

Mobile Finance in Developing Countries: *Macroeconomic Implications and Potential*

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Abstract:

This paper explores the macroeconomic implications of the global proliferation of mobile finance technologies in developing nations from a modern money theory (MMT)-informed perspective. It begins with an overview of the origins of, and recent developments in the mobile finance industry, and its relationship to traditional finance and banking operations. It next introduces the MMT paradigm, focusing on the implications of three core observations: 1) the tax-driven nature of modern money; 2) the hierarchy of money; and 3) the role of publicly-issued safe assets in minimizing systemic fragility. Then, it explores the implications of the MMT view on contemporary debates around the future of mobile finance, before concluding with a recommendation for the creation of a universal, digital fiat money-based payments system, combined with unlimited liquidity provision by the central bank to the banking system, as a third alternative to the current model banking system and the ‘narrow bank’ model of the 1930’s Chicago Plan.

Keywords: mobile money, mobile finance, e-money, modern money theory, narrow banking, payments system, financial inclusion, development, developing nations, financial technology, digital finance

JEL Codes: E12, E26, E40, E41, E42, E44, E51, E52, E58, E61, E63, F54, F62, F63, F65, G21, G32, G23, G28, L86, L96, O11, O16, O17, O23, O30, O31, O33, O38

Introduction

The global proliferation of mobile finance¹ over the last decade is the latest chapter in the ongoing story of collision between financial and digital communications technologies that began with the invention of the telegraph – and shortly after it, the wire transfer – in the nineteenth century (Sommer 2000, 1162). This time, however, the action is taking place not on Wall Street or in the computer labs of Silicon Valley, but among the villages, markets, and taxi-parks of the Global South² (see Ndung’u and Kimenyi 2009, 6).

In response to this phenomenon, academic scholars, market analysts, policymakers, journalists, and, of course, commercial entities have produced a substantial body of scholarship exploring the technological, economic, and political dimensions of mobile finance use in developing nations. Inquiries have ranged from questions of mobile platform design, to the anthropology of mobile money markets, to the legal and economic challenges of regulating mobile operators. Today, most commentators acknowledge mobile finance’s transformative potential in terms of reducing payment transaction costs, increasing rates of financial inclusion among the presently unbanked, and reducing entrance costs for new market competitors in banking and telecommunications. At the same time, however, surprisingly little attention is devoted to the macroeconomic and monetary dynamics underlying mobile finance operations. Those who do adopt a macroeconomically-informed approach, moreover, tend to be concerned with improving the functionality of mobile finance *qua* itself rather than with connecting it to a larger vision of macroeconomic reform (see, e.g., Mas and Klein 2012, 12; Jack and Suri 2011; Maurer 2012; Simplicio 2012; Alleman and Rappaport 2010).

This paper is a modest attempt to address this gap in the literature. It begins with a brief topology of the modern mobile finance sector, before turning to an exposition of “Modern Money Theory” (MMT), a macroeconomic framework with strong roots in institutionalism and real-world financial operations. It then applies this framework to an analysis of mobile finance in order to explore its macroeconomic implications for money-design, banking and payments systems.

I. Mobile Finance: A Background

The mobile finance landscape is defined in large part by the interplay between market-driven experimentation and user-level innovation. Businesses introduce new platform technologies to improve existing services and penetrate previously untapped markets, only to have them

¹ The term “mobile finance” as used in this paper refers to the full spectrum of financial activities that can be undertaken through the medium of a mobile phone, as well as any enabling legal, human, hardware and software infrastructure. These activities include, but are not limited to: i) creation and maintenance of accounts, ii) settlement of obligations, iii) payment for goods and services, iv) transfer of purchasing power or economic value between entities, v) cash storage and withdrawal, vi) saving, and vii) liquidity-creation. For a general overview, see UNCTAD (2012).

² In India, for example, mobile phone penetration went from 1 percent in 1994 to 68 percent in 2011 overtaking formal banking at 61 percent (Ketskaw, Shankar, and Banwet 2013, 1).

transformed into entirely new products and services as consumers adapt them to changing needs and conditions on the ground (see, e.g., Maurer 2012, 601).

One of the oldest and most widespread forms of mobile finance involves the use of tradeable airtime minutes for retail transactions, remittances and saving (The Economist 2013). This practice, still popular today in countries like Nigeria, Egypt, Ghana and Côte d'Ivoire, emerged spontaneously following the introduction of airtime top-up transfer technology, and quickly spread as entrepreneurial individuals began to purchase large amounts in order to resell them in rural communities with limited access to top-up cards (Ray 2007). In addition to being a cheap, easy, and anonymous alternative to cash and deposits, airtime credits also purport to offer a modicum of insulation against price and foreign exchange fluctuations that so often plague developing nations' official currencies (The Economist 2013).

Over the last ten years, another payments system known as "mobile money" has replaced airtime minutes as the dominant platform for mobile finance (Maurer 2012, 591). Mobile money consists of telecom-issued credits that are backed, dollar-for-dollar, by ring-fenced bank deposits at the telecom's partnering banking institution(s) (Mas and Morawczynski 2009, 86-87; GSM Association 2009, 7). Like airtime minutes, mobile money is used to purchase goods and services, make remittances, pay bills, and securely store savings³ (Morawczynski and Pickens 2009, 1-2; Morawczynski and Miscione 2008, 293). In addition, it is readily redeemable on demand for cash at approved retail agents and ATMs (Mas and Morawczynski 2009, 86-87).

