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Mobile Money and Consumer Protection: An Analysis of Regulatory Environments To Enable Mobile Money

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Keywords

M-Pesa, mobile money, pass-through deposit insurance, consumer protection

Disciplines

Consumer Protection Law | Finance and Financial Management | Technology and Innovation

MOBILE MONEY AND CONSUMER PROTECTION: AN ANALYSIS OF REGULATORY ENVIRONMENTS TO ENABLE MOBILE MONEY

By

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Since its rise in the early 2000s, mobile money has become one of the most successful innovations of the emerging economies. This paper provides an overview of the many benefits that mobile money provides within the context of emerging economies and makes the argument that enabling government regulation is crucial to the development of successful mobile money systems. More specifically, we find that within the context of sub-Saharan Africa, consumer protection is the most important aspect of government regulation that predicts the spread of mobile money. The paper also recommends a set of policy tools such as third-party fiduciary requirements and pass-through deposit insurance to safeguard customer funds.

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INTRODUCTION

Since its conception in the 2000s, mobile money has taken the world by storm. Encompassing over 866 million registered accounts across 90 countries and $1.3 billion transacted every day, it has become one of the most successful innovations adding service to the mobile phone[1]. With limited access to formal banking services and relatively widespread access to mobile technology, consumers in emerging economies have been the engine behind mobile money's high adoption rates.

However, its success has varied based on the operators behind the technology and government policies employed to enable its success. This paper aims to examine how government regulation has enabled or hindered the success of mobile money in different contexts, and how policy can be leveraged to encourage the growth of mobile money while ensuring the consumers' privacy and data are safeguarded.

This section provides a brief overview of what mobile money is and how it works. Section two is a literature review with an emphasis on past work on the benefits of mobile money. Section three provides an introduction to the regulation of mobile money and its importance for long-term success of mobile money system. This is also the section that brings to light some of the main concerns of mobile money regulation. Section four is a deep dive into the consumer protection aspects of mobile money regulation, and its effects on the adoption of mobile money systems. Subsequently, section five evaluates challenges to consumer protection and what policy tools can be used to address said challenges.

[1] See Figure 3 in appendix for more on the annual growth of mobile money services

What is Mobile Money

Mobile money is a financial system that lies outside of traditional banking systems. In most cases, it is a service provided by telecommunications companies, as it operates primarily through the mobile device and unique SIM card of the user. For this reason, the mobile banking system has often been referred to as a shadow banking system[2]. A shadow banking system is a term given to non-bank financial entities that provide similar products and services to traditional banks but outside of regular banking regulations. According to the World Bank[3], approximately 2 billion people across the globe lack access to formal banking services. A majority of these people are found in developing countries and rural areas in particular. In these cases, traditional commercial banks are unable or unwilling to provide services due to higher costs and risks. However, an important distinction is that mobile money is not mobile banking. Mobile banking is a service to connect consumers to their already existent bank account through their mobile phones, while mobile money is an entirely separate product, with the potential to provide the same utility as traditional banking services.

The first mobile money service was launched in the Philippines in 2001[4], however Sub-Saharan Africa is responsible for most of its current growth and adoption in the developing world. M-Pesa was launched in 2007 in Kenya by Safaricom - the nation's largest mobile network operator - and has since become the dominant form of mobile money in the region. It was the rapid growth of M-Pesa that brought mobile money to international prominence. As of 2019, there were a total of 1.09 billion registered mobile money subscribers across the world with a combined

[2] Suri, "Mobile Money.", 501.
[3] Grandolini, "Five challenges prevent financial access for people in developing countries."
[4] Aron and Muellbauer. "The Economics of Mobile Money: harnessing the transformative power of technology to benefit the global poor.", 28.

annual transaction value of 690.1 billion USD[5]. The Sub-Saharan Africa region is accountable for the largest portion of mobile money subscribers, as well as transaction volume and dollar value. The runner ups, the South Asia and East Asia and Pacific regions, are also developing regions where people in rural areas often have difficulty accessing formal banking services[6].

Today, M-Pesa is the most successful example of mobile money with over 73.9 million transactions transacting almost $2 billion per month as of 2014[7]. In fact, the M-PESA network handles more transactions in a year than Western Union does globally, and the value of transactions represents more than 15 percent of Kenya's GDP[8]. In line with the success of M-Pesa in Kenya, East Africa accounts for the majority of registered mobile money accounts and transactions in Sub-Saharan Africa. Close in second place, with a higher growth rate in terms of adoption is West Africa[9]. Nigeria is a big player in the region, whose mobile money infrastructures have captured the attention of companies like Visa and several Chinese investors[10]. While providers in Africa are driving growth in mobile money, there are still large swaths of the continent that are lagging behind. Africa's three most populous countries, Nigeria, Ethiopia and Egypt have limited availability of mobile money and low rates of financial inclusion. This is indicative of a tremendous opportunity to unlock even further growth for mobile money on the continent.

How does Mobile Money Work?

As mentioned earlier, mobile money is a distinct product from mobile banking and has little to no connection with formal banking institutions. A basic mobile money infrastructure will have three main players, the consumer, the agent, and the company providing the mobile money

[5] Naghavi, "State of the Industry Report on Mobile Money 2019.", 8.
[6] See Table 3 in appendix for more on regional differences in mobile money transaction amounts.
[7] Muthiora, "Enabling mobile money policies in Kenya: Fostering a digital financial revolution.", 5.
[8] Kendall et al., "An emerging platform: From money transfer system to mobile money ecosystem.", 51.
[9] See Table 4 in appendix for more on mobile money transaction amounts in sub-Saharan Africa.
[10] Naghavi, Nika. "State of the Industry Report on Mobile Money 2019.", 15.

technology - often this position is that of a telecommunications provider. Mobile money operates through the SIM card on a user's mobile phone, which serves the dual purpose of identification and security when engaging in financial transactions.

