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Mobile Banking and Financial Inclusion

The Regulatory Lessons

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Abstract

Mobile banking is growing at a remarkable speed around the world. In the process it is creating considerable uncertainty about the appropriate regulatory response to this newly emerging service. This paper sets out a framework for considering the design of regulation of mobile banking. Since it lies at the interface between financial services and telecoms, mobile banking also raises competition policy and interoperability issues that are discussed in the paper. Finally, by unbundling payments services into its component parts, mobile banking provides important lessons for the design of financial regulation more generally in developed as well as developing economies.

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Mobile Banking and Financial Inclusion: The Regulatory Lessons

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1. Introduction

A financial revolution is in progress. It is not happening under the skyscrapers of New York or on the streets of London. It is not taking place in Beijing or Mumbai but in the slums of Nairobi and in the markets of Kisumu (Mas, 2010). It is not the micro-lending with which developing and emerging markets are associated but something at the other end of the financial spectrum in the traditionally least exciting part of the financial system - payments. Notwithstanding this, it has fundamental implications for financial development and financial inclusion, for our understanding of financial systems, and for their regulation and supervision.

The revolution is mobile banking – the use of mobile phones to make financial transactions. Mobile money or branchless banking schemes are sprouting across the world. According to the deployment tracker of the GSM Association, one scheme was launched in 2001. By 2006, there were just 10 globally but the success of M-PESA in Kenya, which was launched in 2007, appears to have provided added impetus. 25 schemes started in 2009 and 38 in 2010. 2011 is on course for over 50 deployments. By the end of 2011 over 140 mobile money ventures will be operating globally, up from 95 currently. The current boom is focused on Africa with 45 schemes so far, followed by Asia and the Pacific with 25 in operation and Latin America with 12.

The verdict on the viability of the schemes is still out. One success currently stands out: M-PESA in Kenya signed up over 50 percent of all adults in the nation in less than 4 years to a mobile phone-based retail payment system. Brazil established "correspondent banking" around 2000. Over 95,000 shops across the country provided basic facilities for customers to make payments using a Point-of-Sale (POS) device, not a mobile phone. While Brazil is, next to Kenya, the country with the most far-reaching retail payment scheme, the financial viability of the approach remains fragile[1].

The wave of experiments with mobile schemes that is currently sweeping the globe focuses mostly on payment transactions. Based on M-PESA's record, this promises to reach more unbanked customers than previous micro-finance ventures. Most schemes use mobile phones as the device to communicate with an account provider. Some use Point-of-Sale (POS) devices in conjunction with magnetic stripe cards, mostly in Latin America; some use both phones and POS devices, for example WIZZIT in South Africa and Smart in the Philippines.

The account provider may be a bank, but more and more it is a telecommunications company and, in rare cases, a third party, for example, Celpay in Zambia. Most account providers effect payments among the participants within their scheme. A few schemes interconnect different account providers, mostly banks to date. New interconnection schemes that allow payments to be made between different types of account providers are being tested.

The new payment schemes bring people from the cash economy into modern systems of book-entry money that may be recorded electronically or on paper, sometimes both in one system. A key requirement for success is to have retail outlets that change cash for book-entry money. So-called "cash-in/cash-out" services are provided sometimes by shops that operate independent of bank branches or by bank branches. Many shops are branded by a single mobile money scheme, some offer services for several schemes. The success of any scheme is critically dependent on finding the right business model that makes the retail providers of cash-in/cash-out services profitable. Only one scheme, M-PESA, appears so far to have achieved operational profitability. For most schemes it is too early to tell.

All in all, there is no set way to classify the new experiments by type of institution. Each scheme tends to add a new twist and may combine functions and players in new ways. It is thus most helpful to analyze issues by service provided. M-PESA happens to provide a convenient example to discuss the plethora of issues that arise.

The significance of mobile banking is threefold:

it provides financial services in otherwise unbanked locations;
it raises significant regulatory and competition policy issues;
by unbundling and disaggregating financial services, it gives fundamental conceptual insights into the nature of these services.

Information and communication technologies (ICT) fuel the greatest wave of technical innovation currently spreading across the globe, affecting new areas of social and economic activity. Unsurprisingly, financial businesses everywhere have been in the throes of organizational changes and innovation based on new possibilities opened up by ICT. Money, after all, is "just" information about who owes what to whom. Much innovation happens in advanced economies yet new technology has the potential to unleash radical change in developing economies.

These new technologies are leapfrogging the ones that exist in developed economies, particularly when they help to solve problems arising from weak institutional infrastructure. M-PESA in Kenya provides the prominent example at this time. In 2006, instigated by the UK's Department for International Development (DFID) in conjunction with staff at Vodafone, the Kenyan Vodafone subsidiary, Safaricom, experimented with the use of mobile phones to support microfinance. Originally, the idea was to facilitate loan payments and repayments under microcredit schemes. As Safaricom explored the scheme, the company developed a new business proposition that focused on payment and small saving services with the slogan "send money home".

Launched in March 2007, the payment and saving service signed up over 50 percent of adult Kenyans by the end of 2010. The annual number of payment transactions rose to exceed that of Western Union globally and now accounts for about 58 percent of the number of electronic payments in Kenya. The system allows users to send or withdraw money at over 23,000 retail outlets compared with approximately 1,000 bank branches. The absolute amounts are very small reflecting the income level of the users with average savings of around $\$3$[2]. Nevertheless, the

innovation has profound implications for financial inclusion and the provision of financial services to underserved citizens. Its significance stems not just from the reduced costs of access to cash and means of payments which are the most direct effects of mobile banking for communities that previously had no or expensive access to formal means of exchange. It also provides communities with access to a network of individuals, merchants and companies from which they were previously excluded. The potential for reaching providers of such services as health insurance, savings and lending products has increased substantially since the advent of mobile banking in Kenya[3].

