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Mobile Money

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Abstract

This review provides an overview of the operations and impacts of mobile money in the developing world. Over the past decade, mobile money has become a ubiquitous tool in some developing economies, allowing individuals to digitally transact money without formal bank accounts. The impacts, where documented, have been sizeable: For example, poverty decreased by two percentage points in Kenya. However, adoption still lags in many economies and, even where there is universal adoption, product innovation over the rails of these digital accounts has been slow. The review concludes by discussing what the future of mobile money in developing economies may look like and, thus, where the most exciting opportunities for research may be.

1. INTRODUCTION

The mobile phone has been among the most rapidly adopted innovations in the world, with SIM cards and airtime (prepaid phone minutes)[1] being ubiquitous now in many economies. This is particularly true in developing economies: As of 2015, India already had 1 billion (**https://www.gsmaintelligence.com/topics/3363/dashboard/**) and Sub-Saharan Africa 747.4 million subscribers (World Development Indicators, available at **http://data.worldbank.org/indicator/IT.CEL.SETS?year_high_desc=true**). A large body of literature shows the benefits of mobile phones (see Aker & Mbiti 2010 for a review), with specific studies showing that communication via text can affect credit repayment (e.g., Karlan et al. 2012), savings behaviors (Karlan et al. 2016), adherence to medicinal treatments (for one example among many, see Lester et al. 2010), and voting behavior (e.g., Marx et al. 2016). The expansion of mobile phone markets and networks has been accompanied by innovations that add substantial value for and provide beneficial services to customers, in particular, financial services that were previously inhibited by poor infrastructure and high transaction costs. This review focuses on one of the most celebrated innovations in the context of developing economies: mobile money.

The most prominent and best-known innovation adding service over the mobile phone has been mobile money. Mobile money enables mobile phone owners to deposit, transfer, and withdraw funds without owning a bank account. It is therefore distinct from mobile banking, which allows access to one's existing bank account via a mobile phone. Mobile money is an app in the true sense of the word because it operates via software that is installed on a SIM card, although it is typically run on regular phones rather than smartphones.

Mobile money has been adopted widely and quickly across the developing world. **Figure 1** shows the adoption of mobile phones worldwide in 2014, and **Figure 2** shows the dramatic growth in their adoption between 1990 and 2014. **Figure 3** shows the worldwide adoption of mobile money as of 2014. Early deployments of mobile money systems started in the mid-2000s, with the Philippines, Kenya, and Tanzania being among the first countries to use the service. Since then, this innovation has spread quickly across the developing world.

By the end of 2015, a total of 271 mobile money services were being offered in 93 countries (51 with regulatory frameworks), from Argentina to Zambia, with another 110 services planned in the near future (GSMA 2015). In 19 of these countries, there were more mobile money accounts than bank accounts, and 37 of these countries had at least 10 times as many mobile money agents as bank branches. Sub-Saharan Africa accounts for 52% of all live mobile money services. By the end of 2015, there were also 411 million registered mobile money accounts across the world (all in developing economies, 222.8 million in Sub-Saharan Africa alone), 134 million of which recorded at least one transaction in the 90 days preceding the collection of the data. On an average day, 32 million transactions were completed, more than twice the amount of PayPal transactions processed across the world. Similarly, as of 2015, there were a number of cross-border mobile money remittance initiatives across 29 corridors that connected 19 countries (GSMA 2015). The most successful and well-known mobile money product was launched in 2007 in Kenya by one of the main telecommunications companies in the country, Safaricom. The product is called M-PESA, M referring to mobile and *pesa* being the word for money in Swahili. M-PESA has reached almost universal coverage in Kenya.

[1]About 95% of connections in India are prepaid, as are 97% in Kenya, 98% in Tanzania, and 74% in Brazil (Davidson & Leishman 2016).

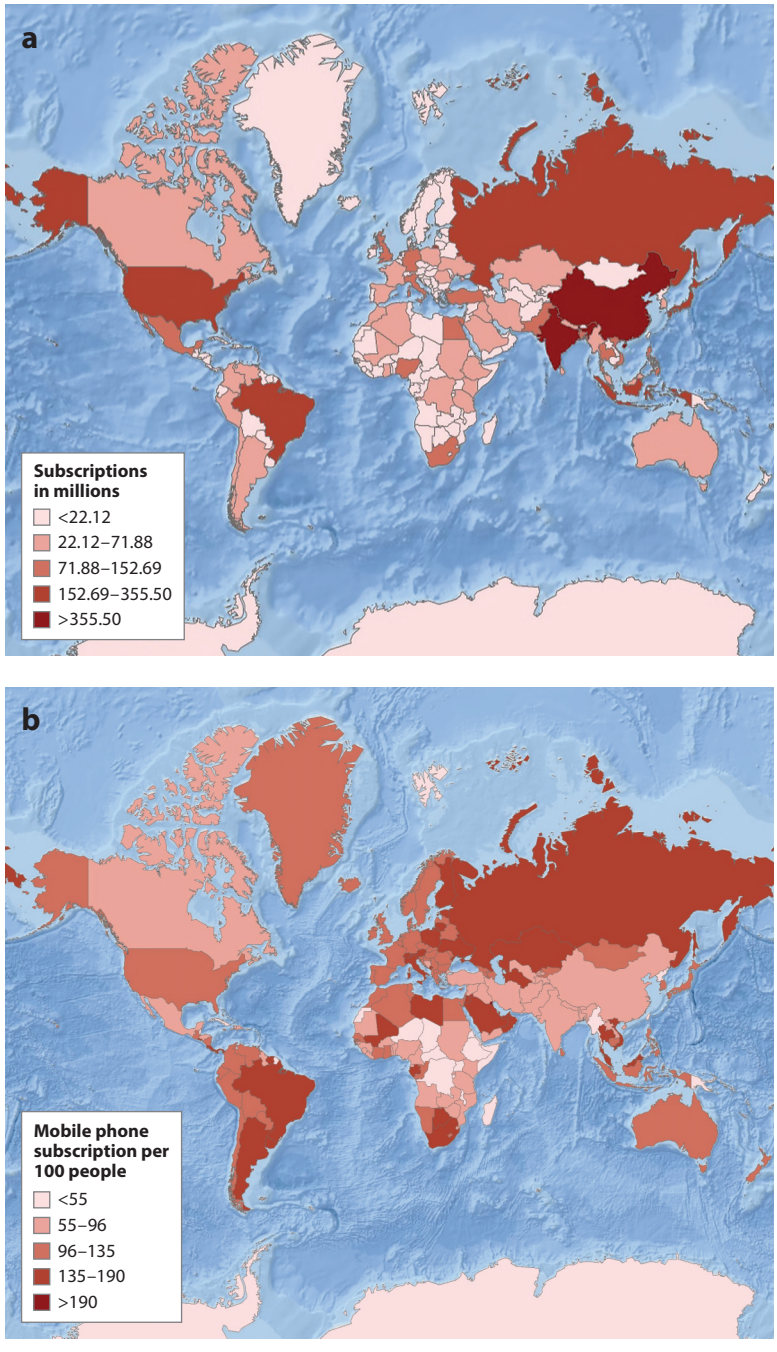

Figure 1

Mobile phone (*a*) subscriptions and (*b*) subscription rate, 2014.