The process for a consumer is fairly simple, they need a government ID and a mobile device with a SIM card to register for a mobile money account. It takes a few minutes at local mobile money agent, as opposed to opening a bank account which can take a much longer period of time. Moreover, since mobile money agents are widely available - even in remote areas - a potential customer doesn't have to travel far or expend much energy to open an account. Once an account is open, the customer can now deposit money in their account through the agent. This happens simply by giving the agent cash and having the equivalent amount immediately deposited in their account in the form of electronic money (e-money). The reverse is true for withdrawals, and the customer can now make secure financial transactions without any distance constraint. Since agents are widely available, depositing or withdrawing money is much easier than with a traditional bank. However, despite the similarity in practice, the actual mechanism of mobile money is very different from traditional banking. In the case of mobile money, depositing in one's account is essentially buying e-money from an agent, and withdrawing is exchanging e-money for cash with the agent.

An agent can be a standalone business dedicated to mobile money, or an existing business that incorporates being a mobile money agent into its operations. An agent's purpose is to allow the consumers to deposit and withdraw money from their accounts, so it holds a certain amount of e-money that it uses to facilitate those transactions. The agent's primary role is then, is to maintain their float or inventory of e-money as they would their inventory of any other commodity they

stock[11]. The agent purchases a certain amount of e-money from the mobile money provider and depending on the demand for its services, has the freedom to purchase more. Agents are a core part of the mobile money model, as they provide the cash-in, cash-out services equivalent to ATMs for a traditional bank. Therefore, the extent of the network of these agents is crucial[12]. However, successful agent networks require a suitably regulated and supervised legal framework. Allocating the legal responsibility of agents has consequences in terms of efficiency and financial inclusion[13]. Hence, how to appropriately allocate liability between the agent, consumer and telecommunications company is an important legal policy question as it is one of the determinants of the success of the mobile money network.

The third player in the mobile money infrastructure is the company providing the mobile money service. Often times, this is a telecommunications company, or a mobile network operator (MNO). The MNO has the responsibility of managing the software used by the consumers and agents, appointing and training agents, and facilitating the creation of new accounts by customers. The MNO also plays an important role in ensuring the safety of the money that agents - and by extension consumers - deposit to buy e-money for transactions. In some scenarios, banks have played the role of being a mobile money provider. Section 3 evaluates this in more detail.

LITERATURE REVIEW

The rapid growth of mobile money has prompted a wide body of research into the effects of mobile money and the factors that contributed to its proliferation. Since mobile money provides a cashless system of making financial transactions, it has been most successful in contexts where formal financial services

[11] Suri, "Mobile Money.", 503.
[12] Ibid, 503
[13] See Gibson, Lupo-Pasini, and Buckley, "Regulating Digital Financial Services Agents in Developing Countries to Promoted Financial Inclusion.", 26-45

are not widespread and transaction costs are high. Hence, the role that mobile money plays in emerging economies has been a common focal point for most of the research on mobile money.

From a macroeconomic perspective, Weil et. al (2012) use survey data from Kenya, Tanzania, and Uganda alongside Central Bank data to document the adoption of mobile money and look for causal effects of mobile money on monetary aggregates. In the case of Kenya, they find that although the velocity of M-Pesa rises over time, the monetary implications are minimal. Given that Kenya is the largest and most developed of the three markets, they extend that conclusion to Uganda and Tanzania as well. The authors acknowledge that this finding can be partly attributed to the small size of mobile money compared to other monetary aggregates at the time. Since the velocity of mobile money affects the inflation rate in the economy, it is possible that as the ecosystem for mobile money grows and it becomes a more common option for making financial transactions, there will be increased implications for monetary policy.

The formal financial market has also had to adjust to the rise of mobile money. Because of high costs, traditional banks don't have many deposit-taking infrastructures (namely branches and two-way ATMs) in low-income or sparsely populated locations such as rural areas. Consequently, residents of such areas, who are often within the low-income category or rely on informal income sources, are financially excluded from the rest of the population. As Kendall et. al (2011) contend, mobile money has the potential to tackle this problem. It enables banks to outsource cash-handling and customer-facing services like deposits and withdrawals while keeping transaction costs low and minimizing physical infrastructure. Once the new clients are in the financial system, the platform enables traditional banks a new range of services that weren't previously available. One such example is M-Shwari, a mobile-based service available to users of M-Pesa that allows them to save and borrow money using their mobile phones. Through the use of qualitative and quantitative data collected from the Jua Kali (an informal economic sector in Kenya), Kiiti & Hennink (2016) find that despite dissatisfaction with some of the terms, those who used M-Shwari for loan services registered being able to boost their businesses and address their personal financial needs. In research backed by the World Bank, Morawczynski & Pickens (2009) also found that M-Pesa serves as a

makeshift savings mechanism for those without access to formal financial services. This reveals a latent demand for formal savings products among mobile money users.

Similarly, there is a large body of research around the benefits of mobile money on an individual and household level. Mobile money has been proven to have positive effects on several factors like internal remittances, per capita consumption, poverty alleviation, and smoothing income shocks. That is further addressed in the following sub-section.

Benefits of Mobile Money

The growth of mobile money systems has promoted a wide body of research into the effects of mobile money and what role they can play in emerging economies. Mobile money systems are largely used to make two types of transactions: (a) geographically disparate transactions, i.e., transactions across space, and (b) transactions where the opportunity cost of holding cash may be high, as in high-crime cities[14]. Several benefits of mobile money are in line with these uses, but there is also large-scale research that shows its effects on poverty alleviation and financial inclusion[15].

In the case of Uganda, Munyegera & Matsumoto (2014) find that using mobile money is associated with a 69% increase in household per capita consumption. In terms of remittances, they also find that households with at least one mobile money subscriber are 20% more likely to receive remittances from their members in towns and that the total annual value of remittances received is 33% higher compared with their non-user counterparts. Similarly for Kenya, Suri et. al (2013) find that households with at least one M-Pesa user are 37.4% more likely to receive and 34.3% more likely to send remittances within their personal networks than nonuser households. Suri & Jack (2016) also find that increased agent access is associated with an increased in log per capita consumption particularly for female-headed households. Increase in agent access also had larger macroeconomics effects such as reductions in both extreme poverty (defined as the share of population living on less than $1.25 per day) and general poverty ($2 per day).

[14] Suri, "Mobile Money.", 509.
[15] See Figure 4 in appendix for the effect of M-Pesa on financial inclusion in Kenya.

