

2022-08-01

Resolving liquidity problems in mobile money

J. Greenacre. 2022. "Resolving Liquidity Problems in Mobile Money" Banking and Finance Law Review.

<https://hdl.handle.net/2144/46840>

"Downloaded from OpenBU. Boston University's institutional repository."

This is a post-peer reviewed and copy-edited version of the contribution accepted for publication in the Banking and Finance Law Review: (2022) 37.3 B.F.L.R. 439-470.

RESOLVING LIQUIDITY PROBLEMS IN MOBILE MONEY

Jonathan Greenacre*

ABSTRACT

Mobile money firms (MM firms) faced with liquidity problems do not usually have *ex post* tools to address this issue. One way to address this concern is to design and implement *ex post*, crisis management tools for MM firms that experience a liquidity crisis. A liquidity crisis refers to a cash-flow problem or a situation that results in a lack of available liquidity. This paper provides a framework for examining the benefits and costs of applying three main tools including direct deposit insurance, pass-through deposit insurance and emergency liquidity or lender of last resort facilities usually applied to banks. The analysis is based on the central argument that mobile money customers behave rationally (much like bank depositors), and the risks that arise when a MM firm mismanages customers' funds or becomes cash-flow insolvent - may create significant issues for both customers who are eager to retrieve their funds and/or MM firms who do not have crisis management tools to resolve a liquidity crisis.

Individual countries designing a toolkit that addresses liquidity problems must decide which tool best addresses liquidity problems at the lowest cost to MM firms. This decision is likely to have implications for the integrity and continued growth of mobile money. In particular, whether financial inclusion efforts in the informal sector as well as low-income countries where mobile money activities are prevalent, will be impeded by the application of a given tool.

Overall, domestic policymakers will need to decide whether the potential benefits of the policy objectives of financial stability and/or consumer protection offset the potential loss of financial inclusion from higher regulatory cost (given the need for *ex ante* tools to address the moral hazard problems caused by liquidity-crisis management tools). Regardless of the precise tool used, liquidity-crisis management tools should be considered part of a holistic framework for addressing a financially distressed MM firm and to minimize financial instability.

* Jonathan Greenacre, Assistant Professor of International Relations, Frederick S. Pardee School of Global Studies, Boston University. Larona Somolekae, an alumna of the MSc in Law and Finance at the University of Oxford, researched selected topics and provided comments. The author acknowledges the excellent research support of Similoluwa Somuyiwa. A component of this research was funded by the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the author and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation (BMGF). The author of this report gratefully acknowledges support received from the BMGF, particularly Christopher Calabria. Components of this paper was presented at the Journal of Financial Regulation's annual conference titled "New Frontiers: Technology, Finance, and Regulation" held on 29 June 2018. The author would like to thank John Armour, Colin Mayer, Dan Awrey, and Howell Jackson for input into the doctoral thesis which underpinned this paper. The author also thanks Robert Hockett, Hal Scott, Benjamin Geva, Martin Bengtzen, and Rohan Grey for providing feedback on key ideas. All errors remain my own.

1. INTRODUCTION

A new service – “mobile money” – is spreading across the developing world, particularly in Africa. A customer can deposit, transfer and withdraw funds from her mobile money account, much like a bank account. She does not need a bank account; instead, she deposits and withdraws funds through transactions with mobile money “agents”; corner stores, petrol stations and other retail outlets operating as contactors for firms which provide the service, usually mobile phone companies. She transfers money by typing instructions into her mobile phone.¹

Since its first major launch in 2007, mobile money has become a large sector. Originally launched by Safaricom in Kenya in 2007, and now jointly owned with South Africa’s telecommunications giant, Vodacom, M-Pesa currently has over 41.5 million active customers who carried out over 12 billion transactions in 2019 alone.² Globally, mobile money now boasts over 1 billion accounts, facilitating \$1.9 billion in payment transactions across 95 countries every day, particularly in Africa and South Asia.³ MM accounts are more prevalent than bank accounts in at least 10 countries in Sub-Saharan Africa.⁴

The sheer growth and prevalence of mobile money in developing countries (and particularly in Africa where mobile money has facilitated financial inclusion) means policymakers must ask: what tools should we use if a MM firm has a major liquidity problem? A liquidity crisis refers to a cash-flow problem or a situation that leads to an acute increase in demand and decrease in the supply of liquidity (perhaps due to an external shock), that results in a lack of available liquidity. A question of which there is currently no easy answer. This question is important because liquidity constraints in mobile money firms can quickly morph into solvency problems⁵ which puts customers’ funds at more risk and worse, may produce systemic risk for the financial system and the real economy; particularly in countries like Kenya and Tanzania which have large mobile money sectors relative to their overall population.⁶ This is because the collapse of a MM firm in such jurisdictions could have a range of knock-on effects for customers and their surrounding economies.

The question is also important because ex ante safeguarding rules (such as trust and portfolio requirements) may not always protect customers’ funds against potential liquidity problems with a mobile money firm. For example, a MM firm may invest users’ funds in illiquid business assets such as a mobile phone tower despite trust rules which prohibit such investments, or the assets in which customers’ funds are stored (e.g., a bank) pursuant to portfolio rules, and may become impaired because the bank where such funds are stored has a liquidity problem.