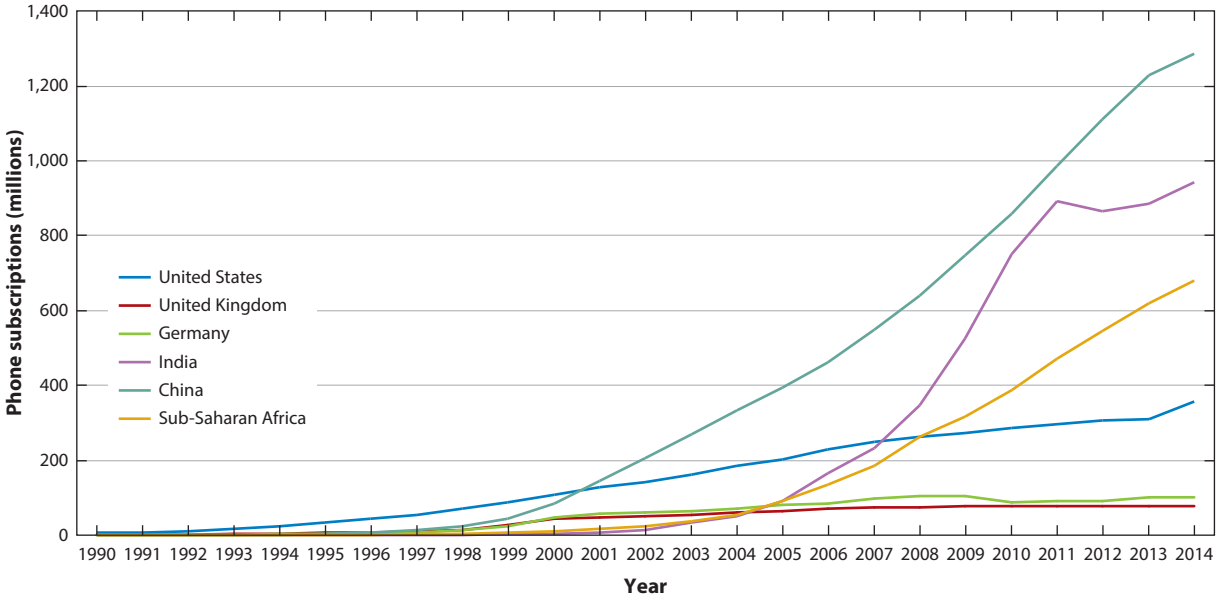

Figure 2

Mobile phone subscriptions, 1990–2014.

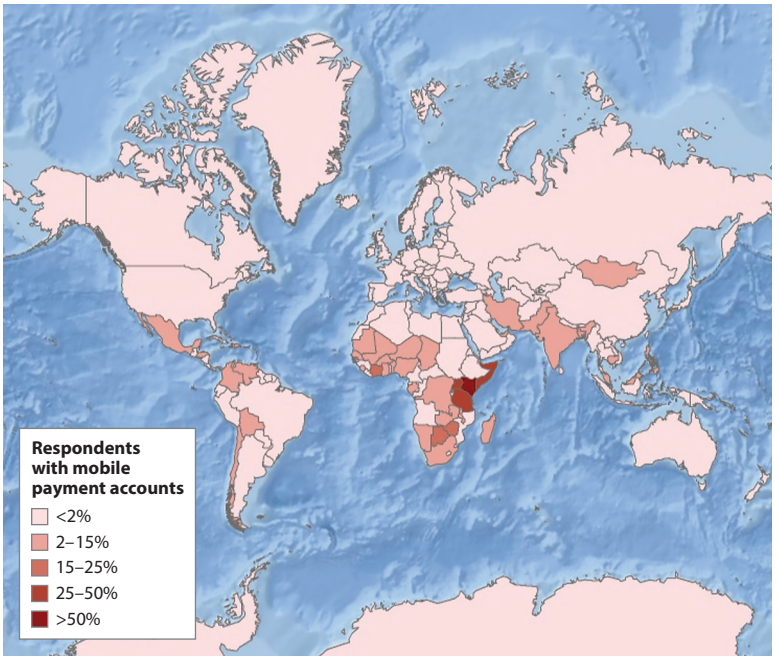

Figure 3

Mobile payment account penetration, 2014.

The aim of this review is not to provide a comprehensive review of all aspects of mobile money,[2] but rather to highlight the economics behind the product: what may have driven its adoption and what are its impacts. Given the success of M-PESA, a large volume of the research discussed in this review focuses on Kenya, although there are some more recent studies of mobile money systems in other countries that are now catching up. Toward the end of the review, I also discuss the more recent innovations that build on mobile money systems to deliver additional financial services and value. Although these innovations exist, they have not given rise to a thriving fintech[3] sector. I therefore also discuss what the constraints to their growth have been, what this implies for the future of mobile money in developing economies, and where the most exciting opportunities for research may be.

The rest of this review is structured as follows. Section 2 describes how mobile money works in practice and provides a brief description of the regulatory innovations that have accompanied its expansion. In Section 3, I discuss the adoption of mobile money and outline the business models that have typically contributed to its success (or lack thereof). In Section 4, I discuss the impacts of mobile money, especially on financial resilience, and how the product's capacity to reduce transaction costs for internal remittances has contributed to these impacts. In Section 5, I describe the few innovations that have followed the initial expansion of mobile money, with a focus on East Africa, where adoption is almost universal. This section also discusses why few services have successfully built on mobile money—a phenomenon that highlights how mobile money systems remain very far from being true payment systems. I speculate on what may be needed to unleash further financial innovation.

2. HOW MOBILE MONEY WORKS

Mobile money is not mobile banking—it is a distinct product. It is most often provided by telecommunications companies, henceforth telcos (exceptions are B-Cash in Bangladesh and Splash in Sierra Leone[4]). Mobile money systems, therefore, lie outside the formal banking system and have often been referred to as shadow banking systems (for a definition of a shadow banking system, see Bernanke 2012). From the point of view of the consumer or user, the mobile money system is a payment account that sits on their mobile phone. It operates through a menu on their SIM card and allows them to engage in a variety of financial transactions.

In the initial stages of mobile money, the focus was largely on allowing consumers to make person-to-person (P2P) payments digitally without needing a bank account or a wire transfer. As mobile money expanded its purview, consumers were able to use it to pay their bills (including utilities), to store and hold money (i.e., save), to make person-to-business (P2B) payments, to receive payments from businesses (such as wages), and to receive government-to-person (G2P) payments.

Mobile money works very simply. On the consumer side, the consumer first shows up at a mobile money agent to register, the equivalent of Know Your Customer (KYC) banking rules. They register for the service with a government-issued ID (in some countries this is the ID used for voting).[5] This process takes a few minutes (as opposed to opening a bank account, which

[2]Aron (2015) provides an excellent review that is more detailed, including on the macroeconomic impacts of mobile money and its regulation.

[3]Fintech refers to financial technology, encompassing all technologies that are related to the finance sector.

[4]These two implementations of mobile money are by private entrepreneurs that negotiated with all of the telcos in each country.

[5]In many countries, one needs to show an ID to get a SIM card.

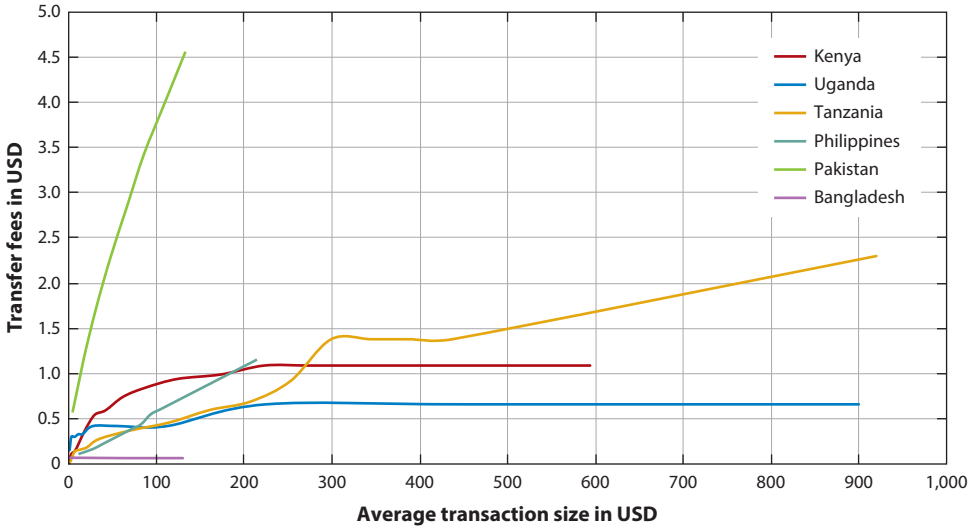

Figure 4

Transaction fees for Kenya, Uganda, Tanzania, the Philippines, Pakistan, and Bangladesh.

could take days or weeks). To be able to make any payments from their account, a consumer must deposit cash into it. They do this at any mobile money agent in the country. They give the agent the cash and immediately get a notification that cash has been deposited in their account. From there, they can use the menu on their mobile phone to transfer that money to anyone else in the country with a cell phone via their phone number. To get their cash back, they have to return to the agent. Each of these transactions (depositing is often an exception) incurs transaction fees; of course, the transaction fee schedule varies across countries. **Figure 4** shows the transaction fees for transfers across a selection of different countries.[6] The consumer side is, therefore, quite simple—a mobile money account is superficially very similar to a bank account, allowing deposits, withdrawals (a number of banks in the developing world impose withdrawal fees, especially for low-balance accounts), holding money, and making transfers to other individuals. However, there is no interest paid on deposits, and the deposits and withdrawals are done through an agent for the mobile money service and not a bank branch.[7] In addition, other standard bank services, such as loans or standing order payments, are generally not available through mobile money.

