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Financial Inclusion, Mobile Money and Regulatory Architecture

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Financial Inclusion, Mobile Money and Regulatory Architecture

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Abstract
This paper discusses first the role of mobile money accounts to enhance financial inclusion towards vulnerable groups in developing countries in the light of recent empirical evidence. Second, we explore the role of regulation to address risks to consumers and the financial system arising from the use of mobile money accounts, a question which has not been thoroughly addressed in the literature. Although financial inclusion via mobile money accounts is increasing, the outreach to particular disadvantaged and poor groups is still limited. However, remittances and G2P payments might develop into game changers for financial inclusion of poor and vulnerable households. Many countries from Sub-Saharan Africa are outperformers in terms of use of mobile money accounts in comparison to developing countries in other regions. Strikingly, the empirical evidence suggests that the regulatory landscape was of strategic importance to unleash the developmental potential of mobile money networks and the crowding-in of formerly unbanked households. Regulation on consumer protection particularly is of strategic relevance for the lasting acceptance and smooth operation of mobile money services and sharing the benefits with disadvantaged and poor households. A lack of effective and convincing consumer safeguards in place could diminish the trust in mobile money services and subsequently their acceptance and use. As mobile money services involve similar risks as traditional banking services, similar rules should apply. In addition, there are risks arising from the particular technology for mobile money account holders and institutions of the financial sector, including DFS providers. To these risks belong hysteresis effects to the disadvantage of poor households due to the use of alternative data and biased algorithms as well as displacement effects in local traditional and digital financial services due to BigTech.

Keywords: **Mobile money, financial inclusion, regulation, consumer protection, digital financial services, Big Data, Sub-Saharan Africa**

JEL codes: **D18, G18, G23, G51, G59**

1 INTRODUCTION

This paper discusses first the role of mobile money accounts to enhance financial inclusion towards unbanked population in developing countries and second the role of regulation to address actual risks to consumers and the financial system arising from the use of mobile money accounts. Inclusive finance has been a policy agenda of international institutions and national governments in developing countries and emerging markets since the beginning of the 21st century. However, it took another decade before the strategic role of digital financial services (DFS) and, in particular, of mobile money dramatically changed the financial inclusion landscape as an avenue of providing financial services to the many unbanked households, the self-employed, and small enterprises. The rise of mobile money was strongly correlated to the spread of mobile phones which continuously evolved "(…) from simple communication tools into service delivery platforms" (Aker and Mbiti 2010, p. 208). Central banks and financial market regulators in many countries now recognise mobile money as a component of the formal financial services. The services offered and distributed via mobile money comprise the full financial circle of making, sending and receiving payments and remittances, accumulation of nominal assets, access to credit and hedging risks via insurance, among others.

The rest of the paper is organised as followed. The second chapter will briefly review the links between mobile money and financial inclusion as discussed in current literature; here we explore in particularly, to what extent vulnerable households are actually able to benefit from the mobile money revolution and how far mobile money induced financial inclusion beyond e-payments. In chapter three, we will analyse three different regulatory approaches based on the framework developed by Amstad (2019) for DFS. We will apply these approaches to the mobile money services in order to identify the catalytic role of regulation for financial inclusion and existing regulatory gaps.

2 MOBILE MONEY AND FINANCIAL INCLUSION

Mobile money services has been the main driver of financial inclusion—an avenue of expanding access to financial services to the majority of the unbanked and low-income earners that were largely excluded in low-income and developing countries. Empirical, evidence-based and analytical literature show clearly a positive correlation between the use of mobile money and financial inclusion in terms of sending and receiving payments. Since the introduction of mobile phones and the invention of mobile money, account ownership through mobile money providers and transaction values have increased substantially; in 2020, there were 1.2 billion accounts showing two-digit growth rates with daily transaction values of $2 billion (GSMA 2021, p.4). The strong dissemination of mobile money is particularly evident in Sub-Saharan Africa; a third of adults living in Sub-Saharan Africa (SSA) have a mobile money account in 2021. Moreover, all 11 economies of the world are located in SSA, where more adults *only* own a mobile money account compared to those possessing a financial institution account[1] (Demirgüç-Kunt et al. 2021, p. 17). In contrast to the global trend, in SSA many economies saw a growth in mobile money accounts and simultaneously facing decreases in financial institution accounts, while in the rest of the world account ownership is still overwhelmingly

[1] Data on financial inclusion through inter alia mobile money account providers is being collected on a global scale by the Global Findex database for 2011, 2014, 2017 and 2021. There is no comprehensive data before 2011.

with traditional banking institutions and only complimented by mobile money accounts (Demirgüç-Kunt et al. 2021, p. 20).[2]

Accordingly, financial inclusion in the narrow sense of account ownership increases with the dissemination of the technology and market penetration by mobile money providers. However, it is unclear (i) to what extent vulnerable and disadvantaged households participate in the mobile money revolution i.e., households in remote areas, low-income households, households with female heads, all of whom are overrepresented in the still unbanked population; and independent from these distributional effects (ii) how far mobile money accounts actually induce financial inclusion *beyond* e-payments. Empirical evidence in these respects is mixed as we show in the brief overview in the following two sub-chapters.

2.1 Benefiting vulnerable groups

According to the Global Findex database for 2021, the majority of income earned in the agricultural sectors is still in cash; only 25% of recipients of all on average receive payments for agricultural sales in an account, in SSA "most often in a mobile money account" (Demirgüc-Kunt et al. 2022, p. 61). In addition, on average, only four out of 10 households in developing countries used an account[3] to pay their utility bills, less so mobile money accounts. This means, that the majority still rather prefers to pay their utilities in cash only or with other methods; one third of those using an account did so for the first time after the COVID-19 emergence (Demirgüc-Kunt et al. 2022, p. 64). Even an opportunity to pay school fees for a public high school via a mobile money system was not appreciated by parents, although school fees were, and still are, an impediment to enrolment and "(…) students often depend on extended family and kinship networks to pay fees" (Adida et al. 2018, p. 1). Collecting money from an extended family network for settling school fees or medical costs would be facilitated by using mobile money accounts. Parents in rural Benin, however, preferred to use other payment options such as cash, although it was costly and risky in terms of loss and missing payment deadlines (Adida et al. 2018).

Only for domestic, and to some extent, regional and international remittances account ownership with mobile money providers, is the mode of payment accepted by both remitting and receiving households. These households often perceive mobile money channels for remittances as superior in terms of service-related features (time, cost, and availability of money agents) and they represent a secure alternative to traditional bank transfers, which are still punitively high in costs (Metzger et al., 2023); however, with $12 billion in remittances sent across countries in 2020 via mobile money, they reach only an equivalent of 2% of total international remittances (GSMA 2021, p. 7).