These results were significant for female-headed households rather than male-headed households implying gender-based effects of mobile money as well.

Mobile money also enables households to respond better to unforeseen income shocks. For example, Morawczynski (2009) finds that during the 2007 post-election violence in Kenya, there was a drastic increase in the use of M-Pesa services because other forms of obtaining cash to smooth consumption shocks were largely unavailable. This was necessitated because formal channels of obtaining cash (like banks) were closed due to the constant insecurity. Similarly, Suri et. al (2012) use a survey covering nearly 2,300 households over 2008-2010 to document how M-Pesa allows households to better respond to medical expenses from health shocks without sacrificing necessary expenditures on food, education, and other consumption needs.

Research into alternate applications of mobile money, such as cash transfers have also yielded positive results. In a randomized controlled trial conducted by Aker et. al (2016) in Niger during the 2009-2011 food crisis, households were given unconditional cash transfers through cash or mobile money. The results found that those who received their cash transfers through mobile money used their cash transfer to buy more diverse types of goods, part of which were more protein and energy-rich foods. These diverse uses of the transfer resulted in a 9%–16% improvement in diet diversity. The results can be partially explained by less time spent using mobile money to receive the transfer - approximately 2.5 days over a 5-month period. Although the magnitude of the effect is small, it likely had a significant opportunity cost because it occurred during the planting season.

REGULATION OF MOBILE MONEY

With the advent of mobile money as a rapidly growing technology, governments have had to develop efficient policies to regulate it without hampering its development. Mobile money offers a new world of finance - particularly for the unbanked populations of the world. Formal financial services have historically been offered by traditional banking institutions, and the entrance of financial intermediaries and mobile networks into the playing field encourages competition and pushes the boundaries of traditional

banking. In the long run, this benefits consumers and the larger economic system. As Di Castri observes, an enabling policy and regulatory framework creates an open and level playing field that fosters competition and innovation, leverages the value proposition of both banks and non-bank providers, attracts investments, and allows providers to focus on refining operations and promoting customer adoption. Unfortunately, ineffective policies and cumbersome regulatory barriers have had a negative effect on the development of mobile money and the expansion of financial inclusion in many new markets[16].

The Importance of Enabling Regulation for Mobile Money

Regulatory environments that enable non-bank institutions – specifically MNOs – to participate in providing digital financial services are crucial to the success of mobile money. The majority of successful mobile money deployments operate in countries where regulators allow MNOs to provide mobile money services. Although they are primarily not financial service companies, MNOs have several advantages when it comes to establishing mobile money networks. Firstly, they have an established relationship with a broad network of third parties used for airtime distribution. This can be leveraged to quickly scale mobile money agents and make the service widely available. Second, they have an existing, low-cost interface with customers through the user's handset and SIM card. These two advantages pave the way for indirect benefits unique to MNOs – including savings from airtime distribution, reduction in churn, and increased share of wallet for voice and SMS[17]. Lastly, MNOs' experience at mass marketing and their established brand image among a broader base of clientele not familiarized with formal financial services is instrumental in building customer confidence as well.

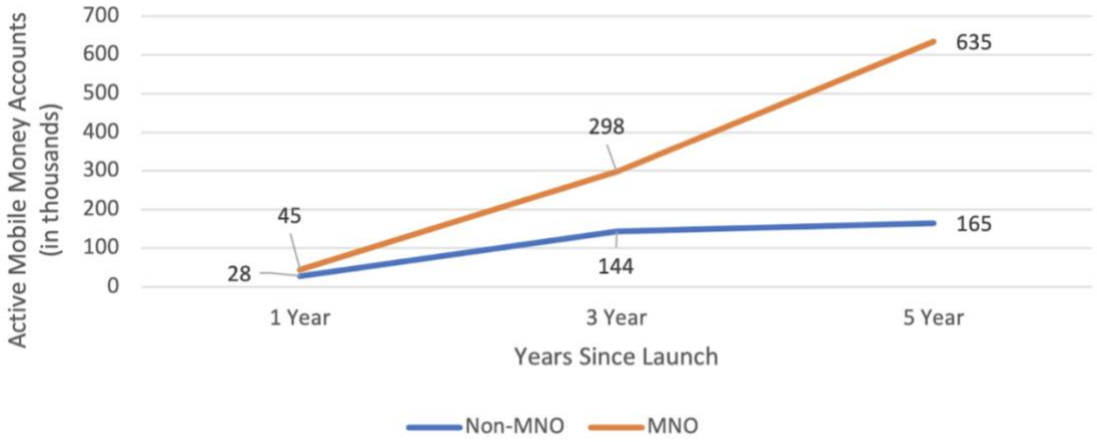
According to a 2016 study[18] conducted by GSM Association[19] in partnership with a Harvard Business School Professor and an independent economist, countries with enabling regulation enjoy higher

[16] Di Castri, "Mobile Money: Enabling Regulatory Solutions.", 4.
[17] Leishman, "Is there really any money in mobile money?", 3.
[18] See Naghavi et al., "Success Factors for Mobile Money Services: A Quantitative Assessment of Success Factors."
[19] The GSM Association is an industry organization representing the interests of mobile network operators worldwide. It includes more than 750 mobile operators as full GSMA members and a further 400 companies in the broader mobile ecosystem as associate members.

rates of success with mobile money. This includes direct regulation of non-bank institutions and a risk-based approach to registration requirements. The study controlled for all significant market conditions and was the first-ever large sample quantitative analysis of mobile money success factors.