Although the consumer side of mobile money feels similar to a bank account, it is not. The back end of the system and how it operates are quite different. The money in a mobile money account is called e-money (or electronic money) and always trades one for one with cash (minus the transaction costs for the particular transaction being conducted). When a consumer deposits money in their mobile money account, they are in fact purchasing the equivalent value in e-money from the agent. This means that the agent must hold a stock of e-money that they can then trade with the consumer. Similarly, if the consumer wants to withdraw money from their mobile money account, they are selling e-money to the agent for cash of the equivalent value

[6]I chose these countries because they have the most successful deployments of mobile money for which tariff charts were publicly available.

[7]In Kenya, withdrawals can also be made from an ATM, although this was added to the suite of services provided by M-PESA some time after the launch of the product.

(minus the transaction cost). The agent's primary role is, therefore, to manage their float or inventory of e-money as they would their inventory of any other commodity they stock.

Most of these agents are either existing businesses that sell airtime and phones or small retailers such as basic grocery stores, petrol stations, chemists, or tailors. As of December 2014, there were about 2.5 million agents globally, with the network growing at 25.2% annually (GSMA 2015). Agents always have an existing business and provide mobile money services as an addition to their regular business. The requirements to become an agent vary across countries. In Kenya, for example, potential agents need to apply to Safaricom, the operator of the country's main mobile money service, to become an agent (see Jack et al. 2010 for more details on the evolution of the agent system in Kenya). Applicants have to have a bank account and an Internet connection to be considered, and, if they are approved as agents, they have to purchase an initial quantity of e-money valued at $1,000.[8] They can then trade this e-money as they would any other commodity of which they hold inventories. If they run out of e-money, they go back to Safaricom to purchase more, and if they run out of cash, they can sell e-money back to Safaricom. Since 2009, Safaricom has allowed banks to be agents to the agents, so that agents can trade cash and e-money back and forth with bank branches rather than only with Safaricom. Agents are a core part of the M-PESA model, as they provide consumer cash-in and cash-out services, i.e., they serve as the ATM equivalents for M-PESA. Therefore, the extent of the network of these agents is crucial. **Figure 5** shows the initial distribution of M-PESA agents in 2007, when the service was launched, as well as the subsequent agent expansion through 2015.

Aside from consumers and agents, there is a third component underlying the operation of mobile money: what happens to the money itself. The cash deposited in M-PESA accounts is ultimately held in trust accounts, which are administered by a small number of commercial banks in Kenya. The trust accounts are owned by the M-PESA account holders—think of each M-PESA account holder as having rights over a small sliver of one of these trust accounts. However, the account holder cannot deposit or withdraw money from their M-PESA account at the commercial bank that holds a trust account (unless the bank branches are themselves M-PESA agents). The account holder can only deposit and withdraw money from an M-PESA agent. Similarly, an individual's M-PESA account is not considered to be a bank account—it does not earn interest, and loans are not available to users.[9] However, the trust accounts often earn interest, as they are accounts in the commercial banking system. Given this structure, the mobile operator with which the mobile money account is held is itself not subject to the same regulations under which commercial banks or other deposit-taking institutions conduct business.[10]

2.1. Regulation of Mobile Money

On the regulatory side, mobile money has required some innovation to build the necessary governance and institutions. For example, in the case of Kenya, when M-PESA started growing, a number of the commercial banks lobbied the Central Bank of Kenya to restrict and regulate it more heavily. These efforts were largely unsuccessful, as an audit by the Central Bank revealed few issues and user satisfaction surveys were extremely positive. However, this was soon followed by

[8]More specifically, agents must be registered as a limited company and have traded for at least 6 months. The investment required is approximately $1,000 per outlet for float and $1,000 worth of SIM card replacements.

[9]As I discuss in Section 5, more recently, M-PESA has created partnerships with banks such that loans are available but come from the partner bank and not from Safaricom.

[10]In some countries, such as India, mobile money accounts must be delivered in partnership with a bank and are thus subject to the same regulatory requirements as traditional bank accounts.

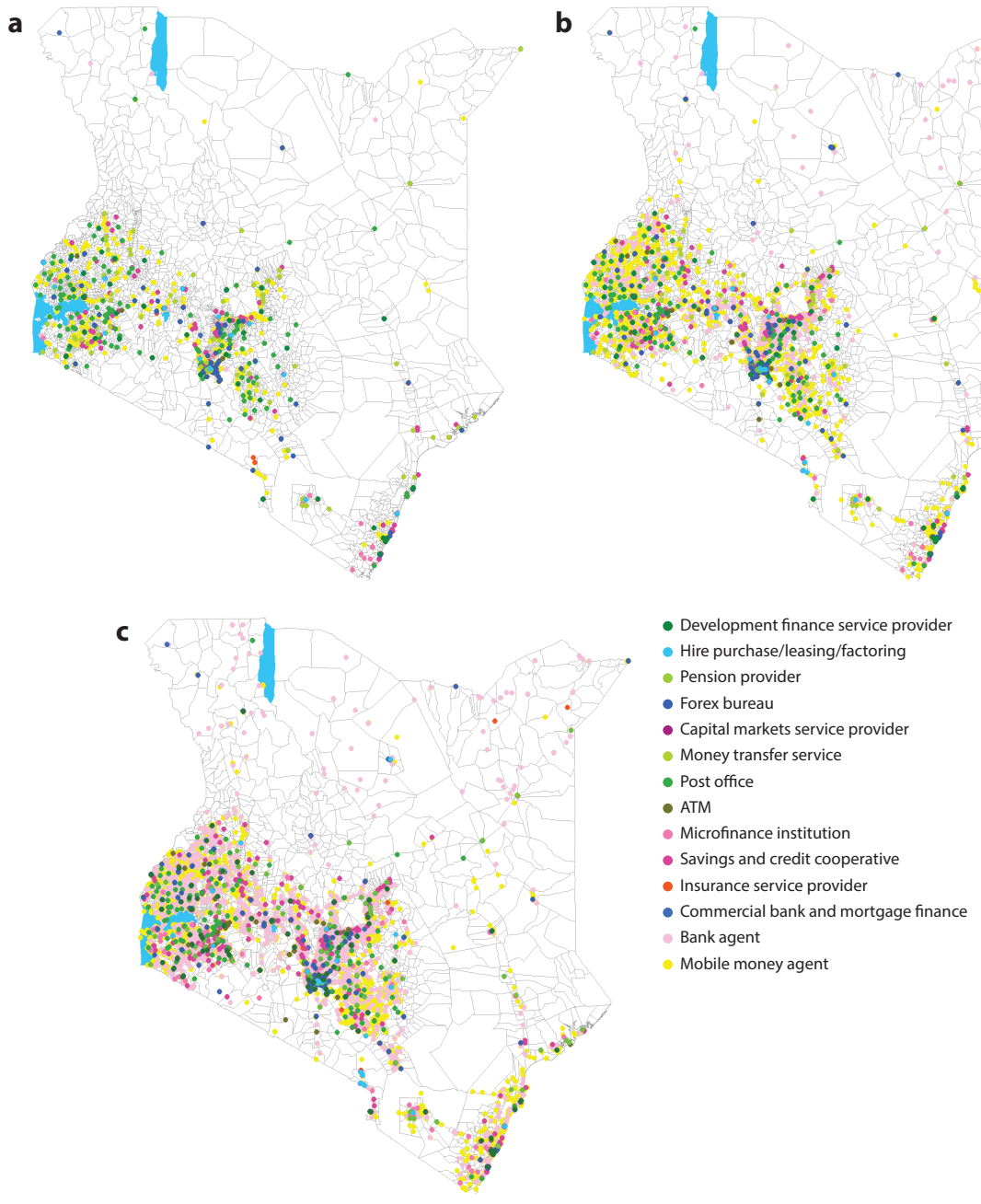

Figure 5

Agent density in Kenya in (*a*) 2007, (*b*) 2011, and (*c*) 2015.

the Central Bank implementing agent banking regulations in 2010, which allowed banks and other financial institutions to offer some banking services (account opening, deposits, and withdrawals) at nonbank agents, the same agents targeted by M-PESA. Banking institutions, previously limited to expensive brick-and-mortar operations, were therefore allowed to compete more directly with mobile money.