From 2017 to 2021, gender gaps in account ownership decreased from 9 to 6 percentage points in developing economies, a ratio previously unaffected despite technological progress and the increased mobile phone coverage in prior years (Demirgüç-Kunt et al. 2022, p. 21ff.). Some countries with a high proportion of households who have only a mobile money account and no formal bank account have on average a lower or no gender gap for mobile money accounts

[2] On a global scale, mobile money account ownership as a stand-alone was a mere 2 per cent in 2021, while total mobile money account ownership worldwide was at 10 per cent (Demirgüç-Kunt et al. 2022, p. 20).
[3] The new Findex Report does often refer to "account ownership". Accounts are –either individual or joint- accounts at a bank, at another type of financial institution, or using a mobile money service. For many indicators, we do not know the precise extent of mobile money coverage.

(Demirgüç-Kunt et al. 2018, p. 24ff.). There are similar general and country-specific findings for closing the income gap in account ownership and in mobile money account ownership only (Demirgüç-Kunt et al. 2022, p. 25f, Demirgüç-Kunt et al. 2018, p. 28f). For both gender and income, the gaps seem to be smaller or non-existent in countries, which display a high ownership of *only* mobile money accounts. "These results are encouraging, but many more years of data and research are needed to understand the connections among mobile money accounts, formal financial services, and gender inequality in account ownership" (Demirgüç-Kunt et al. 2022, p. 24). Though the evidence is not robust, yet, it suggests that from a certain threshold of mobile money market development, mobile money services are established independent from traditional banking services and substitute them.

Gibson (2016, p. v) finds in an impact study that although the Kenyan financial market has undergone a tremendous change within a decade and broadly increased financial inclusion, the main beneficiaries have not been poor households, but those "income groups immediately above the poor." In contrast, Batista and Vincente (2020, p. 595, 597) find that while regular users of mobile money are not statistically different from non-users in terms of age, gender, and expenditure profiles, they are statistically different in terms of higher education and the complementary ownership of a bank account. Their study about mobile money adoption and usage patterns took place in rural Mozambique over an observation period of three years. They explain their differing results from other studies through the design of their intervention, which targeted all household heads, while other studies used data biased by the self-selection of mobile money users.

The majority of government-to-persons (G2P) transfers were paid into an account (Demirgüc-Kunt et al. 2022, p. 57f.) a financial institution. The digitalisation of public transfers has generally prompted optimistic assessments about the potential of mobile money systems to reach vulnerable and disadvantaged households, especially in an environment of restricted mobility. The pandemic has boosted digitalisation of public payments even in low-income countries, where coverage with G2P payments have been lower. "Anecdotal evidence suggests that fintech is already playing an important role in mitigating the economic impact of the COVID-19, by facilitating targeted fiscal measures to be deployed efficiently and quickly to their intended beneficiaries, even the unbanked." (Sahay et al., 2020, p. 2).

G2P-payments via mobile money networks could therefore become a catalyst to increase the financial inclusion of vulnerable groups who are not served by traditional banks. In addition, disbursements of social transfers via mobile money networks enable entitled households in remote areas to participate in a secure mode in social benefits and welfare. Moreover, G2P-payments via mobile money networks allow the public sector to further develop goal-oriented programmes taking into account specific target groups and regions. Nevertheless, the target groups are required to own not only a mobile phone, which is the case for more than half of the still unbanked population in SSA and South Asia (Demirgüc-Kunt et al. 2022, p. 39ff.), but to also have a mobile money account.

Gentilini et al. (2021, p. 21f) showed that the digitalisation of G2P payments, including the use of bank accounts, mobile money accounts and electronic non-account based means (e.g. one-time passwords, tokens), for 58 low- and middle-income countries[4] has been rapidly increasing due to Covid-19. For those countries adopting digital account-based payments, countries in

[4] The study takes into account only countries who reported payment mechanism data. Gentilini et al. (2021, footnote 11, p. 22) suggest that "(T) the sample is very likely skewed towards countries where this information is more readily available, and therefore likely have more advanced G2P systems".

SSA were again more likely to enforce payments via mobile money accounts than Latin American or South Asian countries, who would rather use bank accounts. A majority of countries offers manual and digital payments methods alike, depending on the particular programme and the respective target group or region. In total, 35 out of the 58 countries or 60% of all countries under analysis offer manual payments methods as cash, checks and vouchers (Gentilini et al. 2021, p. 22). They stressed that in some countries recipients could not fully grasp potential benefits of the digital G2P payments in terms of financial inclusion and empowerment due to underdeveloped payment ecosystems (Gentilini et al. 2021, p. 24).

Suri et al. (2021, p. 21) even inferred that mobile money use "remains mostly limited to very specific P2P transactions: those that take place over long distances and those that are in places where holding cash is risky. Outside these applications, there has been less success, and the innovation ecosystem around mobile money is still in its early stages. Even in Kenya, less than a third of households use the system for paying bills, for receiving payments or wages from an organisation, or for paying for other goods or services. As a result, few P2B, B2B, or G2P interactions take place over mobile money."

2.2 Inducing financial inclusion beyond e-payments

Besides broadening users' base of mobile money accounts and expanding financial inclusion to vulnerable and disadvantaged households, there are also high expectations about the potential of mobile money services to deepen financial inclusion *beyond* e-payments, in particular toward savings and loans. "As accountholders, people are more likely to use other financial services, such as savings, credit and insurance, start and expand businesses, invest in education or health, manage risk, and weather financial shocks, all of which can improve the overall quality of their lives."[5] However, as Sahay et al. (2019 p. 4) point out "[t]he data on digital payments are patchy, even patchier for digital lending, savings, and insurance (the other three components of financial inclusion)." Thus, many studies focus on individual countries with the most advanced mobile money markets, most of which are located in SSA.[6]

Aron (2018), one of the few studies dealing with developing countries in Africa, Asia and Latin America, similarly showed that mobile money facilitates risk sharing; however, the link to savings is less robust. Likewise, Jack and Suri (2014) as well as Suri et al. (2021) also find improved risk sharing of mobile money account holders in Kenya resulting in consumption smoothing and higher financial resilience to health shocks. Yet, this is due to lower financial and non-pecuniary costs involved with mobile money transactions and not to higher absolute savings per se which would result either from an increase of net income or an increase in the propensity to save.

There are studies identifying an accelerated role of mobile money accounts for savings, though they fail to show that the increase in savings is actually due to the use of mobile money accounts to mobilise these savings. In Kenya, the government has been issuing digital government bonds called M-Akiba to households via mobile money accounts and letting them trade their shares on a digital platform (Suri 2021). Since the first issuance of one M-Akiba bond, the government

[5] World Bank 2018.