A further feature of mobile banking is the way in which it facilitates the development of relations of trust where previously there was no basis for it. In particular, mobile banking provides an instantaneous and traceable record of transactions that were otherwise anonymous and unverifiable through cash. For example, mobile banking permits the keeping of records and accounts on payments that contribute over a period to the total cost of a delivery of a service. Regular savings for education and health services become possible in a way previously difficult or expensive to monitor.

Currently policymakers and regulators in countries ranging from Namibia to Indonesia, from Mexico to the Philippines and from Kenya to Pakistan are drafting regulations for the era of mobile money. They struggle with adapting banking regulation to mobile banking. Yet, little thinking has been developed so far about how mobile money may be different from traditional banking. Existing attempts include the distinction between "bank-based" and "telco-based" mobile money schemes (Lyman et al 2008). Yet, whether a telecommunications company or a bank is leading the effort sheds little light on the precise risks associated with a particular mobile money scheme. Some basic issues have been identified such as the need to ring-fence funds of a mobile money scheme from that of, for example, an associated telecommunications company (Tarazi and Brefloff, 2010). Yet, often it is not clear how the basic design of mobile money regulation might potentially differ from traditional banking regulation beyond general statements that regulation should be calibrated to the risks of a particular scheme. This paper presents a

comprehensive and practical scheme to assess regulatory approaches to new forms of financial transactions enabled by mobile technology in poor countries, in particular in payments and savings via mobile phone. To date, most analyses of financial inclusion have remained aggregate in nature not drilling down into the "black box" of new business models and their regulatory implications. Yet, new technology shapes business models as lower transaction costs allow different parts of a business to be rearranged, leading, for example, to "unbundling" of functions that used to be organizationally integrated into a traditional form of business, say a bank. As we will describe, new, separate forms of organization have emerged which manage a "slice of risk" that was previously embedded in a traditional financial organization.

The significance of mobile banking goes well beyond developing countries and financial inclusion. By providing a clear disaggregation of the components of banking, it throws light on the nature of financial services in general. In particular, it brings out the distinction between payments and banking and suggests that much of the debate on the reform of banking in developed economies in relation, for example, to the separation of commercial and investment banking has been confused. By identifying the different components of financial services so clearly, mobile banking helps to establish where the focus of regulation should lie in all financial systems.

Section 2 of the paper describes the key elements of mobile banking and the way in which they disaggregate the components of financial transactions principally into exchanges of forms of money, safe-keeping of money, transportation and investment. Section 3 describes various alternative regulatory approaches to the risks inherent in these different components of financial services. Section 4 considers the competition issues related to, on the one hand, the risk of monopoly abuse, and the need to retain an environment that is open to new business models on the other. Section 5 summarizes a basic approach that can be taken to assessing regulatory and competition policy implications of "mobile" payments and saving services and discusses the wider implications of the analysis for the regulation of banking and financial services in developed as well as developing economies.

2. Mobile Banking and Financial Disaggregation

M-PESA in Kenya unbundles a business of what one may call "cash merchants"[4]. It allows people who previously relied only on cash to store and send money by phone and to use a form of book entry money (BEM) recorded and transmitted electronically. This is nothing fundamentally new for people who used banks but now poor people, just like richer ones with bank accounts, can transform cash into BEM and conversely BEM into cash. Previously, people did this at a bank branch but most poor people either have no bank account or face lengthy trips to bank branches.

Safaricom exploited the fact that most Kenyans now have mobile phones. Users buy a SIM[5] card with the M-PESA application for their phone. Once signed up they have an electronic account and they may deposit money into it, withdraw money from it or send money from their account to that of another M-PESA account holder. To deposit and withdraw, they use cash merchants signed up with M-PESA. Some 23,000 such merchants now operate out of small huts, shacks or rooms all across the country.

The merchants themselves invest in their own business by acquiring an M-PESA account and deposit money of their own into it. Once the merchant holds electronic BEM at M-PESA, she can sell BEM to another person for cash. At the same time the merchant needs to hold cash to be able to buy BEM from another person by selling cash. When customers visit the cash merchant to deposit money into their account they give cash and receive M-PESA's BEM via mobile phones. When they withdraw cash they transfer BEM via phones to the cash merchant's M-PESA account and receive cash in return.

The cash merchants are called M-PESA "agents". The word agent together with the acts of depositing or withdrawing money suggests that merchants perform services on behalf of the account provider, M-PESA, like a bank branch performs services for its bank. In fact, the

merchants do not dispose of M-PESA's cash or other assets like a bank branch employee does for a bank. They transact with their own money – either in the form of BEM or cash. It is a service equivalent to the exchange of coins for bills that is allowed to happen without bank regulation anywhere in the world, just like those provided by machines that exchange coins for bills.

The service that cash merchants provide is highly valued by customers. They perform the functions of an ATM that allows cash withdrawals and deposits. The service, often called "cash in/cash out", is crucial for mobile phone based transactions without which poor people could not obtain the cash they need on a daily basis. Cash merchants tend to be in close proximity to people in most of the country. In the slums of the major cities in Kenya M-PESA cash merchants maintain shops every few hundred meters. There are no long waiting lines; they open early and close late like other shops in the informal markets. Poor people can transact at these shops without abandoning their business for lengthy amounts of time and without the cost of transport that may be involved in visiting the nearest branch of a bank.

Merchants receive compensation for their services. In the case of M-PESA, the compensation is paid by the account provider out of the transaction fees charged. The M-PESA cash merchant receives her compensation from M-PESA. New proposed business models, for example, that of a service called ZAP promoted by the telecommunications company Airtel, intend to delegate payments of cash merchants to customers. In this case, ZAP would charge for the transfer from one account to another and the costs of exchanging cash for BEM would be paid directly by customers to ZAP.