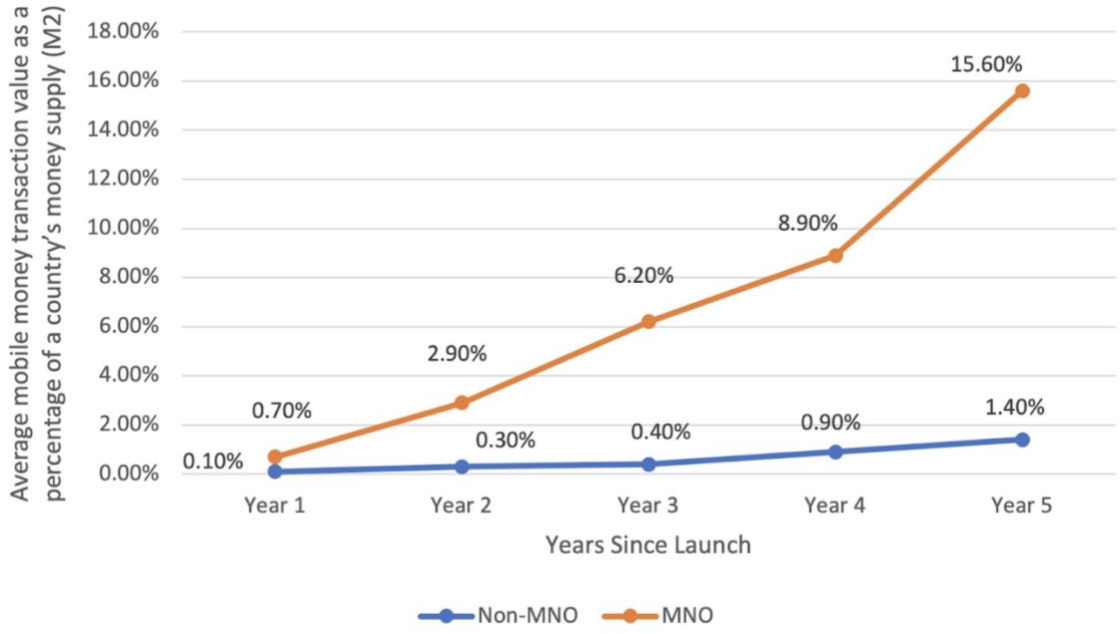
The study finds that MNOs are significantly more successful in designing and deploying mobile money systems than traditional banks, or even non-bank financial service providers. In terms of active mobile money accounts, there is a sizable difference in both the immediate and subsequent success of mobile money services. Within 5 years of launch, the average MNO-led service is able to reach 2.83% of the addressable market, while the average non-MNO-led service reaches only 0.53% of the addressable market. As the figures below demonstrate, there is also a sizable difference between the immediate and subsequent success of mobile money services in terms of both active mobile money accounts and average mobile money transaction value.

Figure 1: Active mobile money account growth for MNO and non-MNO-led services



Source: Naghavi et al., "Success Factors for Mobile Money Services: A Quantitative Assessment of Success Factors.", 7-8.

Figure 2: Growth of average mobile money transaction value for MNO and non-MNO led services



Source: Naghavi et al., "Success Factors for Mobile Money Services: A Quantitative Assessment of Success Factors.", 7-8.

Cumbersome regulatory regimes can also be a factor for the failure of mobile money networks. This problem was identified by a study conducted by the University of Chicago[20]. In a study of 22 countries where mobile money had been introduced between 2005 and 2015, the authors found that heavy regulation is usually fatal to igniting mobile money schemes in a country[21]. Most countries where mobile money failed to reach the critical ignition point necessary for explosive growth had imposed requirements that mobile money systems were established by banks and prohibited MNOs from taking the leading role.

Two main factors explain the rejection of non-bank-led mobile money deployment. They provide limited financial services to customers, contrasting with "full" financial inclusion through the formal banking sector. But this misunderstands the barriers to financial inclusion which mobile money has helped to solve, and how mobile money platforms have provided a pathway to later formal banking inclusion through credit extension, insurance, and savings products. The more cogent objection is against licensing a

[20] See Evans and Pirchio, "An Empirical Examination of Why Mobile Money Schemes Ignite in Some Developing Countries but Flounder in Most."
[21] Ibid, 4.

non-bank to offer financial services with financial risks, but without being legally subject to prudential oversight. This objection has been neatly surmounted in many countries by requiring a partnership between the (service leading) MNO and one or more fully prudentially regulated banks, where the electronic value in the customers' mobile money accounts is fully or partially backed up in bank accounts. The role of the partner bank is thus only as custodian of the funds and it is not involved in the commercial aspect of the deployment[22]. See the section 5 for more on partnerships between MNOs and traditional banks.

THE IMPORTANCE OF CONSUMER PROTECTION FOR MOBILE MONEY

Consumer protection is an essential part of any financial service as it ensures customers receive fair and transparent treatment in the market, thereby building confidence in the providers of financial services. This is especially important in the case of emerging markets with a low history of formal financial service providers. In cases where mobile money is a customer's first exposure to formal financial service, providers must make a concerted effort to build trust with their customers. Regulators also have the responsibility of strengthening consumer protections in order to build robust and relevant mobile money ecosystems.

The Effect of Consumer Protection on Mobile Money Adoption

The GSMA (Global System for Mobile Communications Association) constructed an index used to provide a quantitative assessment of the extent to which a country's regulatory frameworks enable the establishment and growth of mobile money. The index is constructed across six broad dimensions:

[22] Aron, "'Leapfrogging': A Survey of the Nature and Economic Implications of Mobile Money.", 76.

I. Authorization: examines eligibility criteria to provide mobile money services

II. Consumer protection: examines provisions for safeguarding consumer funds

III. Transaction limit: examines limitations placed on transactions and account balances

IV. Know your customer (KYC): examines extend of customer identification needed

V. Agent networks: examines eligibility criteria for potential mobile money agents

VI. Investment and infrastructure environments: examines external factors that can affect the regulatory environment such as tax requirements and interoperability infrastructure

The results across each of these dimensions are used to generate a numerical score from 0 (the lowest possible score) to 100 (the highest possible score) which serves as a general measure of enabling regulatory policy. GSMA finds a strong correlation between the number of registered accounts per 1000 adults and a country's score on the regulatory index score[23]. The results are largely incremental, but the index can be very useful in identifying trends in the relationships between specific regulatory aspects and the success of mobile money.

In order to isolate the effects of consumer protection in a specific region, we filter for sub-Saharan countries in the GSMA index. Additionally, we also employ data from the IMF[24] and the World Bank[25] to identify the number of registered mobile money users per 1000 adults in a country.

[23] See GSMA, *The Mobile Money Regulatory Index* (2019)

[24] Data sourced from the IMF included number of mobile money user per country in 2019, see bibliography for more details

[25] Population statistics sourced from the World Bank. Adults are defined as the age group from 15 years of age to 65 years of age.