[6] For a discussion of the impact of DFS on savings in selected African countries, see for instance Aker and Wilson, 2013 (Ghana); Apiors and Suzuki, 2018 (Ghana); Arestoff and Venet, 2013 (Madagascar); Cátia and Vicente, 2013 (Mozambique); Jack and Suri, 2014 (Kenya).

was able to raise in five issuances KES1 billion (around €8 million). One major incentive is the guaranteed and tax-free 10 per cent interest rate income (Central Depository and Settlement Corporation website) which increases the propensity to save. Alternatively, in Ghana, mobile money providers have to deposit the float money on interest-bearing accounts with formal banking institutes and automatically pass on 90 percent of the interest earned to mobile money account owners (Bank of Ghana, 2019; Wolf, 2019). Hence, mobile money accounts have increased in Ghana by several times in the last 5 years. However, it was the regulation on interest sharing which triggered the strong rise of mobile money accounts. Finally, Kaffenberger et al. (2018) observed also in Kenya and Tanzania that mobile money account owners would indeed use their accounts to save, although they suggest that the major motivator was to improve mobile money owners' access to loans or to expand the amount of a loan already awarded.

In contrast, in a study based on selected SSA countries including Kenya, Ouma et al. (2017) found that availability and usage of mobile phones for financial services indeed promotes the likelihood of saving at the household level and the amount of savings. They concluded that deepening of mobile money services is an avenue for promoting savings, especially among the poor and low income groups that tend to have limited access to formal financial services.

As a first finding, we can conclude that there is some evidence for a positive correlation between the mobilisation of savings and the use of mobile money accounts. From the literature, it is unclear in which direction causality runs. It would be interesting to know whether households actually increased their savings due to mobile money account ownership. If this were the case, then the finding supports the already identified outreach potential of mobile money services to still unbanked households. An increase in savings identified in some other studies, however, might instead be incentivised by either a direct pecuniary reward in the form of interest rates, or an indirect pecuniary reward in the form of an enhanced access to loans and not so much because of the mobile money accounts themselves.

These examples nevertheless suggest that there is indeed a link between access to digital loans and mobile money accounts, though not a one-dimensional or linear relationship. Potential borrowers with mobile money accounts are able to show their ability to save upfront without being forced to open a costly bank account. Creditors' preparedness to lend depends among other things on their expectation that the borrower is able and willing to serve the debt in time. Although these expectations refer to the future, they are based on experience with the potential borrower in the past. Thus, households with little or undocumented credit histories are not or only very limited served by traditional banks (Anderson et al. 2017a, 2017b). To receive income payments and to realise regular savings via a mobile money account creates documented information on income and the ability to save as a proxy for the ability to serve a debt; thus, saving upfront via mobile money accounts can partially compensate for undocumented credit history and thus facilitate access to loans.

In a randomised field experiment with women in Uganda, Riley (2018) showed that financial inclusion via loans increased investment and investment income; women receiving their microfinance loan on a mobile money account displayed higher investment and higher profits up to a two-digit difference in comparison to those women who received their loans only in cash. The reason for this difference was the empowerment of women. Receiving the loan on a mobile money account made it easier for the women to resist claims of their families to share the loan with them in comparison to those women receiving their loan in cash.

Sahay et al. (2020, p. 7) showed in a cross-country study covering 52 countries in Africa, Asia and Latin America that "(D)igital finance is increasing financial inclusion, even when traditional financial inclusion is declining." They identify a trend from spend to lend with private households being the major borrowers in Middle East, Central Asia and Africa (Sahay et al. 2020, p. 13ff). Digital finance in this study, however, comprises credit, which is not only offered via mobile money accounts, but also that from any other digital channel including online banking, which limits the significance of their findings for credit provided by mobile money services. Moreover, overall, digital credit is still marginal and highly lumped in terms of countries; in 2017, more than 95 per cent of all marketplace lending[7] were allotted to China, UK, and USA (Sahay et al. 2020, p. 17). In 2021, only 3% and 7% respectively of all borrowers in developing countries and SSA respectively used their mobile money accounts to raise the loan (Demirgüc-Kunt et al. 2022, p. 92).

Kaffenberger et al. (2018) do indeed find an increase in digital credits in Kenya and Tanzania related to mobile payments systems; however, the digital borrowers are overwhelmingly young, urban, and male. Moreover, this group shows a higher likelihood to utilise other financial services, e.g., microfinance, health insurance, or even pensions. In contrast, vulnerable groups with irregular cash flows in rural areas do not use digital credit to a substantial extent. Gibson (2016) confirms these findings for Kenya and concludes (p. v): "The Kenyan financial system is bigger, more dynamic, more profitable and more innovative than ten years ago. It is also more inclusive, even if poor people have not been the biggest beneficiaries of its growth. (…) A more inclusive financial system would also provide more income-earning opportunities for poor people, but finance for the real economy has changed little. Indeed lending to agriculture (the main livelihood source for the poor) has actually reduced."[8] In addition, there are also emerging concerns about the state of financial health, e.g. growing indebtedness following increased access to digital loans via digital financial apps (Kamau et al 2022).

Interestingly, in Kenya, digital credit mainly substitutes for non-digital loans such as shopkeeper credits, bank credit, savings groups, or family and friends; while in Tanzania digital credit rather complements non-digital sources of credit (Kaffenberger et al., p. 28ff). The different behaviour in Kenya and Tanzania suggests that the already above-mentioned threshold of mobile money market development was achieved earlier in Kenya than in Tanzania. As the inception of mobile money in Tanzania began in 2008 and hence only shortly after Kenya, it is not due to a technology-lag explanation. The diverse regulatory frameworks in the two countries could be an explanatory factor for the different dispersion speed of mobile money technology. Regulation does not shape only market structures, but also the acceptance of DFS by households and firms, and in particular, the perception of mobile money services as offering a full range of financial services similar to banks.

[7] Comprehensive cross-country data does not exist for all forms of digital finance or Fintech credit, but for market place lending (Sahay et al. 2020, p. 17).