Retail cash merchants need to maintain adequate amounts of cash and of BEM to meet customer demand. They obtain this from one or more of several hundred wholesalers. The wholesalers may be banks or separate cash wholesale merchants without associated banking business. When retailers are short of cash or BEM they can obtain more from the wholesaler. Demand for one form of money or another varies by region and over time and the wholesalers help meet that

demand (Eijkman, Kendall and Mas, 2011). Wholesalers have higher limits on BEM stored in M-PESA accounts so that they can perform the cash management service for retailers. Retailers typically transact at least daily with wholesalers, depositing cash or withdrawing cash depending on their net intake of cash.

Traditionally, the cash merchant function has been performed by banks that provided customers with accounts and it was therefore subject to banking regulation. Now it is a free-standing business that does not put money of the account provider at risk. In the case of M-PESA, the account provider, in turn, is not part of a bank and unlike a bank it does not use deposits to extend credit. It simply stores and transfers money. Furthermore, the cash provision function is beginning to move from specific in-store cash merchants to general street-based merchants. It is estimated that the cost of providing exchange services through street-based cash merchants is approximately half that of store-based merchants (Mas, 2011).

Beyond the supply of cash, the next stage in mobile banking is the provision of electronic means of exchange. Customers can pay for goods and services directly via the exchange of BEM without the need for intermediating through cash. Companies can purchase and sell supplies through payments made by mobile connections. There is much debate about whether electronic forms of payment are likely to replace cash. One view suggests that this is unlikely to happen in the immediate future partly because of the general acceptance of cash and partly because of the relatively high charges levied on electronic transfers. However, in the medium term the substitution might well occur as the cost of electronic payments falls.

The M-PESA system as a whole has an overall holding of the net deposits from customers. It could just keep this net cash received in a safe but it is required by the Central Bank of Kenya to invest the net balances in regulated banks for safe-keeping. Currently the Central Bank does not allow interest on these deposits to be paid to M-PESA depositors; instead, interest income is covenanted to charity. The M-PESA system is thus compensated for net balances as if they were kept in a safe-deposit box, namely not at all. The function performed is purely safe-keeping and

the Central Bank regulation assumes that it is better to keep the money in a bank than in a safe. To that extent the account provider functions as a collector of deposits for banks but it is not a legal part of a bank and performs no credit business that puts the depositors' money at risk beyond the risk of investing in safe forms of deposits at regulated banks.

The mobile money system that arose with M-PESA thus exemplifies several forms of unbundled services that have traditionally been provided by banks. The question that this raises is what is the appropriate form of regulation of this service? In order to provide an answer one needs to consider the appropriate regulation for each component of the payments system[6]. In the next section we will examine alternative forms of regulation for protecting the different components of the system, namely:

Exchange of different forms of money for one another

Storage of money for safe-keeping

Transfer of money from one owner to another

Investment of money.

3. Financial Disaggregation and Regulation

Some functions need no more than contractual relations determined by commercial law while others need specific forms of regulation. In the following we distinguish between two classes of regulation:

Business conduct regulation encompasses such fields as consumer protection and anti-money laundering measures. The most basic question is whether to rely purely on normal commercial law and the means for redress it provides, in which case buyers of services are at risk and, if hurt, they need to seek redress via normal dispute resolution procedures. However, customers may be

assisted by regulators empowered to set standards for the integrity of system operations and to review their practice. There may be specific disclosure rules and sanctions in case of breach of rules - business conduct regulation tends to have relatively well defined rules and processes with limited regulatory discretion.

Prudential regulation may require more substantial discretion. Core tools are capital adequacy and liquidity requirements, but also rules governing risk-taking on the asset side. For example, regulators may limit credit growth or require certain loan-to-value ratios. They may have views on the riskiness of assets and reflect these in capital requirements or more directly in rules governing certain asset classes. It is a mantra of prudential regulation that it should be rule-based as far as possible but in practice substantial discretion may be required particularly when assessing system-wide risks, namely macro-prudential regulation.

Exchanging forms of money

Most forms of money currently used fall into one of two categories: book entry money (BEM) or cash. When BEM is exchanged for cash, the parties to the cash/BEM exchange get confirmation of the transfer of BEM by SMS from M-PESA and, once that information has been received, the exchange can proceed. The exchange functions of mobile banking can be handled through normal commercial law dictating the contractual relationship between customer and cash merchant, between the merchant and the wholesaler and between the merchants, wholesalers and M-PESA. Beyond this, the pure element of exchange does not raise financial risks requiring the imposition of prudential regulation; on the contrary, every effort should be made to minimize regulation so as to enable competing cash merchants to enter the market. The cash merchant business is one where free entry is, in principle, both feasible and desirable. The main barrier to entry may in many cases be limits on amounts that can be held in accounts of an account

provider like M-PESA, because this restricts the ability to perform cash-in/cash-out services. In the case of M-PESA the cash merchants also act as agent for M-PESA helping with registration of their accounts and performing identity checks required by anti-money laundering legislation. This function requires regulation related to the storage function discussed below.

Monetary concerns arise when competing currencies are issued by different parties, the key concern being whether the monetary authorities lose control over the money supply. M-PESA is not creating money; it is exchanging one form of money (cash) for another (BEM). Nevertheless, by facilitating the exchange and allowing transactions to occur at distance through mobile connections, it may affect the velocity of circulation and therefore the relation between the money supply and nominal output and income. The authorities need to be aware of this and the likely impact of mobile banking on transactions. However, by making transactions more transparent and the determination of aggregate levels of expenditure more readily measurable, mobile banking may make it simpler for monetary authorities to observe and measure changes in the velocity of circulation. The monetary authorities may thus require the account provider, but not the cash merchant, to provide regular information about volume and structure of payment transactions as discussed below under the transfer function.