Historically, mobile money has been distinguished from bank deposits by the fact that mobile money does not pay interest to account-holders⁴ (Argent, Hanson, and Gomez 2013, 7). Instead, mobile network operators retain interest earned on their clients' escrowed deposits for their own use. One exemption to this rule is Kenya-based M-PESA, the most successful mobile money platform in the world. In its early years M-PESA was required to donate all interest earned on escrowed deposits to charity, thereby rendering its aggregated deposit account the functional equivalent of a digital safety deposit box (Argent, Hanson, and Gomez 2013, 7).

Following the release of the Kenyan Central Bank's Draft E-Money Regulation in 2011, however, M-PESA was given greater discretion in the use of its deposit-interest. While remaining prohibited from paying interest directly on individual M-PESA accounts, M-PESA is now authorized to reinvest the accumulated interest in its own operations in order to lower user fees and increase its competitive advantage (Argent, Hanson, and Gomez 2013, 7).

³ There are some rare examples, such as in India, where payments schemes operate without an explicit bank partnership; however, these are typically prohibited from offering cash-out services (Argent, Hanson, and Gomez 2013, 7).

⁴ Tarazi, on the other hand, argues that the collection of repayable funds from the public constitutes a "deposit" regardless of the collecting institution, particularly given the prevalence of savings-related activity undertaken through mobile money systems (Tarazi 2009). See also Weber and Darbellay (2010, 132) (arguing that pre-paid phone accounts should be considered deposits due to their capacity to be used to make non-phone-related retail payments).

Mobile finance scholars often distinguish between platforms that provide “value-added” telecommunications services, where the telecom directly manages mobile money accounts, and bank-oriented services designed to facilitate transactions through regular deposit accounts (Weber and Darbellay 2010, 132). Up close, however, the boundary between these categories is not well-defined.⁵ For example, because mobile money accounts do not pay interest, they tend not to qualify for deposit insurance. Consequently, most regulatory authorities require account operators to maintain liquid assets⁶ equivalent to the total value of collected customer funds, known as the “e-float,” in order to avoid banking-style macroprudential regulation (Tarazi and Breloff 2010, 2-3). These e-floats aggregate a large fraction if not all of a mobile money operators’ funds in a single deposit account, which typically exceeds the amount protected by government deposit insurance. In times of financial crisis, this exposes mobile money providers to bank intermediary risk, and in the event of bank failure, a loss of consumer funds⁷ (Tarazi and Breloff 2010, 6).

Empirical attempts to harmonize banking and telecom standards have taken a range of forms, from go-it-alone bank or telecom-based models,⁸ to open- and closed-partnerships, through to the highly adaptable “open federated model,” whereby multiple banking and telecom entities agree on a common payments platform to serve as the industry-wide standard (Goswami and Raghavendran 2009, 18; see also Yakub, Bello, and Adenuga 2013, 99-100). For example, in 2010, M-PESA launched a joint initiative with the Kenyan Equity Bank, called M-KESHO, to provide M-PESA customers with an interest-earning savings account that can immediately transfer funds to their regular mobile money account using the M- PESA payments platform (Maurer 2012, 600; Kendall, Maurer, Machoka, and Veniard 2012, 54). This closed partnership enabled M-PESA to bypass the restrictions placed on direct customer forwarding of e-float interest while preserving the uniformity of its payments platform.

Mobile finance advocates often stress the importance of flexible standards and a light regulatory touch in order to avoid discouraging bottom-up innovation and stifling investment in the sector (see, e.g., Ndung’u and Kimenyi 2009, 6; Klein and Mayer 2011, 18). While such warnings are well-heeded, they belie a strong faith in the capacity of market actors to develop and implement industry-wide standards, as well as in their willingness to take broader political and social considerations into account when doing so (Grewal 2008; Donovan 2012, 2660). Moreover,

⁵ For a description of the full spectrum of bank-to-telecom related mobile finance platforms, see Tarazi and Breloff (2010, 2).

⁶ Typically bank deposits, but some jurisdictions also allow treasures and registered corporate securities (Tarazi and Breloff 2010, 5).

⁷ One notable exception to this is the Philippines, which requires e-float deposit accounts to be backed, dollar-for-dollar, by set-aside reserves, thereby effectively creating a 100% reserve requirement for e-float accounts (Jack and Suri 2011, 10).

⁸ While there are many examples of banks that have developed mobile money arms, few telecom-based mobile money operators have succeed without partnerships with licensed banking institutions, and, when they do succeed, the services they offer tend to be more restrictive. In India, for example, a small number of mobile payments platforms operate without a bank partnership, however they are restricted from offering cash-out services (Argent, Hanson, and Gomez 2013, 7).

given that finance and telecommunications are both already highly regulated industries, it is not easy to tell where well-intentioned regulatory “humility” ends and old-fashioned capture begins.