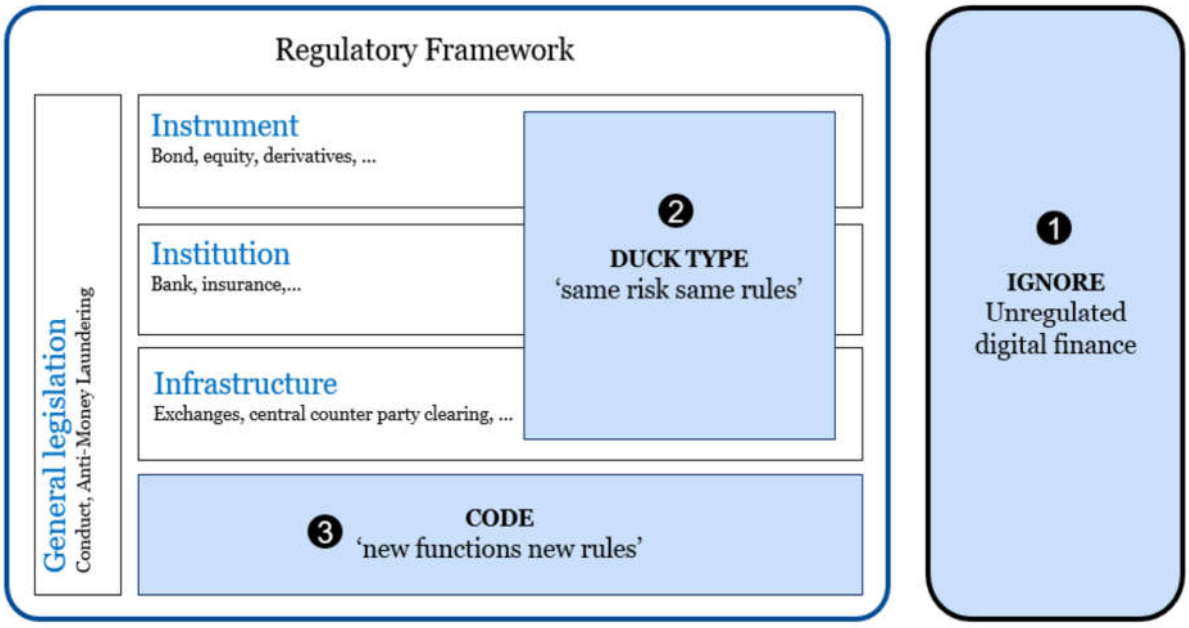
[8] Although the context is different, Fuster et al. (2019), come to similar results surveying Fintech lending for mortgages in the US. Due to the chosen technology, Fintechs process mortgage applications faster and without higher defaults, but there are no observable positive distributional effects: "We find little evidence that FinTech lenders disproportionately target marginal borrowers with low access to finance" (p. 1857).

3 REGULATORY ARCHITECTURE AND MOBILE MONEY

There exist barriers to financial inclusion beyond the ownership of mobile phones and internet availability. There are person-related factors such as digital illiteracy and a lack of understanding of digital products and services. In SSA, on average 30% and in Liberia, Malawi and South Africa more than 50% of mobile money account owners need assistance to properly use their accounts (Demirgüç-Kunt et al. 2021, p. 153). In addition, households might be cautious about using mobile cash systems due to a lack of trust in the system and providers. Finally, households might not be able to capture all of the benefits of mobile money due to an unwillingness of providers to share with them.

Below, we show which options of regulatory architecture exist and discuss how risks to consumers and the financial system evolving from mobile money services can be addressed. Graph 1 presents three different regulatory approaches by Amstad (2019) for DFS, which we apply to mobile money services : (i) ignore or do not regulate at all, (ii) the duck-type regulation or regulate according to the risk manifested independent of institution, and finally (iii) the code regulation or regulate the additional risks due to technology. While the ignore-type regulation excludes the other two, duck-type regulation and code regulation could be complements or substitutes.

Graph 1: Regulatory framework for digital financial services



Source: Amstad (2019), p.7.

3.1 IGNORE OR UNREGULATED

The aims of regulatory architecture for the traditional financial system are consumer protection, financial integrity, and financial stability. As mobile money is a digital financial service where both technology and the mobile-money related industry are still evolving, some authors express their concerns that 'heavy' financial market regulation might turn out to be "(…) fatal to igniting mobile money schemes" (Evans and Pirchio 2015, p.4) and constitute an impediment

to continued and mature innovation. Although the absolute ignore-approach is not very popular in the literature, many authors recommend a rather cautious line of action to regulators: "Their response should be to strike a balance between innovation, consumer protection and financial stability. The broad range of challenges for the authorities includes the need to adapt regulatory and supervisory frameworks" (Barruetabeña 2020, p. 8).

There are clear indications that the quality of financial market regulation is decisive for financial inclusion through non-digital financial services, including non-traditional delivery models such as non-bank lending institutions (Chen and Divanbeigi 2019). A corresponding analysis for the (positive or negative) impacts of regulation for the mobile money industry, however, does not yet exist. Notwithstanding, financial stability and financial integrity concerns as well as consumer protection considerations require a level playing field between the mobile money industry and traditional banking services – or a duck-type regulation - in order to prevent cherry-picking and regulatory arbitrage.

3.2 DUCK-TYPE REGULATION

(i) Instruments

Mobile-money providers are often non-financial sector companies and accordingly instruments such as deposits, loans or payment services are not subject to financial market regulation. However, deposits of households and enterprises with mobile-money providers face the same risk of mismanagement and bankruptcy as well as fraud similar to deposits with regulated financial entities. In addition, they must be available at all times. Thus, the deposits of households and enterprises with mobile-money providers should be kept in as safe and liquid assets as those of traditional banks. One possibility would be that mobile-money providers deposit the liquid funds of their customers' accounts with traditional banks who display a deposit insurance themselves. As mentioned above, Ghana has positive experience with mandatory regulation requiring mobile-money providers to deposit their liquid funds with traditional banks and pass on 90 percent of the interest earned to their customers (Bank of Ghana 2019; Wolf 2019). Alternatively, they could directly deposit the liquid funds with the central bank itself (Sahay et al. 2020), which cannot become insolvent in domestic currency.

The first option is preferred for the reasons related to monetary policy control and the broadening of domestic financial markets. First, when the mobile-money providers' liquid funds are with traditional banks, then all the central bank and financial market regulator's policies apply to the banks and automatically and at the same time also to the mobile-money providers' accounts, e.g., policies relating to the minimum reserves, excess reserves, minimum interest rates for deposits, or capital controls. Additionally, when mobile-money providers deposit the liquid funds of their customers with traditional banks, those banks acquire additional short-term liabilities, which result in an extension of their balance sheets and thus contribute to financial broadening.[9]

Recent financial surveys and studies show an increasing trend for digital credits via mobile money systems (e.g. Kamau et al. 2022, Kaffenberger et al. 2018 for Kenya and Tanzania). Formally, this might suggest an increase in financial inclusion, but there are strong indications that poor transparency of credit conditions and financial illiteracy impair mobile money

[9] Only if banks themselves would completely deposit the mobile-money providers' liquid funds with the central bank, there would be no extension of the balance sheets.

account holders' decision-making thus pushing them into debt. The lack of transparency regarding unexpected fees, actual interest and how it is computed, unexpected withdrawal by the lenders, unclear disclosure of costs as high overdraft fees or penalty fees or of terms of the loans result in an underestimation of costs, higher default rates and late payments. Kaffenberger et al (2018, p. 19ff) identify prevalent late repayments of digital loans of around 50 per cent of debtors in both Kenya and Tanzania with two-digit rates of defaults in both countries. Hence, from the point of view of the borrowers the detected increase of digital credit volume might be rather an involuntary result of mobile money providers' opacity to disclose and communicate clearly and properly their terms and conditions.