¹ Dan Awrey & Kristin van Zwieten, “The Shadow Payment System” (2018) 43 J. Corp. L. 775.

² See Vodafone’s website: <<https://www.vodafone.com/what-we-do/services/m-pesa>>.

³ See GSM Association, “State of the Industry Report on Mobile Money” (2019), online: *GSM Association* <<https://www.gsma.com/sotir/>>.

⁴ Juan Carlos Izaguirre, Denise Dias, & Mehmet Kerse, “Deposit Insurance Treatment of E-Money: An Analysis of Policy Choices.” (2019), online: *CGAP*, <<https://www.cgap.org/research/publication/deposit-insurance-treatment-e-money-analysis-policy-choices>> at 1.; See also Demirgüç-Kunt, Asli, L. Klapper, D. Singer, S. Ansar, & J. Hess. “Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution.” (2018), online: *World Bank* <<https://globalfindex.worldbank.org/>>.

⁵ See John Armour et al., *Principles of Financial Regulation* (UK: Oxford University Press, 2016) at 279.

⁶ It has been reported that Kenya has 58.4 million mobile money subscribers, which is more than its total population - 47.5 million citizens. See online: <<https://www.paymentscardsandmobile.com/mobile-money-accounts-now-higher-than-total-kenyan-population/>>. Similarly, about 55% of Tanzania’s population is financially included through mobile money, see online: <<http://finclusion.org/country/africa/tanzania.html>>.

Furthermore, storing funds in liquid assets may not provide sufficient protection if firms experience a major systemic crisis. For instance, shadow-entities including retail money market funds still experienced liquidity challenges despite having so-called liquidity rules.⁷ This happened because policymakers assumed liquidity rules were sufficient,⁸ however, when the crisis began and these firms faced unprecedented liquidity demand from customers, there were no crisis management tools to address these challenges.⁹ These crisis management tools can include deposit insurance schemes, which provide insurance to depositors of eligible firms against the risk of losses on deposits, and Lender of Last Resort (LOLR), which insures the bank directly by making short-term loans to banks against illiquid assets thereby addressing liquidity problems.

MM firms are faced with the same situation today because many – if not all – have no credible ex post tool to address liquidity problems should they arise, and there is no guarantee that policymakers, especially central banks, will offer the same bail outs that were granted mainly to investment banks during the financial crisis. Even if these crisis management tools exist, they may not operate in ways that protect users’ funds. And ultimately, MM firms’ pooled bank accounts and through it, users’ funds have less protection than regular deposits. In particular, the pooled bank deposit may greatly exceed a country’s deposit insurance coverage.¹⁰

This paper argues that applying ex post, liquidity-crisis management¹¹ tools (normally applied to banks only) to financially-distressed MM firms can address potential liquidity constraints in mobile money. However, using liquidity-crisis management tools raises a range of complex policy and implementation issues that vary between individual countries, requiring a country-specific approach. Without a template approach, a policymaker must decide first, whether a liquidity-crisis management scheme is appropriate for her jurisdictions focusing on financial inclusion,¹² consumer protection,¹³ and financial stability.¹⁴ And second, a policymaker must consider the costs and benefits of the different models available for her use.

⁷ See Deborah Brewster & Joanna Chung, “Fear of Money Market Funds ‘Breaking the Buck’” (2008), online: *The Financial Times*, <<https://www.ft.com/content/696e3dc0-84e4-11dd-b148-0000779fd18c>>.

⁸ Money market assets were believed to be low risk and as a result insurance was not considered a necessity. See Jonathan Macey, “Reducing Systemic Risk: The Role of Money Market Mutual Funds as Substitutes for Federally Insured Bank Deposits” (2011), online (pdf): <https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=3100&context=fss_papers>.

⁹ Brewster & Chung, *supra* note 7. For most of the money market funds the government backed by the US treasury had to provide guarantees to stop the run on these firms.

¹⁰ For example, in September 2013, there were £4.8 billion of M-Pesa users’ funds stored in a bank deposit with the Commercial Bank of Africa. However, Kenya’s deposit insurance scheme insures funds up to a maximum of KSh100,000, or about £659. This meant that M-Pesa users’ funds were virtually uninsured against bank failure. See William Jack & Tavneet Suri, “Mobile Money: The Economics of M-Pesa” (2011), online: *Georgetown University* <https://faculty.georgetown.edu/wgj/papers/Jack_Suri-Economics-of-M-PESA.pdf>.

¹¹ Liquidity-crisis management tools mean funding immediately available to guarantee mobile money funds in the management of MM firms. This funding can either guarantee customer’s funds managed by an MM firm (direct deposit insurance or pass-through deposit insurance) or to a greater extent, assist a firm with liquidity problems to remain operational (lender of last resort).

¹² Financial inclusion refers to the usage of or access to certain financial products by a specific cluster of individuals such as an unserved or underserved sector of the population, being the “unbanked.” Alliance for Financial Inclusion, Issue Paper (2020) at 5 and 17, states that there is no definitive definition of financial inclusion, and each country must have a definition that is a reflection of the local context.

