017 when it increased to 68

people. Similarly, in Mongolia, the usage of digital payments rose from 61 percent to 82 percent in 3 years (for further remarks on the Findex survey DEMIRGÜC-KUNT, A. et al. 2018).

As noted by the IMF in their policy paper world regions differ from each other in the advancement and level of technological adoption. In Africa, mobile payment gained considerable ground and markedly enhanced the level of financial inclusion. On average the level of financial development and inclusion improved significantly in the last decade in Asia. However, this coexists with a large heterogeneity: intra-regional differences are more pronounced as highly developed countries compete with emerging

regions; differences within countries are also substantial. In Europe financial inclusion is relatively large, with differences, although Fintech startups still have room for further growth alongside traditional banking services. In Latin-America many central banks are considering the adoption of CDBC, but at the same time the regulatory environment differs widely. Mobile money services are under-developed compared to the penetration of the internet and the number of mobile phones in the region (IMF – WORLD BANK GROUP 2019).

In the empirical part I am going to further elaborate on this heterogeneity by trying to provide a robust methodology to assess financial development in the light of new financial solutions, and by providing a comparative assessment based on the Findex Survey prepared by the World Bank Group in 2017.

IV.5.4. Measuring traditional and digital inclusion

In the empirical part of the paper I am going to quantify the level of financial inclusion in the wide range of countries based on the last update of the World Bank's Findex survey conducted in 2017.

First, I am going to create two composite indices to capture the level of financial inclusion based on the question responses in the survey. Out of the two indices one tries to capture the development of conventional banking in the respective country, the other reflects the popularity of digital financial solutions. As we mentioned, the latter is more challenging but still possible to estimate. These numbers will be compared to the scores in the peer-group, and to the development of the respective economy, proxied by GDP per capita.

In the survey many questions were asked about banking habits and most of the results reported are presented as percentage points of the responders who answered positively for the binary questions (yes/no). In order to create the two composite indices three variables for each index were selected from the survey to represent the most important characteristics of traditional and digital financial use. In order to make them comparable, answers from each country were converted into scores: the respective countries' survey results were divided by the result of the country that reached the highest score. Therefore, the scale became relative and comparable by saying that the survey results had been translated to a development level

that was compared to a theoretical best result. The received scores have been simply averaged and multiplied by 100 in order of convenience, so both indices vary from 0 to 100, where the most financially inclusive country scores the highest, but not necessarily 100 points.

The indicators that were selected for use were those that

corresponded with general habits, related to financial services, and measured in the entire population of the respective country. Although survey-based indicators usually have several disadvantages, the nature of the topic and the carefully conducted sampling clear doubts about systematic distortion (for the methodological annex DEMIRGÜÇ-KUNT, A. et al. 2018).

	max. value		max. value
people who have a financial account (% age 15+)	Denmark (97.3%)	people received digital payments in the past year (% age 15+)	Norway (89.8%)
debit card ownership (% age 15+)	Netherlands (98.8%)	people made digital payments in the past year (% age 15+)	Norway (98.8%)
people who borrowed from a financial institution (% age 15+)	Norway (39.5%)	people who used the internet to buy something online in the past year (% age 15+)	Denmark (81.4%)
traditional inclusion	Norway (99.7 points)	digital inclusion	Norway (99.16 points)

Table 11: Indicators used in composing the inclusion indices
Source: Findex survey, own calculation