Poor transparency is a major issue for vulnerable individuals, i.e., households with limited financial literacy, low-income consumers, household who depend on farming or casual works as primary income, in general elder segments of society, who are additionally disadvantaged by interface limitations, small screens or small fonts (Anderson et al. 2017b; Fritz and Hilbig 2019; Kaffenberger et al. 2018; Sahay et al. 2020). Fritz and Hilbig (2019) emphasized that some mobile money providers, including Safaricom from Kenya, design their user interface in a way that makes users prone to subscribe to additional services and concludes (p. 50): "It is very easy to sign up to these services by mistake, but extremely complicated to cancel the expensive subscriptions again."

We also find this lack of transparency about costs and terms of loan contracts at traditional banks offering non-digital loans. However, traditional banks do not widely outreach to households in remote areas and tend rather to exclude vulnerable households and small enterprises without collateral from having a loan. On the other hand, mobile-money providers offer more easily unsecured loans to formally unbanked households and small enterprises who have only limited experience with inappropriate or predatory lending and debt conclusion practices as well as aggressive debt collection practices. In a survey, Anderson et al. analyse all existing digital loan products in India, Kenya, Nigeria, Tanzania and Uganda; authors realised that out of 68 loan products 40 target small business owners and low-income households (Anderson et al. 2017c, p. 10). Moreover, many digital borrowers raise funds via very short-term loans with high costs, rolling them over frequently up to every week – or even daily[10]. "Many borrowers, therefore, remain stuck with low-value, short-term, expensive credit, and they could potentially benefit from loans with terms better designed for productive uses" (Kaffenberger et al. 2018, p. 37).

Accordingly, we can also observe a growth of indebtedness due to increased opportunities to raise loans via digital means and a slide into over-indebtedness with households and small enterprises raising a digital loan to repay another loan and thus ending up in a digitally intermediated debt trap (Anderson et al. 2017a, 2017b; Fritz 2018; Kaffenberger et al. 2018; Kamau et al 2022). Sahay et al. (2020, p. 41) even refer to the risk of "'excessive' financial inclusion" as an indication for credit access under insufficient regulation and supervision resulting in an over-expansion of credit to the private sector. A recent study by Kamau et al. (2022) focusing on Kenya found both formal education and financial literacy lowers the probability of over-indebtedness and that women are less financially literate than men and hence, more likely to be overindebted than men.

[10] Sahay et al. (2021, p. 1) report an anecdote of a female shop owner taking up a loan for one day to purchase her supplies in order to sell them during the day: "At the end of the day, she will be able to pay back her loan and keep her profit in her mobile wallet. She can use this mobile money to pay for the gas she uses to cook for dinner, at the utility company has recently connected its payment system to the mobile money infrastructure. In her daily life, this is huge progress."

Thus, consumer protection, also taking into account the gender-based differences, is vital for ensuring that "(…) digital credit markets develop in a way that improves the lives of low-income consumers."[11] Consumer protection is also of strategic relevance for the lasting acceptance of DFS and therefore must be at the core of regulation on loans for vulnerable households by traditional banks, even more so for digital loans via mobile-money systems and other means. Clear disclosures of interest rates, fees, and other charges should be the rule for all loans, digital or not. Regulators could develop rules and standardised procedure to decide when borrowers qualify for longer-term loans, so that those with weekly maturing loans could convert them to monthly loans and those showing monthly loans could turn them into loans with a 3 month term.

One possibility to address negative impacts of over-indebtedness is to establish interest rate caps for loans and loans in arrears for traditional bank lenders as well as for mobile money providers. In 2016, the Kenyan government introduced a cap for regulated lenders of 4%-points above the central-bank rate (Central Bank of Kenya 2015). However they were not quite effective in increasing access to credit especially to poor households and small-scale enterprises that are often perceived to be high-risk borrowers. Mobile-money providers offering loans as KCB M-Pesa and Equity Eazzy Loans indeed reduced their interest rates while increasing other fees so that they could partially compensate the loss in interest income (Kaffenberger et al. 2018, p. 6). This experience suggests, that interest rate caps on loans are not an efficient and precise policy means to protect consumers.

(ii) Institutions

While in the non-financial industry a creative-destruction approach à la Schumpeter facilitates technological dispersion, in the financial sector such an approach entails institutional and systemic risks due to the interconnectedness between (different types of) financial intermediaries and the risk correlations between them. The mobile money industry in general and individual mobile money providers face similar risks, including institutional failures and spillover. If these risks materialise, mobile money account owners could lose a part of or even all their deposits because of bankruptcies or fraud and finally lose their trust in the reliability of mobile money providers and overall in DFS. Hence, mobile money providers with deposit and loan facilities should be liable to similar rules, standards, and regulations as those of traditional banks with deposit and loan facilities. To these rules, standards, and regulations belong all disclosure requirements and credit reporting, compliance requirements, but also all sorts of KYC rules to prevent money laundering and other white-collar criminal activities. If mobile-money providers are not obliged to put the liquid funds of their customers into traditional banks or with the central bank, they would need to provide an own deposit insurance. Moreover, if loan creation were part of the mobile money services, then a duck-type regulation would require the application of capital requirements to cover their exposure. On the other hand, operational risk, e.g., in form of fraud, loss of customer details, insufficient or inadequate cyber security provisions, needs to be addressed in a similar manner as operational risk in traditional banks.