Table 1: Summary statistics for data sets

	Regulatory Score (General)	**Regulatory Score (Consumer Protection)**	**Registered Mobile Money users per 1000 adults**
Mean (μ)	77.27	75.12	1021.02
St. Dev. (σ)	7.1	14.46	700.72
Max. value	88.93 (Rwanda)	100 (Rwanda, Kenya)	2201.2
Min. value	59.57 (Botswana)	50 (Botswana, Mozambique, Angola)	12.79

Methodology and Results

The regulatory index identifies consumer protection as one of the core principles of enabling regulatory frameworks. To construct the index, consumer protection is defined by policies regarding general consumer redress and disclosure mechanism as well as provisions for the safeguarding of customer funds. By filtering the data for exclusively sub-Saharan countries, we're able to isolate the effect of consumer protection in mobile money networks in a specific region. The result is 21 observations of sub-Saharan countries.

The data is used to construct a linear regression of form:

$$y = \alpha + \beta_1 ConsProtection + \beta_2 LogGDPCapita + \beta_3 Popn$$

With the number of mobile money users per 1000 adults in a country as the dependent variable (y) and the index ranking for consumer protection as the independent variable

(*ConsProtection*) and log GDP per capita and population as controlling variables (*LogGDPCapita* and *Popn)*, we find statistically significant results for consumer protection as seen below.

Table 2: Regression Results (n=21)

		Coefficients	**P-Value**
	ConsProtection	28.85	0.0145*
Controlling Variables	**LogGDPCapita**	261.15	0.4824
	Popn	-0.01	0.3275
Remaining Components of Regulatory Score	**Authorization**	2.77518621	0.78733975
	Transaction Limits	-10.224857	0.34068429
	KYC	-6.380234	0.76704684
	Agent Network	2.48081039	0.90094022
	Infrastructure and Investment Environment	18.6322842	0.20732756

*Statistically significant at the 95% level

As we can see from the results above, the coefficient of consumer protection is statistically significant at 95% level. This supports the hypothesis that government regulation supporting consumer protection in mobile money is a significant determinant of the adoption of mobile money in sub-Saharan Africa. The results hold true while controlling for extraneous variables like total population size and log GDP per capita. This takeaway is consistent with studies conducted by

Okello and Ntayi (2020) that find digital consumer protection significantly affects mobile money uptake and consequently financial conclusion.

The last set of rows displays the individual regressions for the remaining components of the regulatory index score. We find that none of the components are statistically significant within in the sub-Saharan context when controlling for the same variables – log GDP per Capita and total population.

It is important to note that due to a lack of a data, we are unable to rule out directional attribution error in interpreting the results. Though unlikely, it is not impossible that it is the already existent success of mobile money that prompts governments to adopt improved consumer protection policies. Finding further data on when consumer protection policies were adopted by respective countries has proved difficult, but these findings call for further research on the topic.

CHALLENGES TO CONSUMER PROTECTION

Despite the importance of consumer protection, ensuring the safety of customer funds remains one of the biggest challenges faced by mobile money systems and regulators. Globally, mobile money is responsible for transacting close to $700 billion per annum, and many use it as an alternate method of saving or keeping their money safe. In terms of transactions, mobile money networks are most commonly used to make quick transfers over geographically disparate locations, and in areas with high crime rates that increase the risk of holding cash. Essentially, if MNOs are unable to guarantee the safety of their customer's funds, they fail to deliver on their value proposition.

To be successful and gain the trust of customers, mobile money providers need to implement mechanisms that prevent the loss of their funds. Regulators also need to establish policies that require providers to operate safely in the market. Common causes for the loss of

customer funds include bankruptcy of the mobile money issuer or imprudent investments using customer funds. In cases where customer funds are managed by a third-party fiduciary, the trustee's solvency can also be a cause for loss. To mitigate these risks, regulators have several tools available to them to protect customer funds. However, there are significant variations in both the availability and implementation of these tools across countries. The following sub-sections provide an overlook of the tools available and their use across different mobile money contexts. The two major risks for loss of customer funds are the solvency of the mobile money issuer and the solvency of the third-party fiduciary managing customer funds.

Tools to Address Solvency of the Mobile Money Issuer

In the event that the issuer of a mobile money service becomes bankrupt, creditors can attempt to claim customer funds to settle debts. Placing customer funds in a separate trust account can help mitigate this risk by ring-fencing customer funds from other assets held by the issuer. However, the liability of trust accounts and the process for establishing an account vary across contexts.

Though trusts are an effective way to safeguard funds in theory, in practice they can still be at risk of co-mingling with the issuer's assets. The primary reason for this is that the issuer often has direct access to the funds stored in the trust. For example, a mobile money issuer may establish a trust to maintain customer funds, but still use some of the customer funds to make investments without the knowledge of the customers. In such cases, the customer funds are still at risk of loss. The use of a third-party trust can help address this challenge and has been implemented successfully by M-Pesa in Kenya.

In the case of Kenya's M-Pesa system, the issuer (Safaricom) does not receive the customer funds. Instead, it is paid directly to another firm, called the 'M-Pesa Holding Company' (MPHC).

The MPHC stores customers' funds in a trust account with the Commercial Bank of Africa. Under this system, Safaricom facilitates the service and mobile money transactions. However, the MPHC plays the role of handling all the payments under M-Pesa. Safaricom - the issuer of the mobile money service - does not receive, store, or manage any customer funds from mobile money.[26] Additionally, the Central Bank of Kenya has the authority to monitor the MPHC's management of the trust account.

Tanzania also employs a similar system. The mobile money issuer is required to establish a separate legal entity that forms and manages a trust account. The corporate structure and management of the separate entity is evaluated and approved by the Bank of Tanzania[27]. It has to submit monthly reports on the operation of the trust to the Bank of Tanzania as well as comply with any additional requirements set forth by the bank. Many countries with mobile money networks recognize the need to prevent commingling of customer funds with the company assets. However, not all of them have an explicit requirement for using trust funds.