Aron (2015) provides an excellent review of the regulatory side of mobile money systems, including how the regulation for mobile money may need to be unbundled at the level of the component systems and how regulation should be built around each of the components (such as customer registration, exchange and storage of e-money, foreign transfers, and interoperability). In this section, I touch on only the main innovations in the regulatory system that have emerged from the advent of mobile money.

Most countries have created their own regulatory frameworks around mobile money, but there are many common elements. The first is the requirement to report on aggregate transactions (and sometimes high-value individual transactions) to the regulator in charge (this is often the Central Bank but may also include the Communications Commission). Often, there are limits on transaction sizes and the amount that can be held in a mobile money account; for example, in Kenya, these limits are $700 and $1,000 respectively, and in Uganda, $1,500 and $1,200, respectively. Similarly, there is often direct regulation around the trust or bank accounts that hold the float and rules on whether these can earn interest (as in Kenya, Malawi, Afghanistan, Sri Lanka, and several Pacific Island countries; see Greenacre & Buckley 2014) or must be 100% cash reserve accounts deposited at the Central Bank (as in the Philippines). When these accounts earn interest, rules regulate whether interest is to be disbursed to consumers and, if not, what happens to it. In Kenya, for example, the interest from the trust account has to go to charity; in Tanzania and Liberia, it can be disbursed back to consumers; and in India, the providers would pay out the interest earned on the value stored in the mobile account through payment banks (see below). Although there are variations in the exact regulatory framework across countries, these regulations are far less stringent than those for commercial banks.

A final regulatory issue that has been debated heavily in the policy sphere (see Camner 2013, Davidson & Leishman 2016) is the issue of interoperability, the ability to transact with mobile money across service providers. Interoperability can be at the platform level or the agent level (allowing customers or agents of different services to send mobile money to each other, respectively) or at the customer level (allowing customers to access their mobile money account through any SIM) (Davidson & Leishman 2016). As mobile money systems come closer and closer to becoming payment systems, the issue of whether transactions can cross different telcos has become relevant. In some countries, like Bangladesh and Sierra Leone, this is not an issue because, in both countries, at least one mobile money operator is an entrepreneur independent of a telco but with agreements with a number of different telcos. However, in most countries where a given product is launched by a single telco, policy makers are debating their role in requiring interoperability. To date, Tanzania is the only country where this is operational. It was enabled by the industry leading the discussions and adopting common business standards to ease switching, working closely with the Bank of Tanzania, which oversaw the regulatory process.

A rather different approach to regulation that is worth mentioning is that of India. Starting in 2014, the Reserve Bank of India issued licenses to several entities to function as payments banks, which remain separate from commercial banks with separate regulated functions. Unlike a regular small bank, this new financial institution is not permitted to extend credit. However, it can perform all the other functions of a banking institution, such as taking deposits, paying interest, enabling transfer and remittances, issuing debit and ATM cards, and offering Forex services. The aim of setting up these payments banks was to boost financial inclusion across the country and

enhance the use of mobile services in banking. In fact, some of the first payments bank licenses in India were awarded to Aditya Birla Nuvo, Reliance Industries, Sun Pharmaceuticals, National Securities Depository, Vijay Shekhar Sharma (Paytm), Fino PayTech, Airtel M Commerce Services, Vodafone M-PESA, the Department of Posts, Cholamandalam Distribution Services, Dilip Sanghvi, and Tech Mahindra (the last three have since surrendered their licenses).

In late 2016, the Indian economy was demonetized and the two largest notes withdrawn from circulation. Although much chaos ensued (for early opinions on demonetization, see Banerjee 2016, Basu 2016), payments banks and digital payment services like Paytm have made immense gains in the months post-demonetization as individuals switch from cash to digital payments where it is easy to do so (Chakravorti 2017). Demonetization may prove to be the biggest push yet for digital payments in India.

3. THE SUCCESS (OR LACK THEREOF) OF MOBILE MONEY

One of the most successful deployments of mobile money has been M-PESA in Kenya. M-PESA has been widely adopted, with 97% of households having an account as of 2014 (see Jack & Suri 2016). Although other countries are now catching up [for example, in Uganda, 35% of individuals older than 15 years have an account, and in Tanzania, 32% do (Demirguc-Kunt et al. 2015)], there are still many unsuccessful deployments of mobile money. Although it is hard to causally identify the reasons for the success (or lack thereof) of mobile money deployments, it is worth discussing some of the hypotheses for why mobile money has been a success in some economies but not others. It is important to understand how the business models and implementations of the various services may differ across countries and what has correlated with success.

As a summary example, Vaughan et al. (2013), some of the actual implementers of M-PESA in Kenya,[11] describe their pilot, which started in October 2005 with a grant from the UK Department for International Development's innovation fund and with microfinance clients. The product was then changed and rebranded based on consumer feedback as an internal remittance product to send money to friends and family—this experimentation was important to the success of the product. Vaughan et al. (2013) also highlight some additional key factors that allowed mobile money to reach scale in Kenya, in particular, developing a strong network of agents, removing entry barriers for customers, investing in the infrastructure for scale at the very outset, and regulating the system after the innovation.

The success of mobile money systems is certainly underpinned by the rapid deployment and growth of the agent network, i.e., the end distributors of the service. This growth and reliability are associated with a network that is trustworthy, efficient, liquid, and profitable for the agents. As an example, **Figure 5** shows the rollout of mobile money agents in Kenya during the success of M-PESA, displaying the growth in access to agents in 2007, just as M-PESA launched; 2011; and 2015. Note that there were fewer than 1,000 bank branches, just over 1,000 ATMs, and 3,000 M-PESA agents across Kenya in early 2008 (Camner et al. 2009). At the time of writing, there are 141,542 agents serving both M-PESA and other mobile money customers.[12] **Table 1** shows data on the number of agents in some of the countries with mobile money deployments.[13] It is striking that

[11] Pauline Vaughan ran M-PESA from 2007 to 2009, and Michael Joseph was the CEO of Safaricom from 2000 to 2010.

[12] Communications Commission of Kenya, Quarterly Sector Statistics Report for Quarter 2, 2015–2016 (October to December, 2015).

[13] The year of the data varies across countries because of the difficulty in finding recent data on the number of agents in each country.

Table 1 Number of agents in selected markets

Country	Number of agents by provider[a]		Number of agents[b]	Number of bank branches[b]
	Provider	Number of agents		
Pakistan	EasyPaisa	10,500	NA	NA
Philippines	GCash	18,000	NA	NA
Kenya	M-PESA	20,500	65,569	10,619
Uganda	NA	NA	41,794	477
Tanzania	NA	NA	45,429	579
Nigeria	NA	NA	3,567	4,989
Bangladesh	NA	NA	31,755	8,641

[a]Data taken from Groupe Speciale Mobile Association data from the Agent Management toolkit, 2012.
[b]Data taken from Financial Services for the Poor maps data for Kenya from 2015, Nigeria from 2015, Tanzania from 2014, Bangladesh from 2013, and Uganda (date unknown). Data available at **http://fspmaps.org**.
Abbreviation: NA, not applicable.

the number of agents is at least triple the number of bank branches in Kenya, Uganda, Tanzania, and Bangladesh.[14] This is not the case in Nigeria because mobile money is both poorly deployed and poorly adopted there, with adoption rates of 2.3% in 2015 (Demirgüç-Kunt et al. 2015).

As these agent networks grew and became denser, the distance between a household and an agent shrank. For example, **Table 2** shows how the average distance to a mobile money agent changed in Kenya between 2007 and 2015 and how it compares to the average distance to a bank branch. These averages mask a lot of heterogeneity: In 2007, 32% of households lived more than 10 km away from a bank branch, and 19% lived more than 20 km away, whereas 46% of households lived within 1 km of an agent, a number that rose to 68% by 2015. In addition to a dense network of agents, successful deployments of mobile money had a network of agents that were efficient at managing their e-money and cash inventories, helped by consistent monitoring and liquidity management by the service operator. Eijkman et al. (2010) show that agents rebalanced their accounts almost daily, more frequently in urban areas. In addition, agents faced a lot of competition, as consumers favored agents with better service and trading volumes.