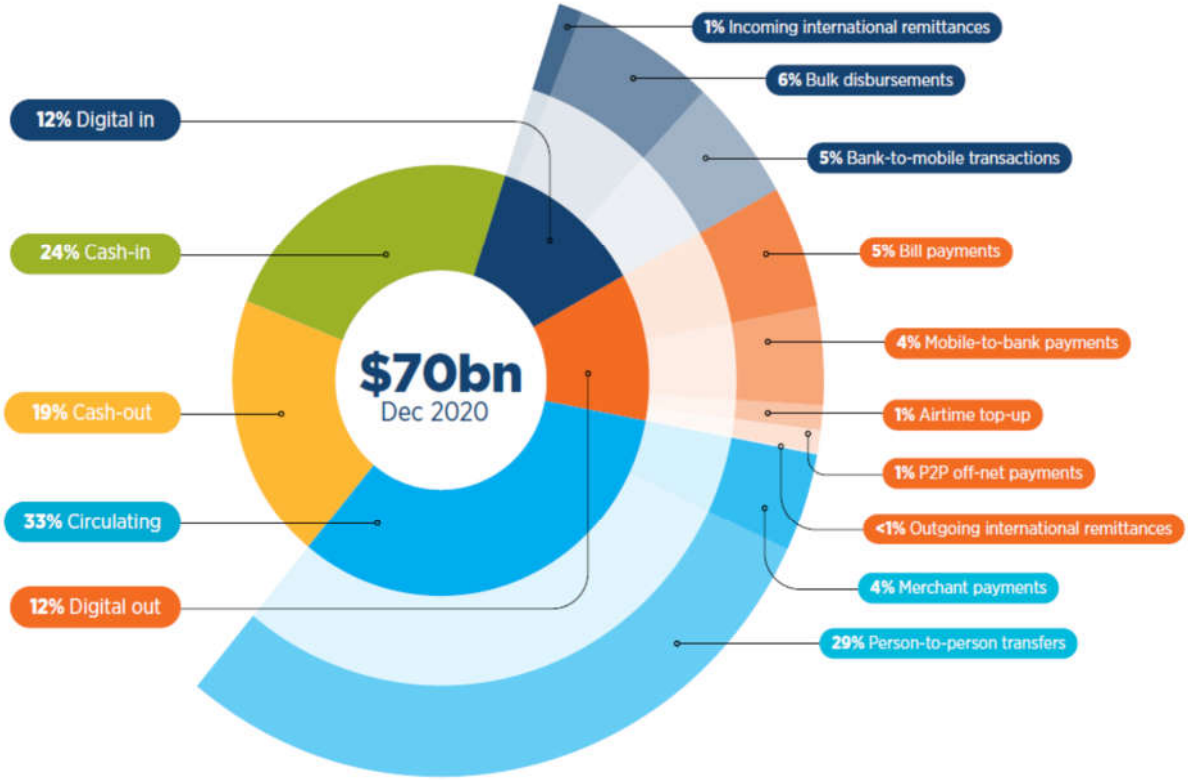
[11] Izaguirre et al. (2018), It's time to slow digital credit's growth in East Africa, CGAP Blog 25 September 2018 (https://www.cgap.org/blog/its-time-slow-digital-credits-growth-east-africa).

(iii) Infrastructure

Internet availability and a reliant electricity grid throughout the country are basic preconditions for the unhampered use of mobile money accounts. A concentration of vital infrastructure in urban areas and agglomerations with only low outreach to rural areas offers unequal access and only increases the urban-rural divide (Sahay et al. 2020). In addition, a dense net of cash-in/cash-out agents are an essential part of the mobile money infrastructure and together with the send-receive platforms, they are as important for the growth of mobile money services as ATMs were for traditional banks.

Graph 2 indicates how important cash-in and cash-out activities still are for mobile money owners; more than 40 per cent of the mobile money value is a result of cash payments. Moreover, mobile money providers using clearing and settlement systems with local pay-out channels are able to position themselves as superior to traditional banks (Metzger et al. 2019). In addition, the cash-in/cash-out agents take over KYC duties in some jurisdictions. Accordingly, the regulatory framework has to be adjusted in order to specify tasks and requirements for performance by cash-in/cash-out agents.

Graph 2: Global average mobile money values according to purposes (December 2020)



Source: GSMA (2021), p. 7.

The suggestion, that "[M]obile money schemes have been more likely to succeed in poorer countries that lack basic infrastructure" (Evans and Pirchio 2015, p.4) is imprecise as it refers to the lack of transportation and traditional banking infrastructure and thus to the lack of alternatives. Another proxy for the success of mobile money as an accepted digital financial service is the extent to which households have *only* mobile money accounts. A high share of households with only mobile money accounts can be interpreted as an indicator that these

households perceive mobile money services as equivalent to account ownership with traditional banks for which reason they do not seek to open another account with them.

A further building block of an enabling infrastructure for the adoption of mobile money services as well general DFS are consumer protection provisions. They should principally cover the use of, and access to, mobile money services, the right of objection to changes in terms and conditions, the rights to dissolve their accounts and to delete digital traces with the mobile money provider, the rights to the privacy and security of customers' transactions and identities, the manner in which customers' data is collected, used, and protected, in particular against identify theft (Barruetabeña 2020; Kaffenberger 2018; Metzger and Wu 2020). A lack of convincing consumer safeguards in place could diminish the trust in mobile money services and subsequently their acceptance and use.

One important consumer right is the right to contact customer care and the right to file a complaint. Kaffenberger et al. (2018, p. 25) find in their survey about digital credit in Kenya and Tanzania that: "In both countries, about 10 percent of digital borrowers reported needing to access customer care and being unable to figure out how." Regulators could even empower borrowers to file claims against credit providers such as the National Consumer Tribunal in South Africa (Metzger and Taube 2010). In case of complaints by consumers and disputes with credit providers, including banks, the National Consumer Tribunal enforces a hearing process at the end of which, when proven reckless, it can completely suspend the credit agreement to the disadvantage of the credit provider.

3.3 CODE-TYPE REGULATION

(i) Hysteresis effects and Big Data

Financial inclusion beyond e-payments via DFS such as digital credit by mobile money providers relies on the use of alternative data. The digital credit approval process in form of automated, algorithm-induced decisions is based on personal data, with which the lender assesses the ability and the preparedness of the potential borrower to serve and repay the credit in the future. "Many of the researchers that investigate alternative data sources are optimistic that the use of alternative data in classification algorithms will help extend the credit market to the underbanked who have had little or no prior contact with formal lending institutions" (Anderson et al. 2017a, p. 2).

Traditional banks apply a very similar credit approval process, with the same objective, to assess the loan risk; however, they use classical data such as regular income, tax statements, regular savings, assets as own capital, ownership of land or real estate, existing liabilities, previous credit history etc., in order to evaluate the ability of borrowers to serve the debt and the probability of default within a certain time span. For many of the unbanked households and enterprises either this form of data is not available because of only few documented credit history, or it is available and actually the reason why traditional banks will not offer them loans. In order to complete whatever typical finance-related data is available, digital loan providers scan the internet and especially all types of social media (for instance clips, podcasts, photos, blocs, comments etc.), as well as the use of landline phones, all electronic devices and here above all the mobile phones (Anderson et al. 2017a). Loan providers collect and archive what they can find and subsequently feed their algorithms or loan engines with this alternative data. Moreover, they also sell these data sets to other interested parties.