Having the composite indices for the traditional and digital inclusion, it is possible to compare the level of inclusion in different regions and in the different income groups. Using the country categorisation of the IMF, peer groups have been constructed, therefore countries in the same region, with a similar level of

general development (income) will be compared in a further analysis. As we may have predicted, high income economies performed pretty well, and regions where financial inclusion is known to be widespread scored at the top. These results suggest that composite indices are robust enough, and they capture the level of development

in an appropriate manner. Regions in high-income countries of Latin America & Caribbean, and in the Middle East & North Africa reached a relatively weak score, and each country achieved lower scores in digital inclusion. In Europe & Central Asia, and in East Asia high income countries reached a higher score than in traditional inclusion. In the upper-middle income category it seems that the difference between traditional and digital inclusion is larger than in the high-income group. In this income category, East Asia performed relatively well, while Sub-Saharan Africa outperformed the Middle East & North Africa. In the lower middle-income group, the gap between traditional and digital inclusion widened further. Europe & Central Asia reached better scores in both dimensions, while East- and South Asia had better scores in the traditional dimension only. In low income countries the Sub-Saharan

region is interesting: they have the best score in the digital dimension, with relatively small differences compared to the traditional dimension. The financially less inclusive region is South Asia, in both dimensions. Based on peer group average scores it is possible to conclude that countries with higher income scored relatively better in both dimensions. Therefore, the financially historically well-developed high-income countries, especially in Europe and in North America have digitalised their financial system, and people have become highly acclimatised to this. In Asia, countries are very heterogeneous, while in Africa digital inclusion has been relatively more successful in poorer countries than other regions. Despite the closeness to the USA and the general level of development, people in Latin-America seem to be underserved by financial services, both in traditional and digital terms.

income group	region	traditional inclusion	digital inclusion
high income	East Asia & Pacific	74	77
	Europe & Central Asia	75	78
	Latin America & Caribbean	61	44
	Middle East & North Africa	69	61
	North America	87	87
upper middle income	East Asia & Pacific	61	47
	Europe & Central Asia	49	39
	Latin America & Caribbean	42	27
	Middle East & North Africa	39	26
	Sub-Saharan Africa	46	38
lower middle income	East Asia & Pacific	38	18
	Europe & Central Asia	39	28
	Latin America & Caribbean	30	17
	Middle East & North Africa	27	12
	South Asia	33	15
	Sub-Saharan Africa	28	23
low income	Latin America & Caribbean	24	15
	South Asia	19	7
	Sub-Saharan Africa	20	16

Table 12: Group average scores in traditional and digital inclusion
Source: Findex survey, own calculation

Although averaging of the scores showed the regional differences, it is an interesting finding to observe how traditional and technology-driven inclusion progresses: in most of the countries better traditional inclusion occurs with better digital service, and among the regions, most of the time the region that is developed in one area also performed relatively well in the other, except in a few cases. In high income countries it is quite

intuitive; although digital financial services developed, traditional banking did not become any worse. On the graph below, we may visually identify those countries that differ from their peers, in any dimension. After filtering the high-income countries, deducting the peer average from the score and using a scatter-plot diagram we can classify the countries into four groups. Countries marked with II

seem to perform better in both scores, while group III scored lower than their peers. Group I has better digital financial inclusion than their

peers, while group IV has better traditional inclusion, but worse digital services when compared to their peers.

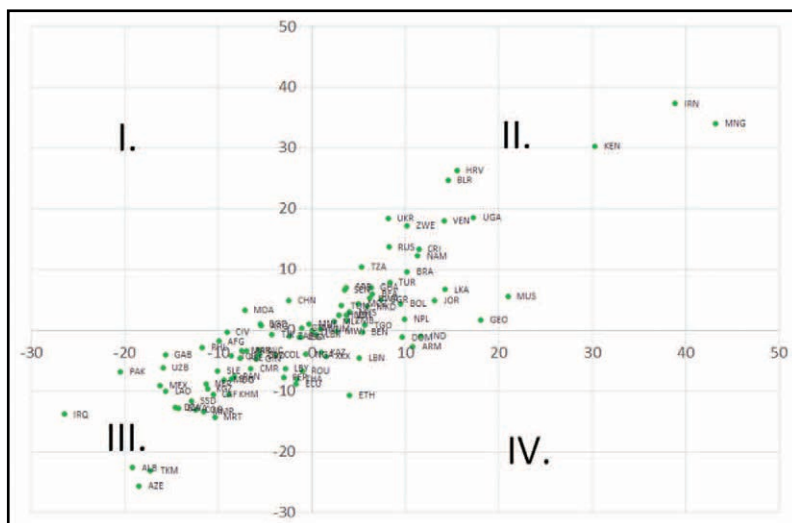


Figure 27: Difference of individual country scores from the group average

Source: Findex survey, own calculations

As most of the countries are in either Group II or Group III we may conclude that based on the indices constructed, the traditional and digital inclusion usually come.