Policies involving a trust account managed by a third party to handle customer funds have several benefits. Primarily, they ensure that the funds are kept separate from the issuing company's assets. This prevents direct access and makes it difficult to use the funds elsewhere. Second, they enable improved regulation from the government. Instead of dealing with the issuing company, the government can now directly supervise the third-party firm when addressing risks related to the customer funds. Lastly, depending on the fiduciary policies in place, placing customer funds in a trust managed by a commercial bank can help protect them in cases of the solvency of the trustee bank as well.

[26] Greenacre, "Regulating Mobile Money: A Functional Approach",11.
[27] Tanzania National Payment Systems Acts, 23.

Tools to Address Solvency of the Third-Party Fiduciary

Although trust accounts can help mitigate the risk of commingling customer funds with company assets, there are still additional risks posed to customer funds that need to be addressed. Most trust accounts employed by nonbank mobile money issuers are placed in commercial banks. A prominent, but inaccurate, view is that such funds are completely protected. One reason may be that banks are usually subject to heavy capital requirements and regulatory oversight. In developed countries, banks usually receive deposit insurance and other government insurance. However, in recent years this view has come under examination. This is because many developing countries do not have deposit insurance. Moreover, even in those countries that do have deposit insurance, policymakers have realized that this may not protect customers' funds from the institutional stress of the bank in which such funds are stored.[28] Funds from individual customers are often kept in a pooled account which is treated as a single account for the purposes of deposit insurance. In the event of institutional stresses such as bankruptcy, customers are not guaranteed the entire value of their funds.

For example, if there are 100 customers that have each deposited $500 into their mobile money accounts, amounting to a total of $50,000 in the trust account. In the event of the bank's solvency, insurance protects up to $25,000 in individual accounts. Although each customer's deposit is below the maximum covered by the insurance, since the trust account is considered a single account, they would receive only 50% of their original deposits. In reality, the difference can be very drastic, because most mobile money pools consist of a very large number of depositors with small individual deposits.

[28] Greenacre, "Regulating Mobile Money: A Functional Approach", 15.

When M-Pesa was first established in Kenya, deposits were protected under the Deposit Protection Fund (DPF) which was designed for individual bank account holders. The DPF provides insurance on a maximum of 100,000 in Kenyan Shillings, which amounts to $1,300. With millions of users, this meant that M-Pesa customer funds were virtually unprotected in the event of a bank failure.[29] In recognition of this weakness, the Kenyan government enacted the Kenya Deposit Insurance Act (KDI Act) in 2012 to protect mobile money users. According to the KDI Act, the deposit held in trust by the trustee for each beneficiary (mobile money user), shall be deemed to be a separate deposit where the trustee is acting for two or more beneficiaries[30]. This model, borrowed from the US Federal Deposit Insurance Corporation (FDIC) is known as pass-through deposit insurance.

Under the pass-through deposit insurance model, the deposit insurance provider acknowledges that under certain circumstances, funds that are combined and held in a single account may be better characterized as a number of smaller accounts for the purpose of deposit insurance protection.[31] The following conditions must be met for the account to viable for pass-through deposit insurance[32]:

i) The agency or custodial relationship must be disclosed in the account records of the insured depository institution;

ii) The identities and interests of the actual owners must be disclosed in the records of the depository institution or records maintained by the custodian or other party; and

iii) The deposits actually must be owned by the named owners and not by the custodian.

[29] Jack and Suri, "The economics of M-PESA.", 10.
[30] Kenya Deposit Insurance Act, Article 29.
[31] Grossman, "Safeguarding Mobile Money: How providers and regulators can ensure that customer funds are protected.", 23.
[32] FDIC, New General Counsel's Opinion No.8

Despite the apparent effectiveness of pass-through deposit insurance at protecting customer funds, it is not a very common policy - especially among countries with high levels of mobile money adoption. According to a 2018 survey conducted by the International Association of Deposit Insurers, only 30% of the respondents (15 out of 51 countries) have adopted pass-through deposit insurance[33].

CONCLUSION

The rapid growth of mobile money – particularly in regions without access to formal financial services – has positioned it as one of the most successful financial innovations of the twenty-first century. Though many are optimistic about the opportunities for financial inclusion that mobile money offers, there are many challenges it has yet to overcome before it can achieve its full potential. Cumbersome regulatory regimes are chief among these challenges. Despite a plethora of positive evidence that points towards the benefits of mobile money, we find that most policy regimes in emerging countries are either hesitant or unprepared to accommodate mobile money.

Nonetheless, certain countries have been able to create environments conducive for the growth of mobile money while simultaneously ensuring the protection of customer data and funds. With the use of mobile money regulatory index constructed by the GSMA, we find that consumer protection is the most important predictor of the number of mobile money users. This finding is contextualized only to sub-Saharan Africa as a region dominated by emerging economies. An important caveat is that while enabling regulation can contribute to the success of mobile money, it is also possible that the already existent success of mobile money prompted the development improved regulation. Though we are unable to address this issue due to a lack of readily available

[33] "Deposit Insurance and Financial Inclusion: Current Trends in Insuring Digital Stored Value Products.", 14

data, it provides strong evidence for further research into the specific causal relationship between consumer protection and mobile money.

Regarding consumer protection, we find that the two major risks for loss of customer funds are the solvency of the mobile money issuer and the solvency of the third-party fiduciary assigned to manage customer funds. Establishing a third-party trust to manage customer funds separately from the assets of the mobile money provider helps avoid mismanagement and eases the process of supervision for the government. Pass-through deposit insurance can help further protect consumer funds within said trust accounts by providing insurance for individual customer deposits.