Keeping money safe

The traditional way of keeping money safe is to store it in a safe place ("under the mattress") and guard it. Modern financial systems allow more sophisticated ways of delegating safe-keeping through for example a safe-deposit box. To facilitate transferring or investing the money, one can delegate safe-keeping by opening an account with an account provider which traditionally has been a bank account but could be an account provided by a non-bank such as M-PESA. A record needs to be created which can either be paper-based or electronic that establishes who owns the account and how access is gained to the account. In addition, an account requires rules on how the records are maintained and how the owner is informed about transactions and the balance on the account.

The key to any safe-keeping function is regulation that assures the integrity of the system and requires procedures to be subject to audit (Makin, 2009). Back-up systems are needed to ensure that account information can be recovered in case of physical destruction or theft. For cases such as M-PESA, the accounts that contain deposits from customers need to be kept separate from the accounts of Safaricom, even though M-PESA is not a separate company. As it happens Safaricom created a special trust to safeguard the accounts and it is important that strict separation is maintained between the accounts of M-PESA and Safaricom so that the custodianship function is kept distinct from the operations of Safaricom. The records associated with the holding of accounts facilitate the imposition of anti-money laundering (AML) regulation (Chatain, Zerzan, Noor, Dannaoui and de Koker, 2011).

In the case of M-PESA the cash merchants perform a function related to safe-keeping, namely registration of the account. They establish the identity of the owner, process the request for account opening and perform checks required by AML regulation. They are thus subject to more regulation than is required for the pure cash merchant function. This means that M-PESA, the "safe-keeper", takes on responsibility to train account openers in requisite procedures like know-your-customer protocols required by AML regulation and to supervise implementation. In principle, however, there is no reason why the account opening function needs to be bundled with the cash merchant function[7]. There could also be different tiers of cash merchants. M-PESA today distinguishes between wholesalers and retail agents with different limits on their accounts. There might also be pure cash merchants with no responsibility for registration, such as the smaller street cash merchants that may be entering the market now. Abroad, cash merchants that facilitate remittances via the M-PESA system also need not perform registration functions or be branded as an M-PESA agent.

Transferring money

Poor people often transport their money themselves or give it to friends or to a bus driver to take to their relatives. Safer and cheaper means of transport are hugely in demand. The issue is

reliability and integrity of the transport mechanism. Prudential regulation is not required for the pure transport function any more than it is for the post office or companies like DHL. The equivalent to the mail in electronic systems is the telecommunications platform and the telecommunications provider may be subject to special regulations arising from consumer protection and competition policy concerns, but specific financial regulation is not required for the movement of money across physical distance.

A special case arises when money is moved across national borders. This may be of concern where monetary authorities seek to implement some form of control on the movement of capital. The reason for concern is not that the physical transport risks require prudential regulation but that local currency may be exchanged into foreign currency. Currency control regulations may thus be an issue and restrict the transfer of BEM across borders but in practice the amount being transferred in systems like M-PESA tend to be below the limits imposed on the transfer of cash or other assets for capital control purposes.

An important feature that mobile payments makes clear is that the payments system can occur entirely outside of the banking system. People communicate directly with each other regarding payments and receipts and an accounting system for recording debits and credits operates independently of banks. There is no requirement for payments to be channeled through a central clearing system. The advantage of this is that it avoids the operation of a banking cartel to clear payments and receipts; it is instantaneous and not subject to the delays of bank clearing systems; and it allows participants to receive immediate records of transactions that enhance trust in the conduct of the parties to a transaction and the organization facilitating the transaction. The bypassing of bank clearing arrangements is therefore a fundamental advantage of a mobile payments system.

The transfer of money requires not just transportation. It requires someone to take the money out of an account and to place it in someone else's account. When a depositor writes a check they provide instructions to their own bank to take the money out of their account and deposit it in the

account of the recipient. They may issue the same instructions using the internet or a mobile phone without use of a check. The account provider of the sender needs to authenticate the instruction and adjust the sender's account and the account provider of the recipient needs to receive authenticated communication that the account is to be credited. The account owners involved need to be informed about whether the instructions have been carried out and they need to receive verification. Systems are thus required to insure the integrity of this process including identification of the parties involved and, depending on the degree of integrity sought, special passwords and other identifiers may be required. To protect information "in transit" varying degrees of encryption may be required and measures to prevent and detect attempts to steal information, for example, via hacking[8]. Over and above normal contractual relations, the form of regulation that is required in relation to transportation is therefore conduct of business. Prudential regulation is not required.

Investing money

The exchange of money, safe-keeping and transfer can all happen without involving lending or other investment. Money may simply be stored in the equivalent of a safe-deposit box, for example, an electronically maintained account. In this case, the money of depositors is not invested and not subject to any investment risk. We may call the account provider who collects the deposits a "deposit-taking" institution, but it does not follow that there is a need for prudential regulation as there is for banks, provided the deposits are not invested[9]. Prudential banking regulation applies to "deposit-investing" institutions, not to purely deposit-taking ones. This is an important issue that is as relevant to developed as developing economies and to which we will return in the final section.

In the case of M-PESA depositors are remunerated as if the money was kept in the electronic equivalent of a safe-deposit box, namely not at all. They bear the risk of loss of value through inflation and do not receive interest. They bear the cost of transferring and withdrawing money. Yet, they clearly find the costs of this system lower than that of the alternative. M-PESA could

keep the net amount of deposits it holds in the equivalent of a box in which case there would be no investment risk associated with payments system. Depositors would hold BEMs, M-PESA would hold the equivalent amount of cash and there would be no risk associated with withdrawals.