Similarly, in a later study, Balasubramanian & Drake (2015) look at how the demand for mobile money in Kenya and Uganda is affected by agent quality (measured in terms of pricing transparency and expertise) and agent competition. They combine a survey of 3,000 mobile money agents with location data on 68,000 financial access and transportation points, spatial census data, and population and poverty estimates. They find that greater agent competition is associated

Table 2 Average distance to the closest financial institution, Kenya

Year	Bank branches	Bank agents	Mobile money agents
2007	9.2 km	NA	4.9 km
2011	7.0 km	5.2 km	1.9 km
2015	6.0 km	1.9 km	1.4 km

Data taken from Finaccess Geospatial Mapping 2016 (**https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/SG589T**).

[14]These numbers come from the FSP Maps data, which was collected in Kenya in 2015, in Nigeria in 2015, in Tanzania in 2014, in Bangladesh in 2013, and in Uganda (date unknown). The FSP maps data is available at **http://fspmaps.org**.

with a higher inventory of both cash and e-money, that more transparency in pricing and greater agent expertise are associated with higher demand, and that the return to expertise increases with competition.

Aside from the agent network, there are a number of other factors that may have driven the successful adoption of M-PESA and that have been described qualitatively. Mas & Morawczynski (2009) attribute some of the success of M-PESA to strong branding, an easy-to-use product, simple and transparent retail pricing, free deposit and no minimum balance feature, ability to send money to nonusers, and ability to perform ATM withdrawals. Heyer & Mas (2009) highlight the importance of volume, momentum, and coverage, as well as the regulatory environment, the quality of the retail infrastructure, and the high telecom penetration. Mas & Ng'weno (2010) highlight brand management, channel management, and pricing as the major contributing factors behind M-PESA's massive success. Similarly, Mas & Radcliffe (2010) discuss the clever and easy-to-use design and Safaricom's business model. The authors suggest that the differentially wide spread of mobile money across countries could be partially attributed to differential regulations. M-PESA, in particular, benefited from a good working relationship between Safaricom and the Central Bank. Mas & Radcliffe (2011) also highlight how important network effects and trust are in scaling up a retail payment system. More recently, Lal & Sachdev (2015) compare five successful mobile money deployments[15] to five less successful ones.[16] In addition to the relationship with regulators and the agent networks mentioned above, they suggest that adoption is also driven by an underlying reliable mobile network with a successful and trusted brand and business.

One of the earliest quantitative studies of mobile money started in 2008 in Kenya around M-PESA. Jack & Suri (2011), in this and later work, document the patterns of adoption of M-PESA over 2008–2014[17] using household surveys conducted across a large part of the country. They tracked the fast adoption of M-PESA in Kenya and traced the rollout of the agents in Kenya until 2010, recording the characteristics of the adopters and collecting data on access to the service. As expected, the initial users were richer and more educated; however, adoption of the product did reach down the income spectrum in the country, with over 90% of households in their sample having an account by the time of their last survey in 2014.[18] Khan & Blumenstock (2016) study the adoption of mobile money more carefully in Ghana, Zambia, and Pakistan. They build a supervised machine-learning model of adoption using call record data and find this model does not distinguish very effectively between active and registered mobile money users, contrary to expectations that active users should be quite distinct in their patterns of phone use. Across countries, it is unlikely that any single set of characteristics will consistently predict mobile money adoption and use.

Beyond the household level, Banco de Moçambique (2015) survey firms in Maputo and Matola in Mozambique and show that financial illiteracy on the part of both the seller and the buyer restricts the use of financial services such as point of sale (POS) devices. Similarly, lack of trust

[15] These are Telesom ZAAD in Somaliland, Dialog eZ Cash in Sri Lanka, Econet EcoCash in Zimbabwe, SMART Communications SMART Money in the Philippines, and Globe Telecom GCASH in the Philippines.

[16] These are Vodacom M-PESA in South Africa, MTN money in Uganda, Eko Financial Services in India, and the broader situations in Nigeria and Brazil, although MTN money in Uganda is now growing rapidly.

[17] The surveys were conducted in 2008, 2009, 2010, 2011, and 2014. The sample was not national—it excluded sections of the North of the country, where households are seminomadic and therefore hard to track over time. The part of the country excluded from the sample covered about 8% of the Kenyan population at the time. The sample was also weighted toward urban areas, as the initial sample drawn in 2008 was weighted by the number of agents in the administrative location (there were about 2,500 locations in Kenya at the time). The reader is referred to Jack & Suri (2011, 2014) for more information on the sample.

[18] Mbiti & Weil (2011) also document the characteristics of the users.

and knowledge, coupled with technological issues, is a hindrance to business owners using mobile payments. Finally, they show that the adoption of POS devices is positively correlated with the size of business and the volume of transactions, whereas the use of mobile phone technologies for payments is related to the owner's age and whether they are a frequent cell phone user.

Although mobile money was a technological innovation, it was enabled by some creative regulation and, more importantly, a network to efficiently distribute and manage cash across vast distances. As we describe in Section 4, one of the most important uses of mobile money has been P2P remittances. Therefore, having a widespread agent network whose cash and e-money inventories are well managed is crucial to the success of the product. Of course, once adoption starts, there will be strong network effects, even stronger than for mobile phones themselves given that there is little interoperability in these markets. There has been surprisingly little work documenting network effects in the adoption of mobile money.[19]

4. IMPACTS OF BASIC MOBILE MONEY

Since the launch and success of M-PESA and the launch of mobile money services across many countries in the developing world, there has been a lot of research around what role systems like M-PESA can play and what impacts they can have on economies.

What are the possible mechanisms through which mobile money systems can affect developing economies?[20] All mobile money systems have transaction fees and so do not really encourage cashless retail transactions in the way credit cards or debit cards have in the United States. Instead, they 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 (see Economides & Jeziorski 2015). For these types of transactions, mobile money provides a dramatic reduction in transaction costs, as well as improvements in convenience, security, and time taken for the transaction. For example, in Kenya, the average transaction traveled 200 km in 2008 (Jack & Suri 2011), which would be an approximately $5 bus ride—instead, consumers paid a $0.35 fee (given the average transaction size). In addition, the mobile money agents are much more easily accessible (see **Table 2**) than any other financial institution, so the money sent via this system can be easily deposited and withdrawn.

Given these reductions in transaction costs and improvements in safety, mobile money could simply facilitate trade both on the intensive margin (making existing transactions more efficient) and on the extensive margin (enabling transactions that would not have happened without mobile money). Such facilitation of trade could result in a better allocation of capital and, thus, increase savings. Similarly, there could be an improvement in the allocation of human capital as the returns to migration improve. In addition, mobile money accounts may provide safe storage of savings, thus potentially increasing total savings as well as improving the allocation of savings and risk (via increased and more efficient remittances) across households and firms. Mobile money may also have effects on intrafamily dynamics, as these accounts are individually held. Finally, on the macroeconomic side, mobile money systems could increase the velocity of money and inflation (though the evidence is mixed on this, as discussed below). In economies with dual currencies, like that of Somaliland (see Iazzolino 2015), mobile money could facilitate trade, remittances, and transactions in US dollars.

[19] An exception is Fafchamps et al. (2016), who study a precursor to mobile money, the P2P transfer of prepaid airtime credit in Rwanda.

[20] Maurer (2012a,b) and Donovan (2012) provide descriptions of similar mechanisms through which mobile money could affect economies.

Economides & Jeziorski (2015) study the demand for mobile money, exploiting a natural experiment created by an exogenous and unanticipated increase in the transaction fees in Tanzania. They identify the slope of the demand curve and compute consumers' willingness to pay for risk amelioration using transportation and storage transactions. They find that consumers who execute large transactions are usually more price inelastic than consumers who execute smaller transactions and that demand for long-distance transfers is less elastic than that for short-distance transfers. Consumers use the mobile money network extensively for extremely short-term storage (less than 2 hours), probably due to high levels of street crime and burglaries, and are willing to pay up to 1% of the transaction amount to avoid carrying money in the form of cash for each extra kilometer and up to 1.1% to avoid keeping money at home for an extra day.