At its best, mobile finance has the potential to revolutionize the global payments system and permanently alter the relationship between consumers and financial intermediaries. Such an outcome, however, requires a far more systemically-oriented reform strategy than has been proposed by even the most enthusiastic pro-mobile finance reformers. Before commenting on what such strategy might look like, this essay will briefly detour into macroeconomic theory in order to understand the core institutions, rules and practices that shape contemporary financial and monetary operations.

II. Monetary and Financial System Operations: A ‘Modern Money’ Perspective

Modern Money Theory (MMT), aka Neo-Chartalism, is a school of Post-Keynesian macroeconomic thought that emphasizes the monetary/financial character of the modern economy, as well as the constructive role played by state institutions such as the rule of law (Tcheneva 2006, 76-77). MMT’s analytical narrative begins with Marx’s insight that in modern capitalist economies, the central force of production is not the exchange of commodities for money in order to accumulate additional commodities (C-M-C’), but rather the exchange of money for commodities in order to accumulate additional money (M-C-M’) (Weeks 2011).

In order to trace the flow dynamics of monetary production, MMT adopts Minsky’s balance-sheet approach, whereby a realistic outline of the economy is derived from tracing the “interrelated balance sheets and income statements of [each of] the units of the economy” (Minsky 1993, 77). This approach pays careful attention to the implications of double-entry accounting rules. The key insight is that any financial asset recorded on one entity’s balance sheet also appears as a financial liability on another entity’s balance sheet. This implies that that a deficit run by one entity is matched by a corresponding surplus in the rest of the financial system.⁹

MMT also adopts the Minskyian view of money as a negotiable liability – that is, a promise-to-pay, or an IOU (Papadimitriou and Wray, 2010, 9). According to Minsky, “anyone can create money, the challenge is to have it accepted” (Minsky 1986, 228). Under this view, the “moneyness” of a particular IOU is a function of its acceptability as a means of third-party settlement (Bell 1998, 1). Since different entities’ IOUs have different levels of moneyness, it is possible to describe the financial economy as a “hierarchy,” or “pyramid” of liabilities, in which the debts of those lower in the pyramid are “extinguished by payment of a[n IOU] issued by an entity higher in the pyramid” (Papadimitriou and Wray 2010, 9; Bell 1998; Mehrling 2012). Typically, the IOUs of households and non-financial firms are at the lowest level of the hierarchy, followed by financial firms, publicly-insured bank deposits, and, finally, government

⁹ For an extended discussion of this approach, known as the “sectoral balances” approach, see Godley and Lavoie (2012).

liabilities such as coins, treasury securities, and central bank notes and reserves at the top (Papadimitriou and Wray 2010, 9).¹⁰

From an MMT perspective, government liabilities have the highest degree of moneyiness, at least in part, because the state has the power to legally enforce taxes payable only in its own currency. As Tcherneva argues,

[C]an agents simply refuse to take the sovereign's money and, therefore, undermine its position in the [money] pyramid? The answer is 'no', because as long as there is someone in the economy who is required to pay taxes denominated in the state's currency, that money will always be accepted [...]. The essence of state money lies [...] in the ability of the government to create '*the promise of last resort*' [...] that is, to levy taxes and declare what will be accepted at pay offices for extinguishing debt to the state (2006, 76-77).

According to Forstater, the history of colonial Africa provides an illustrative example of the causal relationship between the state's coercive power and the widespread adoption of a particular money and unit of account (2005, 58). At the time in question, European colonial administrators in sub-Saharan Africa were struggling to compel native Africans to provide them with labor and higher cash crop yields. Prior attempts to promote compliance, such as the imposition of work requirements, the destruction of the native subsistence economy, and the enforcement of work "contracts" with penal sanctions, had been met with strong opposition (Forstater 2005, 58, citing Fieldhouse 1971). Eventually, the colonists introduced direct taxes on various items – cattle, land, houses, and the people themselves – and required that they be paid in colonially-denominated rather than locally-denominated currency. This approach proved a success, as locals were pressured into working for cash crop farms to avoid tax-based sanctions. Over time, secondary industries also developed, as laborers traded their excess income in exchange for goods and services from other locals who needed to pay taxes but were unwilling or unable to produce cash crops.

The counterintuitive lesson of this deplorable historical episode is that, for the currency-issuing colonial governors, taxes functioned not to provide a source of financial revenue, but rather to coerce locals into participating in the monetary production economy. As Forstater observes,

[A]lthough taxation was often imposed in the name of securing revenue for the colonial coffers, and the tax was justified in the name of Africans bearing some of the financial burden of running the colonial state [...] [w]hat they [really] needed was for the African population to need the currency, and that was the purpose of the direct tax. The colonial government and European settlers must ultimately be the source of the

¹⁰ From an MMT perspective, it is appropriate to consider the central bank and the treasury as part of a consolidated government perspective for the purposes of analyzing the relationship between public and non-public financial flows, even though the constitutional arrangements governing the fungibility of treasury and central bank liabilities may vary from country to country. For a justification of this approach, see Tymoigne (2014).

currency, so they did not need it from the Africans. It was a means of compelling the African to sell goods and services, especially labor services, for the currency (2005, 60).