In practice, M-PESA invests its net balances in a bank. This was done, because the company in consultation with the Central Bank felt that it would be safe[10]. Interest on deposits was not foreseen originally, because nobody expected that the amounts would be significant but today annual interest of the order of 7.5 million dollars is earned.[11] The Central Bank has now asked M-PESA to diversify investment by depositing the money in two banks and has decreed that the interest should be paid to charity[12].

Compared to a model, where the account provider keeps deposit in a safe-deposit box, M-PESA does therefore perform a rudimentary lending function as banks are free to on-lend the deposits from the M-PESA trust. The risk of such an investment is thus equivalent to the risk of a deposit in banks that are subject to supervision by the relevant regulator. M-PESA acts mainly as a conduit of deposits for banks is and subject to prudential rules, namely to invest money only in safe instruments in a somewhat diversified set of regulated banks. Beyond this no prudential regulation is required as bank regulation is meant to capture any risk-taking by the banks. M-PESA deposits are as good as those in a bank.

In countries where banks are not desirable as hosts it may be preferable not to store money in banks but to choose the equivalent of a safe-deposit box managed by the account provider or a special custodian. Where deposit in banks is allowed or required, regulation may limit deposit options to the safest of instruments and insist on some level of diversification among investee banks. When deposits are kept in the equivalent of a safe-deposit box there is no possibility of bank runs. When deposits collected by an account provider are invested in a bank that in turn lends out the deposits, there is a possibility that the depositors in the account provider play a role in bank runs. This observation brings out the fact that there is no necessary association of a

payments system with banking. Payments systems could be entirely safe and subject to neither the risk of particular banks nor systemic failures of several banks.

The following table summarizes the risks and minimum forms of regulation required of the different components of a mobile payments system:

Function	**Risks**	**Conduct Regulation**	**Prudential Regulation**
Exchange	Fraud	No, just commercial law	No
Storage	Inaccurate records, Theft	Yes, including regulation of agents	No
Transfer	Transmission errors, Accounting errors	Yes	No
Investment	Investment failures, Systemic risks	Yes	Yes

4. Competition Issues

M-PESA was launched by Safaricom, Kenya's telecommunications provider with a market share of some 80 percent of the telecommunications market. M-PESA, in turn, built an exclusive network of currently 23,000 cash merchants that also provide account opening services for M-PESA. Traditional banks lost market share in retail payment services, even though payments through M-PESA currently account for just 2 % of all payments by value flowing through Kenya's settlement system. The dominant position of M-PESA in its market segment has given rise to concerns about excessive market power. In this section, arguments about real and alleged sources of market power are discussed as well as possible remedies through competition policy.

As in the discussion on regulation above, the case of M-PESA provides a useful reference point to explore more general issues of competition policy in payments.

The value of both telecommunication and payment networks grows as the number of participants increases. A new customer conveys a benefit to an old customer by virtue of joining the network, providing a network externality. A money transfer service that services only two small villages is of lesser interest than one that connects all major towns and villages. It may also be possible that a larger network has lower unit cost per service provided. Both network effects on value and cost of service mean that networks have to some degree naturally monopoly characteristics. This implies that one large company may be the most efficient way of providing the service. Alternatively, interconnection protocols between different providers may be able to reap the benefits of network externalities, if not necessarily the cost advantages.

In a mobile payment system like that in Kenya, network effects with natural monopoly potential arise in the underlying telecommunications market and in the provision of the payment platform. Consider first telecommunications. In most countries, just a couple of decades ago, telecommunications services were still granted legal protection to protect their monopoly against new entrants to prevent inefficient duplication of network infrastructure. The Philippines at one stage provided a rare example of where competing companies offered fixed-line telephone service. People needed to conclude contracts with all the firms and maintain multiple phones if they wanted to be able to call all others with a phone. Today, the default setting is to allow entry into the telecommunications business but to require interconnection among service providers. Kenya is a case in point; the telecom regulator requires interconnection and sets access charges between telecommunication networks. Hence the basic policy to promote competition exists and so does the regulatory system to implement it. Competing mobile telephony providers can enter the market and are free to offer phones with SIM cards or other solutions.

For such a mobile payment mechanism to function customers need to be able to exchange cash for BEM on demand. This means there need to be cash merchants with adequate balances of

both forms of money. The system will only take off, if the merchants are there and the merchants, in turn, will only be there, if the system takes off. This "chicken and egg" situation arises in industries that need a critical scale of complementary services. For example, in the early days of the gas and electricity industry, energy providers also offered household appliances such as stoves that could be fired with the new energy source. Without the appliances, there would have been insufficient demand. Gas and electricity networks exhibit natural monopoly characteristics on grounds of marginal costs falling with size. However, the complementary business of making and selling stoves is not a natural monopoly but a complement that can eventually be provided in competitive markets independent of the energy companies. So it is with cash merchants: competing cash merchants may offer their services, but to get the market to develop in the first place, M-PESA felt the need to establish a cash merchant network in parallel with providing accounts and transfer services.

Today, anyone with an M-PESA account can in principle provide cash-in/cash-out services. Such cash merchants can, in turn, seek the requisite liquidity in cash and BEM balances from their bank. But independent cash merchants may not register new M-PESA customers and it remains to be seen whether such independent merchants will emerge.[13] Moreover, any new (non-bank) firm offering payment services is free to set up a distribution network to compete with that of M-PESA. In fact, several telecommunications companies are currently pursuing varying solutions, including Airtel under the brand name ZAP and Orange in conjunction with Equity Bank. These telecommunication companies have the resource base to fund the set-up of new distribution networks, if they choose to. Each is pursuing a different approach to developing a mobile payment mechanism; for example, ZAP charges for transfers only, not for deposits or withdrawals and leaves that to cash merchants who need to be paid directly by customers, and not via the account provider as in the case of M-PESA.