For the traditional index:

$$\lg(\text{GDPcap}) = -70.75 + 13.64 * \text{INCL}$$

For the digital inclusion index:

$$\lg(\text{GDPcap}) = -95.63 + 15.68 * \text{INCL}$$

To assess the relative development compared to the GDP the following regression was used:

$$\lg(\text{GDPcap}) = a + b * \text{INCL} + \varepsilon$$

Using linear regression, the following parameters have been regressed:

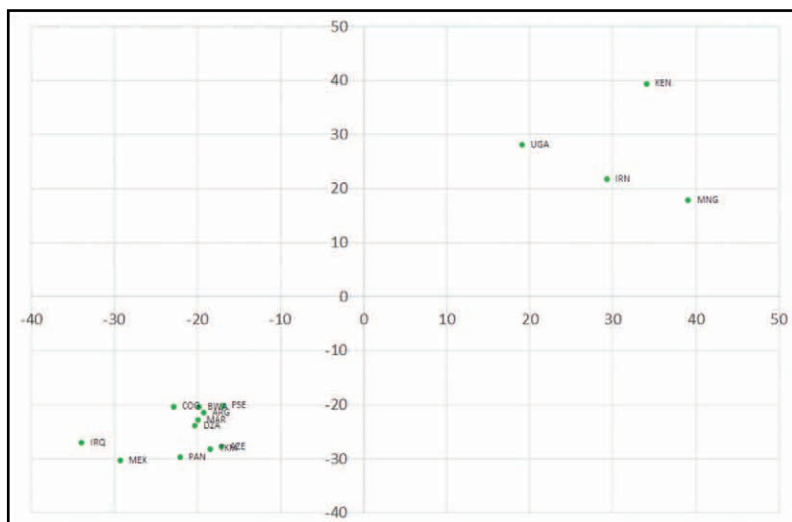


Figure 28: Emerging countries that stand out in financial inclusion compared to its own level of development

Source: Findex survey, own calculations

Based on the equation above, the estimated level of financial inclusion has been calculated based on one single factor: the level of GDP per capita in the respective country. Those countries that scored better than their GDP would predict have gained relatively more financial inclusion compared to itself, while those who did not meet the theoretical score lagged behind somewhat.

As this equation (and all the regressions) is estimated to have the minimum distance from the observations on average, the majority of the values are distributed around the curve. Therefore we shall define that those countries stand out whose scores

differ from the predicted line with at least one standard deviation. In case of traditional inclusion, it is 16; in case of the digital inclusion it is 14-point deviation from the regressed line.

Therefore, we found that a significant difference from the estimated level comes together: four countries, namely Kenya, Iran, Mongolia and Uganda perform better in both traditional and digital dimensions, while countries such as Congo, Argentina, Iraq, Mexico underperformed. In the latter countries there is a potential space for further expansion of digital financial solutions.

Limitations are at least twofold. Firstly, the data was

constructed based on a survey, which is typically limited in terms of errors, willingness to answer and coverage. Secondly, the design of the survey primarily asks questions about traditional bank services; very few questions deal with digital solutions. Additionally, it is impossible to differentiate responders that used digital services connected to a traditional bank account from those who used Fintech solutions solely.

IV.5.5. Conclusion

Financial development and inclusion are two different concepts but they definitely have an impact on each other. Financial inclusion is more user-oriented, though; policy goals usually state that increasingly more people should be involved, and not only be provided with opportunities for financial inclusion. Ozili argues that there are five channels of digital financial improvement that may help to increase financial inclusion (OZILI, P. 2018).