A more benign example of this “tax-driven-money” dynamic can be observed today at the University of Missouri-Kansas City (UMKC). In the late 1990’s, the UMKC Economics Department introduced a complementary currency system called the “Buckaroo” (named after the campus mascot) in order to encourage economics students to engage in community service, while simultaneously giving them first-hand exposure to modern currency dynamics (Mosler 2011). The rules of the currency are as follows: first, every economics student is “taxed” at a rate of 20 Buckaroos per semester, and payment is required in order to receive final grades. Second, students are given a standing wage offer of 5 Buckaroos per hour of work performed at any one of the department-designated community service organizations. Third, students are free to earn as many Buckaroos as they desire, as well as trade them with other students.

As Buckaroo designer and currency operations expert Warren Mosler notes, the product of this very simple system has been a miniature full employment, volunteer-based economy, with a functional floating, non-convertible currency whose value has remained stable around the average productivity of an hour of volunteer labor (Mosler 2011). The system employs taxation to generate demand for the currency and mobilize student labor rather than raise revenue, and maintains spending at whatever level is necessary to maintain full employment. Furthermore, in contrast to the naked violence of the colonial African approach, students voluntarily choose to submit to the Buckaroo system in order to access the perceived benefits of the economics education provided by the department.

After government-imposed liabilities, the next class of IOUs with the highest degree of moneyness is bank deposits. Deposits are generally considered to be as safe and liquid as government currency. This is partly due to the positive network effects that flow from banks serving as the dominant intermediary in the national payments system. Most nations’ central banks, for example, allow banks to accept tax payments from account-holders through their deposit accounts, and settle their outstanding balances to the Treasury through the reserve system. Mainly, however, it is due to the special legal privileges banks enjoy by virtue of their banking license, including a guarantee of par convertibility for cash withdrawals and interbank transfers, government deposit insurance in the event of bank failure, and liquidity backstops via the central bank discount window and/or access to the central-bank-supported interbank reserve market.¹¹

In contrast to the traditional textbook “money multiplier” story, in which banks make loans by leveraging an existing stock of deposits less some fraction retained to meet reserve requirements, modern banks in fact create deposits *ex nihilo* through the process of lending.¹² If, upon

¹¹ The privileges from one half of the ‘social contract’ of banking: in exchange for access to public support, deposit-taking banks submit to heightened regulatory scrutiny, including “activity restrictions, prudential supervision, capital requirements, and deposit insurance fees” (Ricks 2010, 3, 8, citing Tucker 2010).

¹² The creation of a new loan involves four simultaneous balance sheet operations: 1) the bank records a new asset (the borrower’s loan); 2) the bank records a new liability (the amount borrowed in newly created deposits); 3) the

making a loan, a bank finds itself in need of additional reserves to settle end-of-day accounts and/or meet its reserve requirements, it obtains them through the interbank reserve market, the discount window, or through open-market operations with the central bank (Fullwiler 2013). Central banks, in turn, accommodate the banking system's demand for reserves in order to maintain control over its interest rate target.¹³ Thus, a more accurate description is that banks are responsible for the independent creation and destruction of new purchasing power through the lending process, and are constrained in this process only by capital restrictions and the availability of profitable loan opportunities.

A similar (broad) money-creation effect can be observed in the balance sheets of other financial intermediaries, particularly those, such as Money Market Mutual Funds (MMMFs), that comprise what has come to be known as the “shadow banking” sector. These entities issue cash-like debt instruments, which are then used by large institutional investors for storage and large-scale transactions in a manner similar to traditional deposit accounts (Luttrell, Rosenblum, and Thies 2012, 8). Unlike licensed banks, MMMFs and other shadow bank entities do not have access to government liquidity and deposit insurance. Nevertheless, their liabilities are considered relatively safe and liquid, as they are backed by large pools of financial assets that have been subjected to various risk-stripping transformations, such as securitization, repurchase agreements and rehypothecation (Pozsar 2011).

As with bank lending, shadow banking activity represents a major driver of purchasing power creation in the economy. Between 1980 and 2007, the ratio of off-balance sheet to on-balance sheet loan funding grew from zero to over 60 percent (Gorton 2009, 3), and, prior to the 2007-2008 crisis, short-term, deposit-like liabilities in the U.S. shadow banking sector totaled approximately \$11 trillion, compared to only \$5 trillion in insured bank deposits (Ricks 2010, 10).

III. A Modern Money Analysis of Mobile Finance

The preceding analysis offers a number of insights into contemporary monetary and financial operations that are of relevance to, but rarely discussed in, debates around the future of mobile finance technology. This section focuses on the implications of these insights for policymakers in terms of integrity of payments, systemic stability, financial inclusion and macroeconomic growth.

E-Cash

borrower records a new asset (the loan, including interest); and 4) the borrower records a new liability (the loan, including interest) (see, e.g., McLeay *et al.* 2014; Sheard 2013).

¹³ If a central bank does not engage in defensive operations to maintain an adequate supply of reserves, the banking system as a whole will be short reserves, and the interbank borrowing rate will rise above the target interest rate (Fullwiler 2013, 181).