In Kenya, non-bank companies like M-PESA are allowed to conclude exclusive agreements with the members of their distribution network. This helps them provide a customer experience that inspires trust. Banks have recently been allowed to establish agent networks as well but they are

not allowed to require exclusivity from their agents and further restrictions apply, for example, that the agent must have other businesses than banking, say, a petrol station or a retail store. This constrains banks unduly. Entry into the distribution network can be competitive since there is no (local) natural monopoly involved as one might argue for in the case of supermarkets in some circumstances. It is hard to see how a new bank distribution network is truly attractive when any other account provider can piggyback on the facilities. To compensate the investing bank for its costs and risks, regulators might, of course, decide to set "access prices" for use of agents by other account providers but, as discussed below, this would seem unnecessarily cumbersome and impractical for now.

When customers have accounts with different providers, interconnection issues arise. In the case of M-PESA the basic system transfers BEM only between account holders at M-PESA. It is possible to send money to a person who does not have an account with M-PESA but that means an SMS is sent from an account holder to, say, a relative without an account. The relative then goes to an M-PESA cash merchant and the SMS provides a code that authorizes the merchant to transfer money from the sender's account to herself. She then pays out the equivalent amount in cash to the designated recipient. The BEM is only transferred within the M–PESA accounting system.

People in Kenya can also move money from bank account to bank account by transferring it first from their bank account to M-PESA, from there to another M-PESA account holder and from there to that person's account in a bank. The process may be cumbersome and costly, but it is already a basic option for interconnection of accounts. The fear of the banks is that the costs of the system will lead more and more users to desert them and just use M-PESA. Banks, like Equity Bank, which count money transfer as one of their major business lines, are, indeed, under some threat. If such banks cannot improve on M-PESA's business model, their response may need to focus on services that M-PESA cannot offer, notably lending and other investment services. While, the current system does not provide for direct transfers between bank accounts or between M-PESA accounts and bank accounts, technically this could be done. Banks could

agree to adhere to a payments platform that enables this. The platform could be provided by a consortium of banks or a third party provider, possibly M-PESA.

A range of competing solutions for alternative payment platforms is conceivable. The account providers that are party to the system need to agree on protocols that govern authentication, verification, encryption etc. The processes would be enabled by features on the technology devices that support the system. If one wants to work with a combination of magnetic strip cards and point of sale (POS) terminals, the challenge is like that of credit cards belonging to a system such as VISA or Master Card issued by different banks. If one wants to use mobile phones the supporting software could be embedded in the SIM card of a "traditional" mobile phone.[14] Alternatively, phones could dial into a system interconnecting the account providers, for example, using USSD protocols, the equivalent of using an SMS for messages; for example, some banks in Kenya are trying to develop such a system right now to compete with M-PESA. This would be less secure than using SIM cards and may suffer from interruptions in phone service thus leading to aborted/incomplete transactions. When new smart phones become affordable, applications (applets) could be loaded onto the phones that interconnect all account providers that agree to the required standards of an application provider. This then raises other forms of concern about hacking into applets or phishing. The smart phone solution, in particular, shows that the platform for interconnecting account providers can be completely unbundled both from them and the telecommunications company. In Kenya, as elsewhere, the market is open for such competing mobile payments solutions.

Voluntary interconnection between account providers is feasible, but it may not happen, because of diverging business interests. For example, M-PESA has built out a new system including cash merchants at great expense and it would need to be compensated for the costs incurred when providing access to its own systems. Negotiations about access to the system may simply fail because the parties cannot agree on the required system changes and charges for access to the platform. Nevertheless, M-PESA has entered into collaboration with Equity Bank in Kenya. Under the brand M-Kesho, Equity Bank provides, for example, interest paying saving accounts

and loan products via the M-PESA account system and cash merchant network that M-PESA itself cannot provide. Strains have, however, arisen as Equity Bank is also collaborating with Orange in its own branches. It remains unclear whether Equity Bank can effectively leverage M-PESA's distribution network and how to avoid extra regulatory complications when M-PESA cash merchants play a role in offering bank products.

The question for policymakers and regulators is whether to impose rules on market participants that lead to greater connection among account providers or whether to let matters develop so as not to interfere with incentives to innovate given the rapid technical developments and the difficulty in assessing fully the consequences of regulatory action.

Regulators have two basic potential tools: setting standards for interconnection and mandating interconnection. Setting standards based on currently existing technology is possible. Yet, by the time agreement is reached, technology will have moved on. Standards would thus need to be technology-neutral as best as possible focusing only on basic requirements for authentication, communication protocols and verification. While, it may be hard to foresee all the issues that may arise when new technology enables completely new ways of conducting business, an ongoing process of consultation between regulators and private providers would seem useful.

Mandating interconnection can happen in two ways. Regulators may set interconnection charges or they may unbundle the provision of platform services from the provision of accounts. Doing so is hard in practice. Setting interconnection charges among competing account providers ("two-way access pricing") is conceptually hard. Theory exists only for relatively simple cases and even if it was clear conceptually, it would be hard to agree on costs and the unavoidable discretion involved in allocating them across different services. In a case like M-PESA, setting the access price involves cost estimation and allocation judgments across the telecommunications business and the account provider. It thus raises issues of where the domain of the telecom regulator intersects with that of the regulator for the account provider. If the payment platform is also unbundled, complexity potentially increases still further.

In payment systems it is not unusual to find competing public or private payment mechanisms but nowhere have regulators forced banks to unbundle payment platforms (Holthausen and Rochet, 2003)[15]. Mandated interconnection and associated access price regulation remains a controversial topic worldwide. In the end there needs to be a judgment whether the complexity of a regulated solution for interconnection is worth the risk of undermining progress already achieved and stifling further innovation. So far, only one country, Kenya, has achieved break-through progress. It is hard to argue that tough regulatory action is needed to solve the "luxury" problem of perfect mobile interconnection of all account providers. In a market with fast-moving technological solutions, the main check on market power may best come from new disruptive technologies rather than from attempts to limit market power through regulation or anti-trust policies.