Regarding global numbers, the majority of people already have access to financial services: nearly 69 percent of the responding adult-age people said that he/

she has an account at a financial market institution. This is a notable increase over the last decade as the same ratio was 51 percent in 2011, and 62 percent in 2014.

Concluding the empirical part of the paper it has been found that traditional and digital financial inclusion mostly comove: in peer group analysis most of the countries either outperform or underperform in both dimensions at the same time, while compared to general development only a few countries outperformed significantly, and those which did, also differed in the same direction. The financial inclusion of four countries (Mongolia, Kenya, Iran and Uganda) offers a good example to the other emerging countries and may be interesting to discuss further.

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IV.5.6. References

- ANSART, S. – MONVOISIN, V. 2017: 'The new monetary and financial initiatives: Finance regaining its position as servant of the economy', *Research in International Business and Finance*. Elsevier B.V., 39, pp. 750–760. doi: 10.1016/j.ribaf.2015.11.020.
- ARNER, D. W. – BARBERIS, J. N. – BUCKLEY, R. P. 2015: 'The Evolution of Fintech: A New Post-Crisis Paradigm?', *SSRN Electronic Journal*, (January). doi: 10.2139/ssrn.2676553.
- BAYERO, M. A. 2015: 'Effects of Cashless Economy Policy on Financial Inclusion in Nigeria: An Exploratory Study', *Procedia - Social and Behavioral Sciences*. Elsevier B.V., 172, pp. 49–56. doi: 10.1016/j.sbspro.2015.01.334.
- BECK, T. – PAMUK, H. – RAMRATTAN, R. – URAS, B. R. 2018: 'Payment instruments, finance and development', *Journal of Development Economics*. Elsevier, 133(February), pp. 162–186. doi: 10.1016/j.jdeveco.2018.01.005.
- DEMIRGÜC-KUNT, A. – KLAPPER, L. – SINGER, D. – ANSAR, S. – HESS, J. 2018: *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*. Washington, DC: World Bank Group. doi: 10.1596/978-1-4648-1259-0.
- IMF 2019: *Fintech: the experience so far*.
- IMF – WORLD BANK GROUP 2019: 'Fintech: the experience so far', *Imf Policy Paper*, (June).
- JÜNGER, M. – MIETZNER, M. 2019: 'Banking goes digital: The adoption of FinTech services by German households', *Finance Research Letters*. Elsevier, (March), pp. 1–8. doi: 10.1016/j.frl.2019.08.008.
- LI, J. – WU, Y. – XIAO, J. J. 2019: 'The impact of digital finance on household consumption: Evidence from China', *Economic Modelling*, (September). doi: 10.1016/j.econmod.2019.09.027.
- OZILI, P. 2018: 'Impact of digital finance on financial inclusion and stability', *Borsa Istanbul Review*. Elsevier Ltd, 18(4), pp. 329–340. doi: 10.1016/j.bir.2017.12.003.
- PEARCE, D. – ORTEGA, C. R. 2012: 'Financial Inclusion Strategies Reference Framework', *World Bank*, (June), p. 60. – <http://siteresources.worldbank.org/EXTFINANCIALSECTOR/Resources/282884-1339624653091/8703882-1339624678024/8703850-1339624695396/FI-Strategies-ReferenceFramework-FINAL->

Aug2012.pdf.

PHILIPPON, T. 2020: 'On fintech and financial inclusion', BIS Working Papers, (841).

THOMASON, J. – AHMAD, M. – BRONDER, P. – HOYT, E. – POCOCK, S. – BOUTELOUPE J. – DONAGHY, K. – HUYSMAN, D. – WILLENBERG, T. – JOAKIM, B. – JOSEPH, L. – MARTIN, D. – SHRIER, D. 2018: Blockchain – Powering and Empowering the Poor in Developing Countries, Transforming Climate Finance and Green Investment with Blockchains. Elsevier Inc. doi: 10.1016/b978-0-12-814447-3.00010-0.