Mobile payments platforms offer significant benefits over traditional payment system technologies in terms of cost, ease of use and capacity for market penetration.¹⁴ On the monetary side, however, mobile finance has yet to live up to its potential. The former CEO of Safaricom once joked with the governor of the Kenyan national bank that he didn't need to print money anymore, as M-PESA was taking over (Palmer 2012).¹⁵ This view is misleading, however, as the contemporary value of mobile money does not lie in any intrinsic quality it possesses. Rather, it lies in mobile money's monopoly over highly convenient cellular payment networks, as well as its guarantee of par convertibility with higher quality moneys like bank deposits and cash. In other words, consumers today use mobile money *despite* its relatively low level of moneyness rather than *because* of it.

One of the greatest challenges facing the mobile money industry is how to achieve interoperability between mobile money operators and as well as with the banking system (Argent, Hanson, and Gomez 2013, 1).¹⁶ Licensed banks solved this challenge internally long ago through deposit standardization, an interbank settlement system managed by the central bank, and an industry-wide, government-backed safety net. Operators based in the telecom industry, on the other hand, however, have been hesitant to subject themselves to the regulatory compliance costs of transforming into a fully-fledged bank solely in order to achieve interoperability (see, e.g., Uzor 2012). Consequently, many mobile money developers have opted to piggy back on the traditional deposit system through partnership agreements rather than strike out alone.

From a hierarchy-of-liabilities perspective, mobile money is unlikely to achieve higher-level commercial penetration until it becomes standardized and widely acceptable as a means of final settlement (Kreyer, Pousttchi, and Turowski 2002, 400-409). One way to achieve this is to require all mobile money funds be backed, dollar-for-dollar, in "e-cash" reserve accounts at the central bank. These accounts could either be managed through commercial banks as special ring-fenced "100% reserve accounts," or could be managed by mobile operators themselves as narrow-bank-style retail agents of the central bank.¹⁷ In either case, mobile money operators would deposit and transmit funds directly from reserve accounts while remaining prohibited from engaging in commercial bank-style credit-creation.

¹⁴ When surveyed, consumers in Haiti (where mobile phone and formal bank registration lie around 80 and 15 percent, respectively) emphasized the advantages of mobile money in terms of privacy, access to retail outlets (any registered business can become a mobile money agent), and ease of withdrawals and deposits at all times (Taylor, Baptiste, and Horst 2011, 5-8; Intermedia 2011, 24-28).

¹⁵ According to the GSM, the "primary purpose" of mobile-enabled schemes is for cash-substitution purposes (Donovan 2012, 2653, quoting Dermish *et al.* 2011, 86; Maurer 2011).

¹⁶ In Indonesia, three mobile money operators have achieved internal interoperability, however each platform retains independent relationships with banking institutions for settlement clearing purposes (Camner 2013, 8).

¹⁷ The European Union, for example, designated mobile money operators as narrow banks in 2000 in recognition of the fact that they are prohibited from granting credit (Porteous 2007, 21).

There are a number of benefits to this approach. First, consumers would be able to transfer funds immediately between mobile money and bank deposit accounts, as well as convert them directly into physical cash through approved agents, thereby facilitating the growth and widespread adoption of digital money services. Second, central bank would be empowered to promote universal interoperability standards from its position at the apex of the settlements system, while simultaneously preserving the freedom of mobile money platform designers' to experiment with consumer-end delivery platforms without the high costs of obtaining a commercial banking license. Third, an explicit central bank guarantee of all mobile money funds would eliminate the intermediary risks associated with the current practice of mobile money operators storing aggregated consumer funds in partially-insured deposit accounts.¹⁸

Banking

Minsky's insights reveal that the critical question when it comes to financial intermediation is not whether an entity is able to create new money-liabilities, but the conditions under which its liabilities become widely accepted as a means of third-party payment. According to Gorton, "the essential function of banking is to create a special kind of debt, debt that is immune to adverse selection by privately informed traders. ... this kind of debt is very liquid because its value rarely changes and so it can be traded without fear that some people have secret information about the value of the debt" (2009, 3-4). While Gorton is referring in the passage to demand deposits and, to a lesser extent, money market instruments, his description applies most completely to government liabilities. Indeed, as explained above, the main reason deposits function so effectively as "informationally insensitive debt" is because governments afford banks various legal privileges – in particular, deposit insurance – to ensure that their liabilities are viewed as functionally equivalent to its own.¹⁹

Presently, most nations that offer deposit insurance prescribe limits on the amount of funds covered in each account, including the aggregate accounts of mobile money operators (see Taraz and Breloff 2011). This is problematic for at least three reasons. First, limits undermine the uniformity of the payments system by creating two tiers of deposits. Second, in times of crisis, limits tend to be ignored anyway in order to maintain system-wide liquidity and prop up too-big-to-fail institutions (Schich 2008, 3; Demigurc-Kunt and Kane 2002, 1377). Third, limits starve large institutional investors of safe, cash-like storage vehicles for large pools

¹⁸ See, e.g., Batista, Simione, and Vicente (2012, 8): "[F]unds [...] safeguarded in accounts of prudentially regulated institutions [...] are often pooled and held in the name of the issuer ... thereby making the underlying funds vulnerable to claims by the issuer's creditors if the issuer goes bankrupt or if accounts have been used as collateral to secure specific debts of the issuer").