The collection and archiving processes, let alone the selling of data to third parties, raises serious questions about legitimate interests and the possible abuse of personal data.[12] These issues require a regulatory framework, bringing together regulators responsible for different sectors, at least for the financial and telecommunication sector, in order to jointly address the risks arising from alternative data and Big Data, to come to an understanding about the division of labour between all involved authorities, to identify blind spots, and to prevent regulatory gaps. If data privacy concerns are not, or only insufficiently, addressed, and mobile money account holders as well as users of other DFS are denied the right of informational self-determination, trust in digital technologies and those enterprises using them can erode quickly and permanently.

Big Data analytics itself might contribute to financial exclusion – a pathway, which has not been thoroughly analysed, yet (Anderson et al. 2017a; Sahay et al 2020). One reason is that algorithms are not calibrated perfectly. This could mean that the algorithm of mobile money providers rely on indicators, which involve already a bias against disadvantaged groups or which do not allow for changes in credit worthiness of individuals. A second reason is that the initial data entry is biased due to a limited availability of data on potential borrowers. As already reported, in particularly unbanked individuals lack documentation of credit history and thus get blanks in records which could give rise to errors. "As a result, even "unbiased" machine learning algorithms can produce asymmetries in error rates between groups that can lead to systematic disadvantages for particular groups" (Anderson et al. 2017a, p. 2).

There is a strong element of hysteresis linked to Big Data analytics; systematic disadvantages, which arise from biased data and compromised algorithms, perpetuate financial exclusion. Hence, regulatory authorities need to address the risk of financial exclusion by big data. One way to do so would be to define rules and standards with which the algorithms have to conform, similarly to the internal risk estimation and assessment models within international banking regulation Basel to calibrate adequate capital requirements per credit risk (Metzger 2006). Regulators could define those areas of indicators digital finance providers were allowed to use and in which time intervals they would have to delete certain types of personal data. Limiting periods of record keeping is essential to ensure that algorithms adapt to and prevent hysteresis effects. Moreover, regulators should require information and disclosure of the algorithms in place as part of their supervisory tasks. And finally, digital finance providers should run tests similar to stress tests in order to check whether their algorithms produce systematic disadvantages for vulnerable groups.

(ii) Displacement effects and BigTech

Fintechs are profoundly changing the way in which banking services are provided and have a lasting impact on the financial-services market. In the banking sector, Fintechs compete with traditional banks and non-traditional lending institutions. The emergence of mobile money providers substantially reduced the average cost of account ownership and digital payments. Thus, mobile-money providers – as other Fintechs – put considerable pressure on traditional banks, which dispose over a branch network in contrast to mobile money providers who use agents and do not run physical branches themselves. There is a lower bound, under which the account ownership and digital payment costs cannot sink without *compromising the financial resilience of banking institutes and their branch network* (Metzger et al. 2019). The further erosion of fee and interest rate income of traditional banks can have three impacts. First, a

[12] Traditional banks are increasingly catching-up on this data-exploration avenue; however, it is not yet as extensive as digital financial providers.

higher concentration in the traditional banking sector through an increase of M&A between banking institutes to stabilise their return on equity. Second, cherry-picking of financial services in combination with regulatory arbitrage where traditional banks create their own Fintechs and outsource some of their services to the Fintech. Third, a mixture of impact one and two; traditional banks purchase Fintechs and partially outsource their services to the purchased Fintechs. Regardless, the branch network and the availability of direct banking services will decline and risk cutting-off those households and small enterprises, who are reluctant to move towards the digitalisation of banking services. Moreover, banking services and activities are shifted from a regulated traditional banking sector to a less regulated Fintech sector.

Consequently, thorough regulation is necessary and regulatory arbitrage needs to be addressed. To prevent regulatory arbitrage is even more difficult if the bodies to be supervised and regulated are part of the digital market segment, whose activities and businesses might be easily shifted even across borders. At the same time, Fintechs, as a part of the shadow banking system, might pose financial stability risks to the banking sector, mediated via direct or indirect links between the banking institutes. Depending on the regulation, a systemic crisis in the mobile money sector might have negative spillover to the traditional banking sector, especially if the mobile money sector is increasing quickly and involves digital credit.

Fintechs, to which mobile money providers belong, also put pressure on non-traditional lenders such as microfinance institutions. In many jurisdictions, these institutions are less regulated than traditional banks and thus have a cost advantage over traditional banks, which makes them more resilient to the competition from Fintechs. Moreover, their capacity to adapt to technological change and their reserves for contingencies out of which such a change of strategy could be financed are less developed than those of traditional banks. “As fintech develops, the microfinance institutions and small banks that have traditionally catered to the financially vulnerable may suffer. (…) If they were to scale back their operations before fintech companies have sufficient scaled up, the risk of financial exclusion could increase” (Sahay et al. 2020, p. 37).

From a regulatory perspective, the infiltration of DFS by global market players or *Big Tech* is particularly challenging due to their market power (Sahay et al. 2020). While Fintech and Big Tech might not yet present systemic risks due to their small market share in comparison to that of traditional banks and shadow banking institutions, various hazards exist (FSB 2020, 2019), e.g., the increase in bargaining power, the development of closed-loop systems, and amplified operational risks. Consequently, given the rapid growth of Fintech transactions and transaction volumes, international cooperation and the creation of a level playing field by central banks and regulatory authorities are essential if countries are not to lose sovereignty (IMF 2019, 2018; Metzger and Wu 2020; Sahay et al. 2020).

(iii) Financial exclusion by mandatory digitalisation

Financial exclusion is a topic not only relevant for mobile money accounts, but for DFS in general. DFS can play a vital part in the ambition to lower barriers and facilitate the access to financial services as long as DFS are more complementary to traditional banks. However, digitalisation of financial services also has a downside; there is the risk of leaving behind households and small enterprises who encounter barriers to use DFS. For targeting vulnerable and disadvantaged households, a UN Capital Development Fund study (2017) showed that the creation of specific tailor-made products and services might additionally be required to better

respond to the needs of these groups. These financial services and products should address the specific features and contexts of the respective groups and ideally overcome their group-specific barriers to DFS due to characteristics linked to the individuals such as age and physical handicaps. These handicaps particularly affect the capacity to see and interact with digital devices as does limited literacy and technological comprehension. Cultural and social norms could also be reasons why certain groups have less access to DFS. There are indications that in some countries women have unequal access to DFS and gender gaps are even increasing (Sahay et al. 2020).