Looking at the impacts of mobile money in Kenya, Jack & Suri (2014) use the survey data described above to understand how M-PESA has improved the ability of households to share risk. Informal risk-sharing networks are used extensively to pool risk in developing economies,[21] including in Kenya (see Suri 2014). Given the prevalence of such relationships, which involve transfers of money between households, and given the large transaction cost reductions afforded by M-PESA,[22] M-PESA could have important impacts on the efficiency with which individuals spread risk. As Jack & Suri (2014) show, these effects are sizeable—**Figure 6*a*** illustrates their findings. Households with M-PESA are better able to smooth risks, and their consumption is less sensitive to shocks. When subject to a shock, households that have mobile money are more likely to receive a remittance from friends and family, receive more money in total, and receive it from a more diverse set of people in their network, all resulting in efficiency gains in risk sharing. This also explains why a large share of transactions on M-PESA are P2P remittances across long distances. Using similar empirical specifications, Riley (2016) finds that mobile money improves risk sharing in Tanzania.

In complementary work, Suri et al. (2012) look specifically at how M-PESA affects people's response to health shocks. They find that M-PESA users are able to spend more on medical expenses in the event of a health shock while also increasing expenses on food and maintaining their education expenditure. Nonuser households or households far from agents are unable to increase expenditure on food after the shock, decrease their nonfood subsistence expenditure, and might pull children out of school to finance health care costs. When hit by an illness shock, nonusers substitute away from nonmedical expenses, such as nonfood subsistence, to finance the needed medical care expenditure. The authors find no evidence that nonusers suffer significant food reductions, suggesting that both users and nonusers do not cut back on necessary consumption. Nonusers seem mostly to substitute away from their children's education to fund their health shocks. These results are illustrated in **Figure 6*b***.

Finally, using the last round of their panel survey conducted in 2014, Suri & Jack (2016) measure the longer-term impacts of M-PESA. They find that better access to mobile money services has increased household consumption and savings and, thus, reduced poverty rates. They find that poverty rates declined by 2 percentage points as a result (196,000 households move out of extreme poverty), reductions that were larger among female-headed households. They also find significant changes in occupation choice, largely among women, who moved away from agriculture as their main occupation to business and retail. As a result of M-PESA, 186,000 women made this transition.

[21] Kinnan (2014) provides an excellent review of the literature on informal risk sharing.

[22] The cost of sending money via M-PESA was almost 30% of that of sending it via postal bank or via bus delivery through a driver and 46% of the cost of sending it via Western Union (these percentages do not include transportation or time costs).

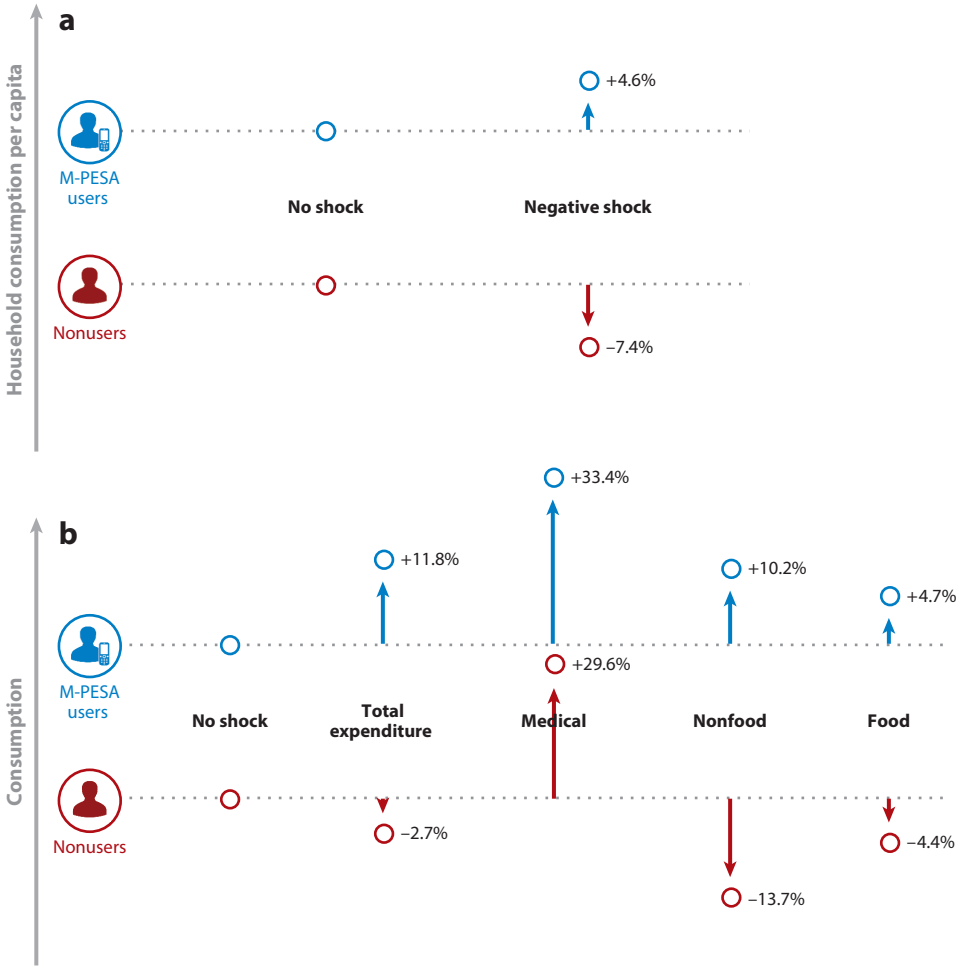

Figure 6

Resilience of M-PESA users and nonusers to economic shocks. Panel *a* is based on data from Jack & Suri (2014); panel *b* is based on data from Suri et al. (2012).

Blumenstock et al. (2016b) also study the response to shocks (in the context of an earthquake in Rwanda) using administrative data on mobile phone records, airtime purchases, and transfers of airtime. They find, as a result of the earthquake, a modest increase of $84 in airtime transferred and an increase of $16,959 in value of calls made, potentially indicative of indirect transfers as the caller bears the cost of the call in Rwanda. They also find that transfers were more likely to be sent to wealthier individuals and to individuals with a history of reciprocity with the sender. For Uganda, Munyegera & Matsumoto (2014) use panel survey data to show that using mobile money is associated with a 69% increase in household per capita consumption, mobile money subscribers are 20 percentage points more likely to receive remittances from their family members in town, and the total annual value of remittances received is 33% higher compared to nonuser households.

Using survey and administrative data on M-PESA in Kenya, Jack et al. (2013) study the impact of mobile money on the volume, reach, direction, and type of internal remittances. They find that M-PESA users are more likely to receive and send remittances (by 37.4 and 34.3 percentage

points, respectively). This includes an increase in the frequency (two more transactions per round) and amount of remittances. The reach of transactions is, on average, 100 km greater for M-PESA users, and reciprocity is also greater for M-PESA users (they are 13.2 percentage points more likely to engage in at least one reciprocal transfer). Finally, M-PESA users are more likely to transact for regular support, credit, and insurance purposes, and they change the composition of remittances by shifting from regular support purposes to credit arrangements.

Using qualitative methods, Morawczynski (2009) finds that M-PESA usage increased during periods of violence, like the postelection violence in 2007 in Kenya, and resulted in a reduced vulnerability to consumption shocks. Morawczynski & Pickens (2009) find that M-PESA increases savings for both the banked and unbanked, improves women's empowerment, and facilitates transfers within networks during bad events. Plyler et al. (2010) find community-level effects of M-PESA in terms of money circulation and local employment; physical, financial, and food security; greater financial, human, and social capital accumulation; and an improvement in the business environment, as transactions are easier.

Aside from these initial studies on mobile money, there has been one field experiment studying the impact of mobile money. Batista & Vicente (2013) study the initial rollout of a mobile money product, mKesh, in Mozambique. In the treatment areas, there was intense mobilization of agents and information dissemination (agents were recruited and trained and community theater and community meetings were organized to describe mKesh). In addition, there was individual information dissemination to randomly chosen households in treatment areas. Using both survey and administrative data, the authors find that, in terms of take-up, 64% of treated individuals conducted at least one transaction on the system. In terms of impact, financial literacy, the trust in local agents, and the usage of mCel (the accompanying telco), financial services were higher in treatment areas. In addition, the overall willingness to remit (independently of the money transfer mechanism) increased, though the overall willingness to save did not increase significantly. As with the studies on M-PESA, the remittance aspect of mobile money seems to be the most salient.