BIBLIOGRAPHY

1) Aker, Jenny C., Rachid Boumnijel, Amanda McClelland, and Niall Tierney. "Payment mechanisms and antipoverty programs: Evidence from a mobile money cash transfer experiment in Niger." *Economic Development and Cultural Change* 65, no. 1 (2016): 1-37.
2) Aron, J. "Leapfrogging': A Survey of the Nature and Economic Implications of Mobile Money (No. 2017 02)." *Centre for the Study of African Economies, University of Oxford* (2017).
3) Aron, Janine, and John Muellbauer. "The Economics of Mobile Money: harnessing the transformative power of technology to benefit the global poor." *Centre for the Study of African Economies, University of Oxford* (2019).
4) Bahia, Kalvin, and Brian Muthiora. "The Mobile Money Regulatory Index." *GSMA*, (2019).
5) Bongomin, George Okello Candiya, and Joseph Mpeera Ntayi. "Mobile money adoption and usage and financial inclusion: mediating effect of digital consumer protection." *Digital Policy, Regulation and Governance* (2020).
6) "Deposit Insurance and Financial Inclusion: Current Trends in Insuring Digital Stored Value Products." *International Association of Deposit Insurers* (2019).
7) Di Castri, Simone. "Mobile Money: Enabling Regulatory Solutions," *SSRN Electronic Journal*, 2013, https://doi.org/10.2139/ssrn.2302726.
8) Evans, S. D., and Alexis Pirchio. "An empirical examination of why mobile money schemes ignite in some developing countries but flounder in most. University of Chicago Coase-Sandor Institute for Law & Economics Research Paper No. 723." (2015).
9) FDIC, New General Counsel's Opinion No.8, (2008).
10) "Financial Access Survey." *IMF* (2019), https://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C.
11) Gibson, Evan, Federico Lupo-Pasini, and Ross P. Buckley. "Regulating Digital Financial Services Agents in Developing Countries to Promoted Financial Inclusion." *Sing. J. Legal Stud.* (2015): 26-45.
12) Grandolini, Gloria M. "Five challenges prevent financial access for people in developing countries." *The Guardian* (2015).
13) Greenacre, Jonathan. "Regulating Mobile Money: A Functional Approach." *Pathways for Prosperity Commission Background Paper Series* 4 (2018).
14) Grossman, Jeremiah. "Safeguarding Mobile Money: How providers and regulators can ensure that customer funds are protected." *Global System of Mobile Communications Association, London* (2016).
15) Izaguirre, Juan Carlos, Timothy Lyman, Claire McGuire, and Dave Grace. "Deposit Insurance and Digital Financial Inclusion." (2016).
16) Jack, William, Adam Ray, and Tavneet Suri. "Transaction networks: Evidence from mobile money in Kenya." *American Economic Review* 103, no. 3 (2013): 356-361.

17) Jack, William, Tavneet Suri, and MIT Sloan. "The economics of M-PESA." *Unpublished paper* (2010).
18) Kendall, Jake, Bill Maurer, Phillip Machoka, and Clara Veniard. "An emerging platform: From money transfer system to mobile money ecosystem." *Innovations: Technology, Governance, Globalization* 6, no. 4 (2011): 49-64.
19) Kenya Deposit Insurance Act, (2012).
20) Kiiti, Ndunge, and Monique Hennink. "The use and impact of M-Shwari as a financial inclusion banking product in urban and rural areas of Kenya." (2016).
21) Leishman, Paul. "Is there really any money in mobile money?" *GSMA* (2010), http://images.gsma.com/mwl/00001019/moneyinmobilemoneyfinal63.pdf.
22) Morawczynski, Olga, and Mark Pickens. "Poor people using mobile financial services: observations on customer usage and impact from M-PESA." (2009).
23) Morawczynski, Olga. "Exploring the usage and impact of "transformational" mobile financial services: the case of M-PESA in Kenya." *Journal of Eastern African Studies* 3, no. 3 (2009): 509-525.
24) Munyegera, Ggombe Kasim, and Tomoya Matsumoto. "Mobile money, remittances and rural household welfare: Panel evidence from Uganda." *Tokyo: GRIPS* (2014).
25) Muthiora, Brian. "Enabling mobile money policies in Kenya: Fostering a digital financial revolution." *GSMA Mobile Money for the Unbanked* (2015).
26) Naghavi, N. "State of the industry report on mobile money 2019." *GSMA, London, (2020). Available online: https://www.gsma.com/sotir/wp-content/uploads/2020/03/GSMA-State-of-the-Industry-Report-on-Mobile-Money-2019-Full-Report.pdf*
27) Naghavi, Nika, Janet Shulist, Shawn Cole, Jake Kendall, and Wentao Xiong. "Success Factors for Mobile Money Services: A Quantitative Assessment of Success Factors." *GSMA, November* (2016).
28) "Population ages 15-64, total." World Bank (2019), https://data.worldbank.org/indicator/SP.POP.1564.TO
29) "Population, total." World Bank (2019), https://data.worldbank.org/indicator/SP.POP.TOTL
30) Suri, Tavneet, and William Jack. "The long-run poverty and gender impacts of mobile money." *Science* 354, no. 6317 (2016): 1288-1292.
31) Suri, Tavneet, William Jack, and Thomas M. Stoker. "Documenting the birth of a financial economy." *Proceedings of the National Academy of Sciences* 109, no. 26 (2012): 10257-10262.
32) Suri, Tavneet. "Mobile money." *Annual Review of Economics* 9 (2017): 497-520.
33) Tanzania National Payment Systems Acts, (2015).
34) Weil, David, Isaac Mbiti, and Francis Mwega. "The implications of innovations in the financial sector on the conduct of monetary policy in East Africa." *Report submitted to the International Growth Centre Tanzania Country Program* (2012).

APPENDIX

Table 3: Annual Mobile Money Transaction Amounts by Region (2019)

Region	Transaction Volume	Transaction Value (USD)
East Asia and Pacific	4,400,000,000	$78,900,000,000
Europe and Central Asia	217,000,000	$3,800,000,000
Latin America and the Caribbean	601,000,000	$16,500,000,000
Middle East and North Africa	663,000,000	$9,100,000,000
South Asia	7,300,000,000	$125,400,000,000
Sub-Saharan Africa	23,800,000,000	$456,300,000,000