There is a profound risk of financial exclusion through digitalisation due to identification issues. Auer et al. (2020, p. 4) argue that in total 4.4 billion individuals overwhelmingly located in lower-middle income and low-income countries lack sufficient identification (ID) documentation, of which 1 billion individuals do not have any basic ID at all and 3.4 billion have an ID with only limited ability to use it for digital finance: "Lack of ID makes it difficult for citizens to access financial services, for financial service providers to on-board customers and for governments to efficiently transfer funds to the rightful beneficiary."

The example of the governmental-run Aadhaar system in India strikingly shows the potential benefits (Demirgüç-Kunt et al. 2018), as well as the dire consequences of exclusion from digitalisation (Fritz and Hilbig 2019). The Unique Identification Authority of India issues a 12-digit identification number to practically every resident. With a registration of already more than 1 billion numbers generated, Aadhaar is the biggest biometrical database containing information about name, gender, age, address plus eye Iris scans and finger prints. There is a mobile phone-linked application with which individuals can receive transfers and income. Since the launch of the system in 2010, reports indicate that the pension leakage dropped by almost 50 percent when transferred via the app and not handed out in cash (Demirgüç-Kunt et al. 2018, p. 2), the gender gap has decreased (p. 4), and generally, it has boosted digital account ownership particularly in formerly excluded groups (p. 19f).

At first, the registration in Aadhaar was voluntary, but it is now required to receive certain subsidies and payments e.g. from the Mahatma Ghandi National Rural Employment Guarantee Fund, which covers more than 300 different payment schemes (as of Q12020). Furthermore, a range of private companies in India even require the Aadhaar number as do banks and cell phone companies. If the electronic reading devices do not function properly, electricity is cut off or access to the internet is poor, households are at risk not to receive benefits and cannot access their funds in time, or potentially not at all. Moreover, those individuals who opt not to register are excluded and face dire consequences. "The digitalisation of government services threatens the social security of the poorest Indians. Because they have no Aadhaar numbers, millions of people have been denied food rations, children have been unable to commence their schooling or to access school meals, and old people have had their pension payments stopped" (Fritz and Hilbig 2019, p. 54). At least 27 individuals starved to death in India as they were excluded from the food subsidies of which of which they were entitled and they were in dire need (dito).

If digital finance stops being an additional option to traditional banks and lending institutions, and instead becoming a mandatory obligation, then there is a real risk of financial exclusion from digitalisation as the experiences with the Aadhaar system have shown. Whether the development of central bank digital currencies (CBDCs) could address the issues attached to identification and promote financial inclusion, is still to be seen. Those households and individuals who use cash, either by choice or as necessitated by their environment, are prone

to be left behind, if the availability and acceptance of cash in public services, finance, and retail business is structurally reduced (Auer et al. 2020; Barruetabeña 2020; Ceeney et al 2019).

4 CONCLUSION

Since the invention of mobile money in the 2000s years, we observe a steady increase of mobile money accounts and a continuing diversification of financial services provided via mobile money networks. Although financial inclusion - in terms of account ownership, payments undertaken and received, loans disbursed and savings realised - is increasing, the outreach to disadvantaged and poor groups, e.g., households in remote areas, low-income households, households with female heads, all of whom are overrepresented in the still unbanked population, is still limited. The increase in mobile money accounts is overwhelmingly realised by a group of households who also have an account with financial institutions. Thus, we observe that mobile money accounts also become a gateway towards digital financial services beyond e-payments, though only if they are used in conjunction with an account at a financial institution.

This applies in particularly to borrowing opportunities and to a lesser extent also to the mobilisation of savings. Formerly unbanked households, however, contribute very limited to the increase in mobile money account ownership and even less so to the increase in borrowing via mobile money accounts. The most promising channels of mobile money to increase financial inclusion seem to be domestic and international remittances as well as G2P payments which might develop into game changers for financial inclusion of poor and vulnerable households. Both payments increase the disposable income of recipients also within the group of poor households and thus could incentivise the use of mobile money accounts. However, there are households and individuals who further use cash, either by their choice or required by their specific social and economic environment. Thus, digitalisation of financial services, including the ownership of a mobile money account should not be a mandatory obligation for G2P payments.

Many countries from SSA are outperformers in terms of use of mobile money accounts compared with their peers in Asia and Latin America. Strikingly, the empirical evidence suggests for pioneers like Kenya, but also meanwhile for Ghana, that the regulatory landscape was of strategic importance to unleash the developmental potential of mobile money networks and the crowding-in of formerly unbanked households. There are indications that financial market regulation for the mobile money industry is as important as it is for the traditional banking industry.

Regulation on consumer protection particularly is of strategic relevance for the lasting acceptance and smooth operation of mobile money services and sharing the benefits with disadvantaged and poor households. A lack of effective and convincing consumer safeguards in place could diminish the trust in mobile money services and subsequently their acceptance and use. As mobile money services involve similar risks as traditional banking services, similar rules should apply. Consumer protection should cover fraud, bankruptcy, identify theft, compliance and KYC rules. In addition, regulatory requirements should cover all aspects of mobile money services e.g., the use of, and access to, mobile money services, the right of objection to changes in terms and conditions, the rights to dissolve accounts and delete digital traces with the mobile money provider, the rights to the privacy and security of customers'

transactions and identities, the manner in which customers' data is collected, used, and protected.

In particularly, borrowers are vulnerable and exposed to various risks. Among mobile money providers there is a substantial lack of transparency about their credit conditions, involved fees and costs. Borrowers risk ending-up with very short maturities and high interest rates, which tend to increase their indebtedness. Empirical evidence even indicates some predatory lending resulting in over-indebtedness. Regulators need to develop rules and standards for clear and comprehensive disclosures and to address mobile money providers' opacity and aggressive debt collection practices. They should also entitle mobile money account holders to the right to contact customer care and file complaints.

The regulatory framework has to be advanced as technology itself also involves additional risks, e.g. hysteresis effects to the disadvantage of poor households and exploitation of their personal data. Currently, we find regulatory gaps in terms of the collection, use and storage of so-called alternative data and the use of biased algorithms. Furthermore, the infiltration of local DFS by BigTech is concerning due to the market power of the global market players. Regulators need to closely observe their business conduct and integrity as well as the impacts of their activities on the stability on the local mobile money industry and the wider financial sector stability.

Regulators need to not only enforce regulation to protect mobile money account holders and in particularly borrowers; regulators also need to monitor comprehensively the activities of mobile-money providers in order to identify attempts to circumvent regulation and regulatory arbitrage. To prevent regulatory arbitrage is even more difficult if the bodies to be supervised and regulated are part of the digital market segment, whose activities and businesses might be easily shifted across borders. Accordingly, international cooperation and the creation of a level playing field by central banks and regulatory authorities are essential tasks ahead if countries are not to lose sovereignty.

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