Firms eyeing the mobile payment market need to have incentives to try out new solutions and to invest in distribution networks. If they can expect that, once successful, they will be forced to share their success with others without being sure that they are adequately compensated for their investment as well as the risks they incurred then they might be unwilling to invest in the first place. Moreover, mobile technology is evolving very fast by any historical standard. More likely than not, a few years from now, new superior competing solutions will be found and compete with the early movers like M-PESA. Successful early entrants may obtain high returns for a few years, but that may be necessary to compensate them both for the original risk they took and the fact that they bet on a solution that will be outmoded just a few years later. The core tool of competition policy for mobile money systems is entry by new competitors. What is clearly counterproductive is legal barriers to new entry, for example, in the form of exclusivity periods for incumbent providers. Free entry provides the strongest incentives to develop new business models if entrants can devise their own pricing structures.

Pricing services for poor people may attract special scrutiny and views about a fair price may push regulators to interfere with commercial decisions. One view holds that the poor should not pay much, the other that what they and others pay should be related to cost. In the case of M-

PESA the costs of sending and withdrawing money may in a number of cases reach or exceed 10 percent of the amounts sent, a high price but, judging by demand, clearly cheaper than the alternative.

M-PESA's prices for individual services are not individually cost-based, but seem related to demand. For example, there is no charge for depositing money. The fee for withdrawing money pays for the cost of the checking account. Many people see this as acceptable or fair as they associate the withdrawal fee with the transport fee they would otherwise have to pay. It could also be efficient as deposit-making is discretionary ("elastic"), whereas withdrawing funds may be a necessity ("inelastic") to meet payment obligations. Such pricing structures may well be the most efficient way to offer service.

Competition limits the scope for demand-based pricing. As one company raises prices for inelastic customers, another company can offer the same service at prices closer to cost. Competition thus limits demand-based pricing and combines considerations of fairness and efficiency in a flexible manner without price regulation. It is tempting for regulators under political pressure to interfere in commercial pricing decisions but the cost may be reduced access. Both price ceilings of some sort and regulation aiming at cost-based pricing can undermine the goal of achieving financial inclusion.

5. Conclusions

The example of M-PESA in Kenya has demonstrated the power of unbundling traditional banking services in order to reach poor people. The fundamental choice for policymakers and regulators is whether to allow such unbundling to proceed and what regulatory intervention, if any, is necessary. By allowing M-PESA to experiment, Kenyan regulatory authorities have provided a great deal of insight into new possibilities and consequences for regulation.

What mobile banking illustrates in a stark form is the way in which payments systems can be disaggregated into component services, namely exchange, storage, transfer and investment.

Regulation should mirror this and be structured by service rather than along traditional institutional lines, like a bank. The question then is what type of regulation is appropriate for each type of service.

Cash merchants provide cash-in/cash-out services by exchanging cash for BEM. They trade with their own property and do not impose risks that are different from other types of normal merchants. Reliance on normal commercial law governing merchant transactions may be appropriate and pure cash merchants should be free to enter the market and charge market-based fees for their services without special regulation.

Concepts like "agents" need to be treated with care. In traditional bank regulation, the use of the word "agent" tends to imply coverage by banking regulation. In unbundled systems, principals may contract with agents to carry out functions on behalf of the principal. The regulatory treatment will be dependent on that of the principal and if the principal does not perform functions which require prudential regulation then nor do agents. By the same token, agents may need to be covered by special regulations when this is required for the function they fulfill on behalf of the principal.

Account providers offer safe-keeping and transfer services. System integrity is an issue. This may entail disclosure requirements, including, for example, standards for informing depositors about balances held and transactions carried out, and regulators may review system operations with a view to supporting integrity. Prudential regulation is not warranted as long as account providers do not invest deposits. When account providers delegate certain functions like opening accounts, regulators may require rules assuring operational integrity. For example, M-PESA delegated identity checks for account opening to cash merchants and these are subject to rules which regulators need to review. Platform providers link different account providers and allow their customers to transfer money from accounts with one provider to accounts with another. Here again operational risk is crucial and regulators may need to inspect operational integrity. Prudential regulation is not applicable.

Conduits for deposits (or deposit aggregators) collect deposits and invest them in banks. Here a basic level of prudential regulation is required. Regulators may need to determine the types of assets the deposits can be invested in, for example, only low risk deposits at banks. Regulators may also determine which banks are eligible and impose diversification requirements so that funds are spread over several banks. Regulators need to take a view on whether interest earned on bank deposits can benefit the depositors of the conduit. In principle, this seems unproblematic and it could be reflected in payment of interest or lower fees. Policymakers can also decide whether to make small deposits that end up in banks via conduits subject to deposit insurance, including deposit insurance fees.

The processes of exchange and transfer raise particular sets of issues concerning interoperability between different service providers that are distinct from transmission involving telecoms. Competition is critical for ensuring that services are provided at lowest cost but the determination of costs of interconnection is complex and if imposed too rigidly and early may discourage the upfront investments that are required to encourage innovation and the entry of new providers.

Investment in technology platforms for storage of information regarding accounts and transactions that are separate from the mobile providers may facilitate the determination of interconnection rules that are simpler than those associated with a bundled supply of account and transmission systems. However, the imposition of interconnection rules in relation to specific technologies may discourage investment in these new technologies.

In general, it will be efficient to allow relative prices for various payment related services to be set on the basis of demand. Furthermore, it may be efficient at least in the short-run to allow consumer surpluses to be exploited to finance upfront investments. In the longer term as technologies become established then a move to cost-based pricing in the aggregate (but not for relative prices) may be appropriate but an excessively rapid shift in that direction may delay the introduction of the technologies which would allow this to happen.