¹⁹ In many respects, the tendency towards increased reliance on private liabilities as money-substitutes reflects a Gresham's Law dynamic: bank deposits become popular because they are cheaper to access (i.e. through loans) than government money, yet guaranteed to be convertible at par. In turn, money market instruments become popular relative to bank deposits because they are cheaper to access (i.e. through repeated financial transformation of collateral) than bank deposits yet appear safe in normal times.

of funds, thereby forcing them to turn to riskier money market instruments that increase fragility and opacity.²⁰

One option for simplifying the deposit-reserve relationship and promoting interoperability between banks and mobile payments platforms is to nationalize deposit risk so that bank deposits become fully integrated into the e-cash system.²¹ This could be done the following way: First, banks would be required to gradually transition to a 100% e-cash-backed deposit requirement vis-a-vis consumer deposit balances, similar to ring-fenced mobile money accounts (Jack and Suri 2011, 6). Second, banking institutions would be given a choice to either use another entities' e-cash platform, or to obtain a license to manage their own e-cash accounts.²² As with mobile monetary operators, however, they would be required to maintain a financial firewall between their customers' stored funds and their own operating accounts (see, e.g., Batista, Simione, and Vicente 2012, 7). Third, banks would continue to engage in credit-creating lending activity, but would be required to back up any newly-created deposits with e-cash borrowed directly from the central bank.²³ Fourth, the central bank would commit to providing unlimited and unsecured liquidity to any licensed banking institution at the target interest rate, on a rolling basis, provided the bank remained compliant with capital adequacy regulations and asset quality restrictions.

If done carefully, these reforms would promote the unbundling of payments processing and credit intermediation activities (see, e.g., Klein and Mayer 2011, 15), simplification of the money market, and the enhanced effectiveness and stability of the financial system, without undermining traditional banking activity. In the event of a banking crisis, every unit of e-cash would be backed by government guarantee, thereby eliminating any risk of systemic illiquidity while allowing for targeted intervention against failing banks. More generally, this approach would clarify banks' role as engines of purchasing power creation by conclusively demonstrating that deposits do not fund new loans.

²⁰ According to Pozsar, the rise of shadow banking over the last 30 years is largely a function of the lack of safe, government-backed savings and cash vehicles (Pozsar 2011).

²¹ In contrast to other well-known 100% reserve proposals, such as Benes and Kumhof (2012), which effectively turns banks into piggy banks, by prohibiting them from financing loans through the creation of new credit *ex nihilo*, this approach preserves the core dynamics of modern banking. The main operational difference is that presently, the central bank sets interest rates through the price of reserves used at the margin by depository institutions for settlement purposes, whereas under this approach, it does so through the price of reserves used to provide direct loan liquidity. Under both approaches, banks create purchasing power through issuing liabilities whose liquidity cost is determined at the margin by the central bank.

²² This model already exists in Kenya, where microlending institutions like Musoni operate entirely through M-Pesa's payments system.

²³ This could result in a one-off change in bank lending costs, however any adverse effects could be addressed through reductions in the overnight interest rate on reserves.

Macroprudential Regulation

Upon first glance, the aforementioned reform proposals appear naïve to the moral hazard concerns of socializing deposit risk. In reality, however, they reflect a pragmatic decision to prioritize the future of the payments system over the preservation of an inferior channel of prudential regulation. As the rise of shadow banking in developed nations demonstrates, there is a strong demand for access to safe, digital cash-like liabilities across the financial spectrum, and attempts to limit the supply of such liabilities (through, for example, restricting reserve liquidity to the banking sector, or limiting access of large institutional investors to deposit insurance) tend to fuel the growth of inferior-quality near-moneys rather than meaningfully improve systemic stability. Hence, as Mosler (2010) argues,

[t]he hard lesson of banking history is that the liability side of banking is not the place for market discipline. Therefore, with banks funded without limit by government insured deposits and loans from the central bank, discipline is entirely on the asset side. This includes being limited to assets deemed ‘legal’ by the regulators and minimum capital requirements also set by the regulators.

From a public policy perspective, an integrated mobile money-deposit-e-cash system would be superior to the status quo for a number of reasons. First, a central-bank administered universal settlements system would standardize payments data and consequently improve regulators’ capacity to monitor economy-wide financial flows.²⁴ Second, provision of direct liquidity to lending institutions would reduce the complexity of interbank flows,²⁵ thereby freeing additional regulatory resources to focus on monitoring of asset-side activity. Third, the creation of consumer e-cash accounts would give policymakers new tools for fiscal and monetary policy implementation, such as direct-to-the-public quantitative easing and system-wide transaction micro-taxes (see, e.g., Waldman 2010; Kaletsky 2012).

On the other hand, a large-scale reorientation of regulatory focus will likely be met with skepticism from change-averse politicians, regulators and established market actors. Given the decentralized and grass-roots nature of mobile finance-based consumer activity, it is important that any top-level reform efforts be complemented by market- and consumer- driven pressure from below.