There has also been a growing body of literature that tries to understand the applications of mobile money, i.e., other aspects and circumstances where mobile money could play a role. For example, Aker et al. (2014) conduct the first randomized controlled trial (RCT) involving mobile money in the specific context of cash transfers. To reduce malnutrition during the drought and the 2009–2010 food crisis, households in Niger were given monthly unconditional cash transfers, with women as the primary beneficiaries. The authors compared: (*a*) a cash arm, where households received the transfer manually; (*b*) a Zap[23] arm, where transfers were received via mobile money and households were also given a service-enabled mobile phone; and (*c*) a mobile arm, where the transfers were received manually but households were also given a mobile phone. There was no pure control group.

Recipients of mobile money transfers had better nutrition, with a 10–16% more diversified diet, including greater proportions of protein and energy-rich food, and their children ate 33% more of a meal per day. The authors argue that these effects came from reduced time costs for the recipients, with mobile money transfer recipients saving, on average, 2 days over a 5-month period. Despite the small magnitude of this effect, it could have had a significant opportunity cost because it occurred during the planting season. Another potential mechanism increasing bargaining power for women is the increase in privacy, given that the transfer was less observable to other household members. The electronic nature of the cash transfer did not, however, lead to significant use of mobile money beyond the program. Finally, the authors also show that, although total costs were

[23] Zap is a mobile money service operated by the mobile telecommunications company Zain.

higher in mobile money villages (due to the distribution of phones), per-transaction costs were 20% lower. With appropriate infrastructure, mobile money could, therefore, significantly reduce costs of cash transfers to disbursing agencies.

Blumenstock et al. (2015c) design an experiment to study mobile salary payments in seven provinces across Afghanistan between August 2012 and March 2013. The intervention provided employees in a firm with a mobile phone and training on using M-Paisa, a mobile money service, and randomly assigned half of them to receive their salary through M-Paisa as opposed to cash. The authors use survey and administrative data and find significant cost reductions for the operating agency but no significant impacts of mobile money use on the recipients. Blumenstock et al. (2016a) conduct a field experiment with automatic payroll deductions toward savings through M-Paisa via a new salary platform called M-Pasandz. Employees were randomized into the following groups: (*a*) different default contribution rates from salary to a savings account (0% or 5%, which they could choose to change) and (*b*) different matching contribution rate from the firm (0%, 25%, or 50%). These were cross-randomizations, creating a 2×3 design with a total of six treatment groups. The authors find that employees enrolled in the 5% deduction rate were 40 percentage points more likely to save and that a 50% matching rate had comparable results to the 5% deduction for saving. The main explanation for this striking result seems to be present-bias preferences, where the employee procrastinates when making a nondefault contribution.

Blumenstock et al. (2015b) study the relationship between violence and financial decisions in Afghanistan. Using data from an RCT administered to increase mobile money take-up and combining this with administrative data, a nationally representative household survey, and behavioral field experiments, the authors find that people increase their cash holdings when exposed to violence and that people experiencing violence are less likely to transact in mobile money and hold less funds in their mobile money accounts. They argue that the mechanism underlying these effects is a demand for liquidity that arises from the fear of future violence. In particular, a one-standard-deviation increase in individual forecasts of violence is associated with holding 20% less mobile money and 20% more cash. This suggests that violence may play an important role in preventing the development of formal and digital financial networks.[24]

In an ongoing field experiment, Habyarimana & Jack (2016) study an innovative savings and credit product that layers over M-PESA, called M-Shwari (I discuss this innovation in more detail in Section 5). Habyarimana & Jack (2016) study M-Shwari in a set of schools in Kenya using a field experiment with two treatment arms: a commitment (locked) savings arm and a regular savings arm (with a cross-randomization of text message reminders to save for education). The intervention was targeted to the transition between primary and secondary school. The authors find an increase in savings and in secondary school enrollments for both groups relative to the control (though the effects are not significantly different across the two groups).

Finally, there has also been some work on the macroeconomic impact of mobile money systems. Weil et al. (2012) use survey data from Kenya, Tanzania, and Uganda to document the rapid adoption of mobile money between 2006 and 2009 and aggregate data from the Central Bank to look for structural breaks in monetary aggregates that would suggest macroeconomic effects of mobile money. They find evidence of these effects in Kenya, though the velocity of M-PESA, computed based on aggregate data provided by Safaricom, was no higher than that of cash or other monetary aggregates. Similarly, Mbiti & Weil (2011) start by showing that the transactions

[24]In an accompanying policy white paper, Blumenstock et al. (2013) suggest that, when transactions are conducted in an unsafe or unstable environment, firms might benefit from shifting the costs of managing salary payments to mobile operators through mobile money.

velocity of M-PESA was four transactions per month in 2008, not much higher than the velocity of cash. The calculated value of outstanding e-float was 3.3 billion shillings in August 2008, also a modest value in comparison to the 85.2 billion shillings of currency (M0) on average between January and June, 2008. Analyzing transactions, they conclude that M-PESA is not used as a store of value, with the average account balance of users valued at less than $10 at any point in time. More importantly, they show an effect on the prices of competitors to M-PESA (such as Moneygram and Western Union), with competitors reducing prices on transaction sizes below M-PESA's thresholds.

Contrary to this, Mas & Klein (2012) find that the velocity of money increases considerably; however, it does not affect money supply base when e-money is based on a safe-deposit-box model. Aron et al. (2015) find little evidence of a link between mobile money and inflation using inflation forecasting models for Uganda. Simpasa et al. (2011) study the same question in Ethiopia, Kenya, Tanzania, and Uganda, highlighting the fact that mobile money could cause an increase in the velocity of money and, thus, the need for regulation to make sure such products do not undermine the effectiveness of monetary policy in these economies.

In a different vein, Jack et al. (2010) show how existing models of monetary theory can be used to think about the impact of mobile money on the operations of the financial system and the subsequent implications for monetary and regulatory policy decisions. Discussing results from household and agent surveys in late 2008, the authors show that the most common problems are agents' lack of cash and e-money, which would give rise to price discrimination if the price of cash to e-money was not fixed. However, they argue that there may be informal credit or debit relationships between the agents and their coordinating bodies, which can be welfare improving according to the theoretical models.

5. CONCLUSION: IS MOBILE MONEY THE PAYMENTS INFRASTRUCTURE OF THE FUTURE?

Although mobile money has been very successful in some countries (for example, by the end of 2014 in Kenya, 96% of households outside Nairobi used M-PESA) and is expanding in a number of other economies, its use remains mostly limited to very specific P2P transactions: those that take place over long distances and those that are in places where holding cash is risky. Outside these applications, there has been less success, and the innovation ecosystem around mobile money is still in its early stages.[25] Even in Kenya, less than a third of households use the system for paying bills,[26] for receiving payments or wages from an organization, or for paying for other goods or services. Only 5% use it to repay loans. As a result, few P2B, B2B, or G2P interactions take place over mobile money.[27] Although often referred to as a payment system, mobile money cannot fulfill its promise as a genuine payment system unless it can provide these other services at a sensible fee structure.

In the case of G2P transactions, it is important to mention innovations that are working toward delivering such services. In India, along with the universal ID, there has been a rollout of

[25] Mas & Mayer (2011) hypothesize that households need to manage their budgets, savings, and payments in order to better manage their livelihoods, and the services available to the poor rarely combine these needs. They suggest how mobile money may provide an avenue and set of products to do this.

[26] For the Safaricom product timeline, the reader is referred to **http://www.safaricom.co.ke/mpesa_timeline/timeline.html**. In April 2009, Safaricom partnered with Kenya Power to enable customers to pay electricity bills through M-PESA. Starting in October 2010, customers could pay at supermarkets using M-PESA. Similar bill payment services are now provided by many mobile money providers.

[27] One nongovernmental organization, Give Directly, operates in East Africa using mobile money to distribute cash transfers, though they do not yet reach anywhere near the scale of a G2P program.

smartcards using a biometrically authenticated payments infrastructure through which government payments can be made to households. Muralidharan et al. (2016a) evaluate the impact of these smartcards on beneficiaries of the government's rural employment guarantee and pension programs in Andhra Pradesh. They find that payments made using smartcards were faster and more predictable and involved less corruption and leakage than the existing system, especially for the employment program. These effects resulted mostly from a reduction in over-reporting and quasi-ghost workers. These reductions in leakages, which do not involve any changes on the beneficiary side in receipts, make smartcards highly cost effective. In an accompanying study, Muralidharan et al. (2016b) look at the general equilibrium effects of the smartcards being used in the employment program. They find an increase in income, 90% of which came from private sector earnings (the remainder came from increases from the program itself) through increased labor market competition, productivity, better credit access, and increases in demand.