A special case is the development of cash exchange outlets. So long as cash remains a critical part of the system then the establishment of a network of cash merchants to exchange cash and BEMs will be central to the functioning of the payments system. A network is both expensive and time consuming to develop and the ability of service providers to have exclusive relations with merchants may be necessary for them to invest in the creation of such networks. A requirement for competitors to be able to access a merchant network on particular terms or for merchants to act as agents of more than one service provider may limit the development of the agency network. We thus question policies that restrict exclusivity of agent networks. Moreover, new entrants into the account provision and transfer market are always free to establish competing networks and anyone can, in principle, set up a merchant business.

When services are unbundled and no longer part of a traditional bank the question arises as to which organization should regulate them. Financial regulators are the most competent for banking and financial services, and depending on the country prudential regulation and business conduct regulation may be under the same roof or carried out by different agencies (the "twin-peak" model of regulation). However, where competition issues arise in network industries, it is typically sensible to allocate responsibility to sector-specific regulators. Special rulings on matters like interconnection pricing and rulings on exclusivity arrangements may be better made by sector-specific regulators that have a grasp of the technical and organizational intricacies of the problem at hand. In some cases the regulatory system may require co-ordination between several different sector-specific regulators, for example when co-coordinating registration requirements for SIM cards and accounts. Most of the time, rulings by telecom regulators on competition issues in the telecom network and rulings on competition in the payments network by financial regulators can be made separately but some level of consultation about the nature and timing of decisions may be required.

Beyond financial inclusion, the M-PESA experiment provides important insights into the regulation of financial services in developed economies. There is an active debate in the UK and US amongst other countries about the separation of commercial and investment banking and

whether commercial banking should be regulated as a utility and required to invest in low risk assets distinct from investment banking. One of the arguments for this is that commercial banking is the beneficiary of publicly provided deposit insurance and should not be used to cross-subsidize investment banking. A second argument is that in the event of failures, as observed in many countries around the world over the last few years, governments are frequently called upon to bail out their banks. This comes at the expense of taxpayers and not only should the likelihood of this be minimized by limiting the degree of risks taken by banks but in addition the core parts of the banking that need to be rescued should be separated from the remainder so that special resolution procedures are easier to implement.

The issue that mobile banking in Kenya raises is what is meant by the core part of banking. What M-PESA clearly demonstrates is that a payments system can operate entirely independently of a banking system. Indeed given the cheapness, speed, convenience and transparency of payments transacted by mobile phones, it is very likely that in due course similar technologies will replace the bank clearing systems that exist in developed economies. The borrowing and lending functions of banks can therefore occur independently of payments. Individuals can have access to payments and custody systems without, as this article has demonstrated the need for prudential regulation. The payment system can therefore be operated with virtually no risk to the tax payer. With the mobile payments system offering full liquidity and security outside of the banking system, the conventional functions of banks of performing liquidity and maturity transformation become less critical for the financial system as a whole. Individuals can allocate some of their savings to transactions outside of the banking system and then determine their savings in more illiquid and longer assets separately. In other words, the public good aspect of banking, namely the payments and safe custody functions are removed from banking and operated by other service providers that have little or no risk associated with them. This suggests that not only does mobile banking clarify the nature of financial regulation in developing countries but it also sheds important light on the real sources of market failure and regulatory requirements in developed countries as well.

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[1] Rotman S. (2011), “Branchless Banking in Brazil” CGAP technology blog, Feb 5

[2] The data reflect information available at January 12-14, 2011

[3] The way people are using M-PESA is analyzed in Jack and Suri, 2010.

[4] New draft regulations on electronic retail transfers issued by the Kenyan Central Bank in February 2011 use the term “cash merchant”.

[5] SIM cards are the Subscriber Identification Modules of GSM phones.

[6] Generic regulatory issues for mobile payment schemes are discussed in Lyman, Pickens and Porteous, 2008, Porteous, 2009, Tarazi and Brefloff 2010, Dias and McKee, 2010 and Alexandre, Mas and Radcliffe, 2011. The Basel Committee on Banking Supervision issued a broader report on microfinance activities in August 2010.

[7] In the case of M-PESA the company itself may have a business interest to establish identity so as to ascertain that an individual who wants to send money to a recipient pays this into her own account rather than the account of the recipient, which would avoid the transfer fee.

[8] Makin, 2009 explains how M-PESA adopted good practices of credit card schemes to ensure adequate encryption

[9] In a similar vein the Basel Committee on Banking Supervision states in its report on “Microfinance activities and the Core Principles for Effective Banking Supervision” (August, 2010): "As long as …the [cash] collateral is not intermediated, there is no risk to the “depositor” and this activity should not trigger prudential oversight.”

[10] For an account of the genesis of M-PESA viewed from the perspective of the Central Bank of Kenya see Kimenyi and Ndung’u, 2009.

[11] Oral communication by Michael Joseph, former CEO of Safaricom, January 12, 2011.

[12] Kenya’s new regulation of e-money requires non-bank account providers not to pay interest, but gives them the option of deploying the interest earned on deposits in banks, for example, to reduce fees.

[13]Such merchants have emerged outside Kenya where they facilitate cross-border remittance payments using M-PESA.

[14]This would put the telecom company that controls the SIM card in the driver's seat. At some future date it is conceivable that the SIM card itself would be an unbundled platform with access rights beyond the telecommunication company (Makin, 2009).

[15]Brazil has mandated a limited form of interconnection of payment platforms by requiring all banks to accept a special payment instrument. This instrument may also be used by authorized retail outlets that perform cash-in/cash-out functions. In Brazil, the cash merchants are set up as agents of banks and use points of sale (POS) terminals, not mobile phones. A retail agent for one bank can thus effect payments to and from the account of another bank.