Promoting New Standards

According to Grewal, the widespread adoption of particular network standards (and concomitantly, the elimination of alternative standards) is driven by three types of factors:

²⁴ Indeed, policymakers have already noted the inflationary potential of mobile money due to increased payments velocity: “The increase in the velocity of money induced by these activities may have in turn propagated self-fulfilling inflation expectations and complicated monetary implementation” (African Development Bank 2012).

²⁵ Instead of borrowing settlement balances on the interbank market, each bank would source liquidity directly from the central bank, and only need to transfer funds to other banks on behalf of account-holders.

reason, force, and chance (Grewal 2008, cited in Donovan 2012, 2649). Reason refers to a standard's instrumental capacity to satisfy an agent's goals better than available alternatives, and can be further divided into intrinsic reason, referring to characteristics that are inherent to the standard, and extrinsic reason, referring to characteristics deriving from the network brought together by adoption of the standard. Force includes direct force, which consists of imposing punitive costs on those who fail to adopt a given standard and/or denying other, unrelated benefits, as well as indirect force, which consists of the opportunity cost of non-membership. Chance is relatively straightforward, referring to random processes that result in a natural convergence around a particular standard.

In this case, there are a number of intrinsic reasons why telecoms and mobile platform providers might actively support a universally interoperable payments protocol managed by the central bank and backed by government-guaranteed e-cash. First, business operating costs will likely be reduced as the central bank assumes partial responsibility for maintenance of the common infrastructure of the payments system. Second, subsuming mobile money and bank deposits into central bank reserve accounts will facilitate interoperability between *all* bank accounts *and* mobile platforms, thereby significantly increasing the extrinsic network benefits of e-cash participation. Third, explicit central bank support for e-cash will likely increase public trust in the integrity of mobile money and reduce any spillover risk from bank failure.²⁶

On the other hand, attempts to transform the infrastructure of the payments system may encounter strong opposition from established banking institutions as they seek to defend their captive deposit base, lucrative and low-risk transaction fees, and monopolistic role as central bank intermediaries to the private sector (Donovan 2012, 2658; Maurer 2012, 596). This is a serious political concern, but not one unique to the proposals articulated above. Indeed, licensed banks already face growing competition in the payments industry, from money markets above and mobile money and other digital payments systems such as PayPal below.

From a modern money perspective, the most effective way to introduce a new form of money-instrument is to directly impose taxes payable only in that instrument. For developing nations, however, political corruption, limited regulatory capacity, a weak rule of law, high rates of participation in the informal economy and gaps in payment infrastructure all limit the effectiveness of this approach as a one-size-fix-all tool for changing social behavior.²⁷ A potentially more effective approach, drawing on the lessons of the Buckaroo program, is to target narrow spheres of social activity in which agents are already highly regulated, and reframe their options within those spheres. This could include, for example, public acceptance of mobile money as acceptable means of payment taxes, fees and utilities *in addition* to existing forms

²⁶ Empirical research suggests that, even in a relatively low-trust payments system environment, consumers trust mobile money backed by large, credible institutions. For example, an ethnographic study of the use of M-Pesa in Kibera, one of Kenya's largest slums, found that consumers use M-Pesa, despite low trust in retail intermediaries, due to the high level of trust placed in M-Pesa's operator, Safaricom (Morawczyński and Miscione 2008, 287, 295).

²⁷ In the case of colonial Africa, for example, governing entities expended significant resources to ensure tax compliance and punish those who avoided payment (Forstater 2005, 61).

of mobile money, as well as launching initiatives to encourage its adoption in schools, local governments, universities, hospitals, and the military.²⁸

Licensed mobile and banking service entities are also suitable targets for regulatory intervention, as they are few in number and easy to monitor for compliance. While industrial intervention is often criticized for discouraging investment and interfering with the development of voluntary, market-based solutions,²⁹ it makes sense for policymakers to take a leadership role in this instance for a number of reasons. First, both banking and telecom entities are already highly regulated,³⁰ due to the public commons-nature of spectrum and the national payments system.³¹

Second, the government has a direct interest in the substance of such standards, as its own central bank's balance sheet lies at the heart of the entire system. Third, in the absence of legal requirements, banking institutions tend to resist assuming the infrastructural and regulatory costs of improving payments system technology (see, e.g., Salmon 2014).

That said, it is important that regulatory intervention be limited to areas of legitimate public interest, such as securing e-cash accounts and promoting platform interoperability. Industry regulators should also be weary of setting unachievable goals and not providing enough leadership and support. As a case in point, in 2013 the National Bank of Rwanda demanded that all mobile payments systems in the country become fully interoperable within one year, despite the fact that the most developed mobile money systems in the world have yet to achieve this goal (Argent, Hansen, and Gomez 2013, 12).³² Such regulatory overzealousness can erode political capital, discourage investment and inspire free-rider objections as younger market entrants benefit from infrastructure paid for by older, more established competitors (Tarazi and Kumar 2012).

²⁸ For example, a number of countries are presently experimenting with accepting mobile money in payment of water bills, school fees, business taxes, and public transport costs (see, e.g., Gutierrez and Choi 2014, 9, 18; Plyler, Haas, and Nagarajan 2010, 7; Taylor, Baptiste, and Horst 2011, 12).