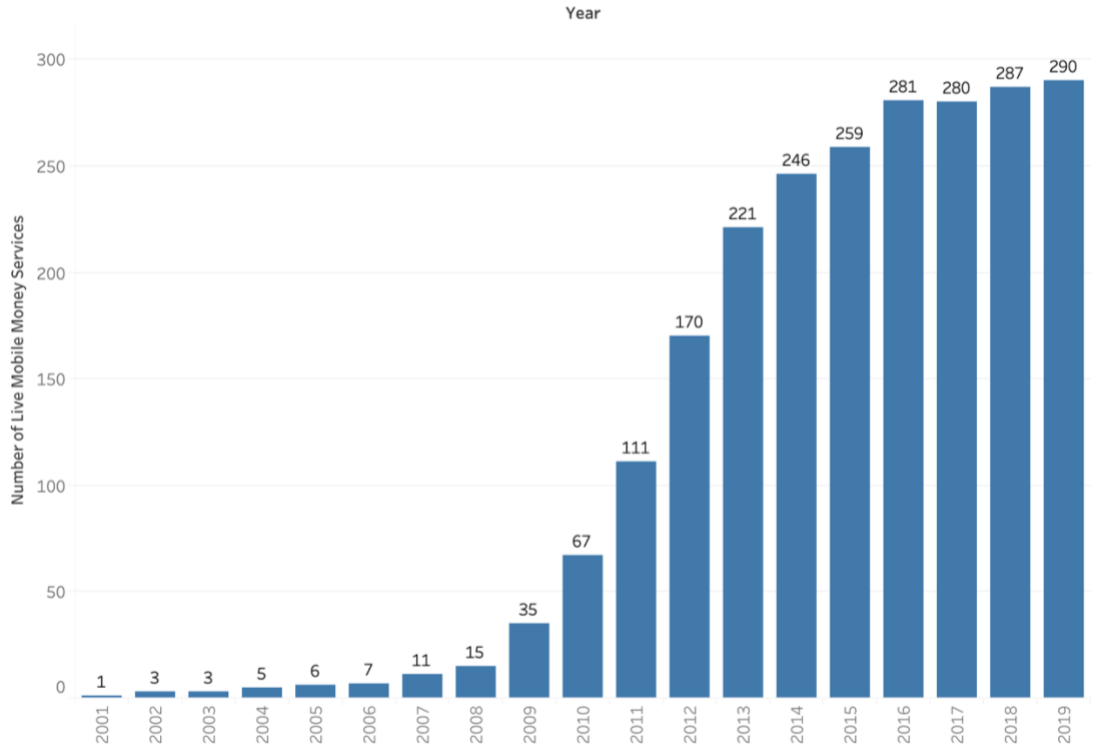
Source: Naghavi, N. "State of the industry report on mobile money 2019.", 8.

Table 4: Annual Mobile Money Transaction Amounts in Sub-Saharan Africa (2019)

Region	Transaction Volume	Transaction Value (USD)
East Africa	17,100,000,000	$293,400,000,000
Central Africa	1,800,000,000	$30,400,000,000
Southern Africa	165,000,000	$2,500,000,000
Western Africa	4,800,000,000	$130,000,000,000

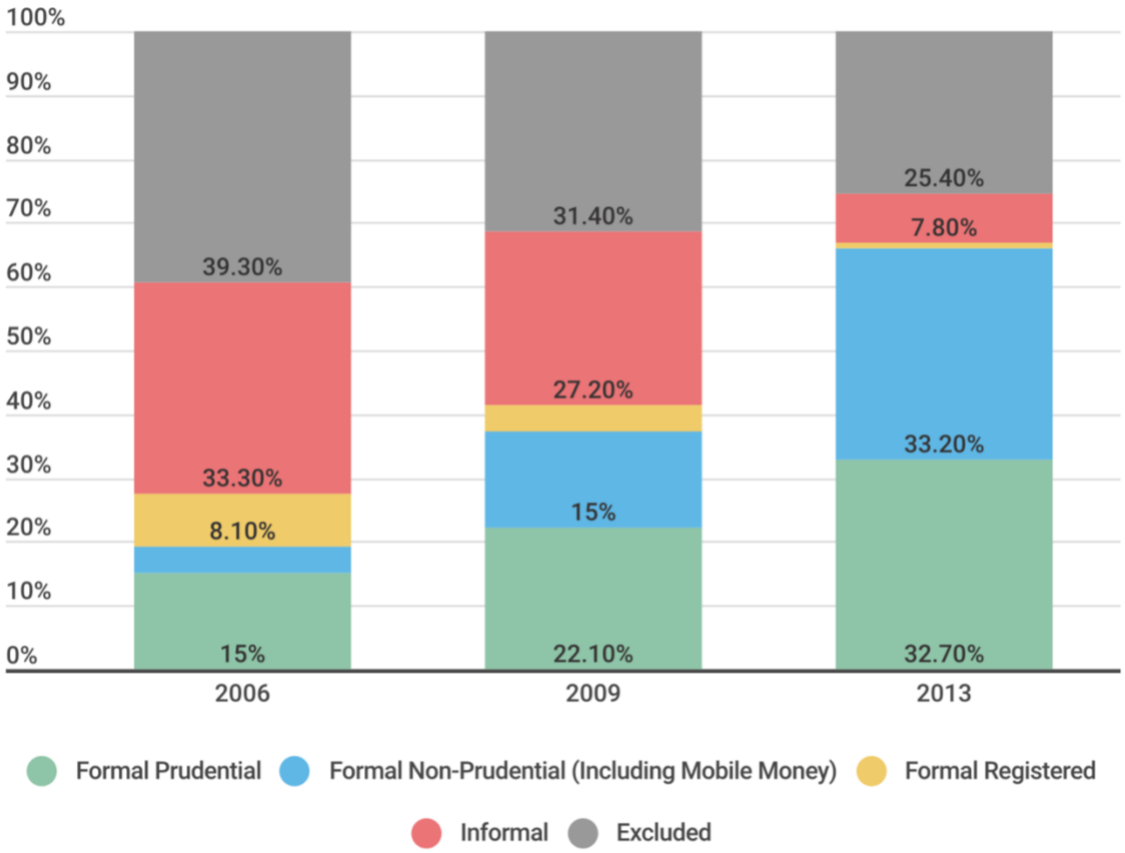
Source: Naghavi, N. "State of the industry report on mobile money 2019.", 9.

Figure 3: Annual Growth in Mobile Money Services



Source: Naghavi, N. "State of the industry report on mobile money 2019.", 11.

Figure 4: Financial Access by Year (Kenya)



Source: Muthiora, Brian, "Enabling mobile money policies in Kenya: Fostering a digital financial revolution.", 4.