Although the literature on mobile money is growing, research on the innovations that are already building on mobile money has been lagging. In the spirit of spurring new research ideas, I outline some of the more recent product innovations that have built on existing mobile money systems and encourage researchers to catch up with the innovations. Whether these innovations ultimately deliver improvements in livelihoods to households is still an open question.[28]

In 2011, Safaricom partnered with a local bank in Kenya, the Commercial Bank of Africa (CBA), to create a new banking product called M-Shwari. Since then, CBA has launched similar products in Tanzania (M-Pawa) and Uganda, Rwanda, and Cote d'Ivoire (MoKash). Similar platforms are provided by Equity Bank Kenya (Equitel) and Kenya Commercial Bank (KCB M-PESA). With M-Shwari, consumers can use their mobile phone to open a bank account at CBA, deposit money in it by transferring balances from M-PESA, withdraw from it via M-PESA, and request a loan. Underlying the loan decision is a credit scoring rule or algorithm based on administrative data on airtime purchases and mobile money transactions (in Uganda, the product is based on a machine-learning credit scoring and credit limit assignment algorithm).[29] By April 2015, over 10 million Kenyans had an M-Shwari bank account, and some, for the first time, had access to formal financial services.[30] A company called Branch offers a slightly different form of mobile credit (with no savings component, as they are not a bank). To make a lending decision, the product asks for permission to scrape the applicant's phone for data on handset details, GPS info, call and SMS logs, social network data from Facebook, and contact lists. A machine-learning algorithm then uses these data to create a credit score and make a lending decision. Increased usage of the product results in lower interest fees and larger loans. The company Tala provides a very similar product to that of Branch. Similarly, M-KOPA and Angaza (two other systems in Kenya) offer asset-based financing for solar panels where payments on the loan are made from M-PESA.

In 2013, Safaricom launched Lipa-na-M-PESA, a product that encourages retail payments over the M-PESA platform. Before this, the transaction fees on M-PESA, as on all other mobile money systems (see **Figure 4**), were too high for basic retail payments, especially because the

[28] Kendall et al. (2011) look at how some other market players use M-PESA as a platform to integrate more financial services using results from phone and Internet surveys.

[29] Although there is little research on the value of mobile money transaction data itself, the transaction data are being used in practice to create credit scores in Kenya. However, recent literature uses mobile phone call data records (CDRs), which are beyond the scope of this review. As an example, Blumenstock (2014) uses call records from Rwanda to predict wealth, and Blumenstock et al. (2015a) show that predictions from records match the Demographic and Health Survey in Rwanda fairly accurately.

[30] Cook & McKay (2015) provide more information on M-Shwari. In 2010, under a similar partnership between the mobile operator and a different bank, a bank account called M-KESHO was launched, focusing on promoting individual savings (kesho means tomorrow in Swahili). However, although heralded by many, that product was not widely adopted.

incidence of those fees falls on the end consumer and not on the retailer. Lipa was an attempt to lower these transaction fees to 1% of the transaction size, which was then further lowered to 0.5% in March 2017 for transactions above KShs 200 ($2) and 0% for transactions less than KShs 200. The retailer can choose to pay it or pass on the fee to the consumer.[31] In practice, there has been a mix of retailers choosing to pay it and choosing to pass it on. Regardless, given the size of many retail transactions, this fee was too high for both consumers and retailers, though the changes in March 2017 may make a marked difference.

In March 2017, the Kenyan Treasury launched a pilot version of a digital government bond called M-Akiba. It is a 3-year infrastructure bond that is purchased over mobile phones. The back-end system is built to allow individuals to use the KYC behind their mobile money accounts to open a Central Depository System (CDS) account through their mobile phone in a few keystrokes. Individuals can then actively purchase and trade these bonds on the underlying digital platform (which links to the bond exchange). These bonds come with a coupon rate payout of 10% per annum, paid every 6 months. To make this happen, Kenya passed legislation that lowered the minimum investment in treasury bonds to KShs 3,000 ($30) from KShs 100,000. The government also allowed for a CDS account to be opened via a mobile phone and allowed individuals to use mobile money to purchase and trade treasury bonds over a mobile phone. M-Akiba will serve as a positive real return savings instrument for low-income households, hence the name: M for mobile and akiba meaning savings in Swahili. The March 2017 bond issue was only for KShs 150 million ($1.5 million) because it is a pilot version, and it closed in just over two weeks. The Treasury plans another KShs 5 billion issue on M-Akiba in June 2017.

In late 2015, Safaricom made available an application programming interface (API) to allow for programmatic access to the M-PESA platform over the web, with a second generation expected to be launched in mid-2017.[32] APIs are a convenient approach for businesses to expose some of their core assets and to enable the emergence of a developer community around these assets. APIs come with instructions for developers on how to access them, but also with terms and conditions, a pricing model, and other business contractual agreements. Exposing APIs has become a standard approach to creating B2B interactions over the Internet without tedious human business development transactions in the way.[33]

Given the popularity of M-PESA, one could assume significant uptake of the API in Kenya. However, there have been few integration efforts to date. This is most likely due to some design challenges for the API in terms of technology, as well as issues of business contracts for potential users. Whereas usage is encouraged in a sandbox model, production usage requires exactly those kinds of B2B negotiations that APIs should do away with.

It is fair to assume that these are teething challenges. The universal access to M-PESA presents a tremendous opportunity for an API model and could accelerate the fintech market in East Africa rapidly. The value of global fintech investment in 2015 was $22.3 billion (Skan et al. 2016), with the United States having the largest sector, receiving $4.5 billion in new funding in 2015. China had nearly $2 billion, India $1.65 billion, and Germany $770 million. Whereas the growth in investments in Asia-Pacific have been dramatic (a fourfold growth between 2014 and 2015), there has been little investment in Sub-Saharan Africa, where mobile money systems have no doubt

[31] This is in contrast to Visa and Mastercard, where the incidence of the fee is always entirely on the retailer.

[32] For more on APIs and M-PESA's initial API, the reader is referred to the Bankable Frontiers Association (Bank. Front. Assoc. 2016) and Morawczynski (2015). For more on the operational aspects of M-PESA's API from Safaricom, the reader is referred to **http://www.safaricom.co.ke/business/corporate/m-pesa-payments-services/m-pesa-api**.

[33] For more information on APIs and their standardization, the reader is referred to **http://oldwww.acm.org/tsc/apis.html**; Meyer (2016) provides more information on APIs in telcos.

been the most popular (Skan et al. 2016). Given that Sub-Saharan Africa has some of the poorest economies in the world, it may also have the economies where the returns to fintech investments are the highest, as illustrated by the case of mobile money. Democratizing access to a payment system such as M-PESA might well be the missing link between the current situation and potential significant increases in investments in fintech in the region.

The big question is: What can we learn from these nascent innovations that can change the gestalt of payments and financial markets in developing economies? Although mobile money may seem revolutionary, aside from the dramatic adoption, it is far from revolutionizing the role of financial markets or cash in these economies. Mobile money has been, in most cases, a cash-in-cash-out system, with the majority of transactions being the purchase of airtime and small P2P remittances, generally once a month. In the success cases, cash has come into the financial system, and the flow through the system has often amounted to a sizeable fraction of GDP. However, these economies are not to be mistaken for cashless when compared, for example, to Sweden, where cash makes up only 2% of transactions (see Bank Int. Settl. 2015). Similarly, their financial flows are tiny when compared to the US financial system, which trades more than 60 times its GDP a day just through stocks, bonds, and derivatives. The benefits of cashless economies, especially in low-resource environments, remain an open question. Should these economies become cashless or close to cashless, and, if so, how will that be accomplished? Will the banking system be the primary venue for this transformation, and, if so, what sets of products and services will be needed to accomplish this? What will encourage financial market transformation in these economies? Will mobile money be the first stepping stone toward new financial markets and transactions in these economies? Will it encourage broader, better-integrated, secure platforms for transactions? There is a lot still to learn.

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