²⁹ In Kenya, for example, mobile market penetration exploded following the dismantling of the state telecom monopoly and implementation of business-friendly licensing regulations (Ndung'u and Kimenyi 2009, 5; see also Gamner 2013).

³⁰ In the United States, regulatory authority for mobile banking activity is currently shared by the Federal Trade Commission, the Federal Communications Commission, the Federal Deposit Insurance Corporation, the Office of the Comptroller of the Currency, and the Federal Reserve System (Crowe, Kepler, and Merrit 2012, 2). According to Alampay, the main mobile finance concerns for telecom sector actors are: 1) market entry; 2) anti-competitive pressures; 3) scarce resource allocation; 4) tariff regulation; 5) interconnection; 6) access; and 7) service quality. For the banking sector, they are: 1) procedures for redress; 2) security; 3) integration of transactions; and 4) cashing out (Alampay 2010, 6).

³¹ Indeed, some scholars have already expressed concern that the ongoing growth of mobile payments is likely to raise political questions regarding allocation to scarce spectrum bandwidth (see, e.g., Alampay 2010, 12).

³² One exception is Indonesia, where three mobile money services reached an agreement ensuring interoperability by 2013 (Camner 2013).

Beyond hard regulatory guidelines, policymakers can also influence market conditions through indirect fiscal channels such as targeted business subsidies, public provisioning of mobile handsets,³³ technical education and account registration support, and retail network-based employment,³⁴ and direct public investment in the expansion of electricity and cell coverage.³⁵

Paradoxically, however, the degree of fiscal space available to policymakers to implement such policies depends on existing levels of economic activity, technical expertise and administrative capacity.³⁶

Other Issues

In addition to the core questions of monetary and banking operations discussed above, a comprehensive mobile finance standards framework will need to address other macroeconomic considerations, such as fiscal and monetary policy implementation (see, e.g., Simplice 2012), exchange rate management, cross-border transfers, and the bank/telecom licensing standards (Weber and Darbellay 2010, 139). It will also need to consider non-economic concerns (see, e.g., UNCTAD 2012), such as how best to balance consumer privacy and data collection interests,³⁷ standardize authentication procedures,³⁸ and prevent e-cash from being used to launder money or fund politically subversive activity (see, e.g., Mas and Klein 2012, 12; de Almeida 2013). Specific solutions to these issues will likely vary by context, as well their relative priority at any given point in time.

³³ Historically, mass campaigns aimed at promoting access to digital platforms such as One Laptop Per Child have had mixed-to-poor results (see, e.g., Kraemer, Dedrick, and Prakul 2009). In this case, however, such concerns may be alleviated by the low cost and ubiquity of mobile phone handsets.

³⁴ Researchers have identified pricing, agent network management failure, low literacy, platform complexity, and ID-related registration issues as major reasons why Tanzania's attempts to promote mobile money have been so unsuccessful compared to neighboring Kenya (Argent, Hansen, and Gomez 2013, 7; Camner and Sjoblom 2009, 2). Additionally, in contrast to Tanzania, M-Pesa kiosks are considered a valuable source of new employment for rural and underbanked communities in Kenya (Plyler, Haas, and Nagarajan 2010, 7).

³⁵ According to Taylor, Baptiste, and Horst, mobile money adoption is generally hampered by lack of access to electricity and mobile coverage (2011, 10).

³⁶ Even in cases where a state has the enforcement and regulatory capacity to reach a state of full employment through Buckaroo-style direct investment, it may lack access to natural resources or technological capital to afford large-scale investment in telecommunications and financial infrastructure.

³⁷ For example, with regard to the common practice of SIM card sharing, there are competing public interests in promoting legal transparency and preserving some degree of transactional anonymity (Maurer 2011, 311; Weber and Darbellay 2010, 140).

³⁸ For example, reducing the compliance costs of, and reconciling the differences between, Know-Your-Customer (KYC) requirements for the registration of bank and mobile phone accounts (see, e.g., Ketkaw, Shankar, and Devinder 2013; Batista, Simione, and Vicente 2012, 4). In addition, Porteous has identified protection against fraud and abuse as a first-tier, critical condition for the mass adoption of mobile finance (2007, 5).

Conclusion

The operational and regulatory issues raised by mobile finance technology cut to the heart of macroeconomic design. On one hand, mobile money operators have faced difficulty in building public trust and achieving platform interoperability, underscoring the hierarchical nature of money, and the importance of access to the balance sheet of the sovereign in times of financial crisis. On the other hand, telecom operators have taken the lead in designing and popularizing mobile money systems, in the process challenging the historical inseparability of banks' payments processing and credit intermediation activities. The architectural questions underlying these issues – *who decides what counts as money? What are the social functions of banks? What financial services do people actually need and use?* – both affect, and are affected by, decisions made within the mobile finance sector. Consequently, as mobile finance enters its next evolutionary phase, it is crucial that advocates and regulators, particularly those in developing nations with low levels of financialization and financial inclusion, articulate a normative framework for financial reform that informs and directs action in individual policy arenas. Without an understanding of where the financial system has come from and vision of where it should go, decision-makers and activists run the risk of losing sight of the forest for the trees, leading to misallocated resources, short-term fixes, and greater systemic fragility.

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