¹³ Consumer protection refers to the protection of individuals outside of the course of business. There is a need to protect consumers due to asymmetry of information and in order to protect consumers from “their biases and inaccurate judgements.” Armour et al., *supra* note 5 at 64.

¹⁴ Financial Stability refers to the stability of the financial system as a whole, Armour et al., *supra* note 5 at 64; See also Daniel Tarullo, “Financial Stability Regulation” (Distinguished Jurist Lecture delivered at the Faculty of Law, University of

The findings from this approach are that a policymaker concerned about potential liquidity problems amongst one or more MM firms in her jurisdiction can proceed through at least the following three steps. First, to consider whether policy goals in her jurisdiction *justify* the use of ex post liquidity tools. Financial inclusion, consumer protection and financial stability may serve as such justifications.¹⁵ Second, identify existing and/or potential liquidity-crisis management tools that advance these policy goals. And third, consider the benefits and cost of using these tools.

Overall, this paper examines the liquidity-crisis management tools alone, but we need a holistic toolkit to make it all work. This toolkit should involve consumer education initiatives; trainings for regulators and preferably a macroprudential toolkit in which liquidity-crisis management tools are just one of many tools that a policymaker has at her disposal.

The paper explores these points in four parts. Part One outlines the problem of liquidity, examining how it arises in MM. It also examines the economic justifications for using liquidity-crisis management tools for MM firms, noting that policy justifications may be in conflict, particularly consumer protection and financial stability on one hand, and financial inclusion on the other. Part Two explores how deposit insurance and guarantee schemes could be applied to MM firms. Part Three outlines how lender of last resort facilities could be applied to MM firms.

The table below provides a summary of the benefits and costs of applying current models of liquidity-crisis management tools. Policymakers should consider how these models can be applied in their individual jurisdictions.

Table 1: Summary of the benefits and costs of liquidity-crisis management tools

Tool	Application to MM	Benefits	Costs
Direct deposit Insurance	<ul style="list-style-type: none"> • Customers’ funds are insured. • Deposit insurer honors the liquidity claims of customers on demand. 	<ul style="list-style-type: none"> • Directly covers depositors’ funds. • Insures against risk of losses. • Consumer protection. • Contributes to financial stability. 	<ul style="list-style-type: none"> • Moral hazard. • Costly to a country’s fiscus. • Often deposit insurance does not exist in a developing country or is ineffective. • May create arbitrage opportunities.
Pass-through Deposit insurance	<ul style="list-style-type: none"> • Deposit insurance is not extended to the mobile network operator but is rather provided indirectly or “passed-through” by the custodial account 	<ul style="list-style-type: none"> • Grants special treatment to the float accounts for purposes of deposit insurance. • Consumer protection. • Insures against risk of bank failure. 	<ul style="list-style-type: none"> • Does not protect customers’ funds which are stored in other assets, such as government bonds. • Exposes customers to bank financial failure.

Pennsylvania, 10 October 2012), online: *Federal Reserve* <<https://www.federalreserve.gov/newsevents/speech/tarullo20121010a.htm>>.

¹⁵ The Alliance for Financial Inclusion and International Association of Deposit Insurers (2020) correctly recognizes the relationship between deposit insurance (an emergency liquidity tool) and consumer protection and financial inclusion. They state that deposit insurance results in consumer protection because it “fosters trust and confidence” and by having it – ultimately allows for financial inclusion. See Alliance for Financial Inclusion (2020), Issues Paper, at 18.

Tool	Application to MM	Benefits	Costs
	provider (which is either a bank or other insured depository institutions) to the digital depositors.	<ul style="list-style-type: none"> • Contributes to financial stability. 	<ul style="list-style-type: none"> • Costly and comes with an administrative burden, due to need for management and record keeping. • May increase regulatory costs and defeat financial inclusion goals. • May increase arbitrage opportunities.
Lender of Last Resort	<ul style="list-style-type: none"> • Illiquid assets of the MM firm such as government securities, are transferred to the central bank, in exchange for liquidity. 	<ul style="list-style-type: none"> • On standby, provides short-term loans to banks. • Stops economic distress from becoming financial distress. • Contributes to financial stability. 	<ul style="list-style-type: none"> • Moral hazard which may cause MM firms not to monitor their portfolio of MM investments. • Creates a funding subsidy for MM firms, leading to excessive risk taking (such as higher borrowing). • MM firm may not have sufficient high-quality collateral.

2. THE BACKGROUND PROBLEM

(a) Liquidity Problem

Mobile money users' funds are exposed to a range of risks within MM firms. One of such risks is a liquidity risk. This simply means that the MM firm is unable to redeem its assets quickly.¹⁶ In other words, it is cash-flow insolvent.¹⁷ It arises principally out of the storage function an MM firm provides. We can better understand this risk by examining how a MM firm stores or invests the cash it receives from its customers focusing on the source of liquidity problems and then the consequences.

(i) Source of Liquidity Problems

Generally, the liquidity problem may arise once a MM firm fails because it is unable to pay its debts (including customers' funds) as they fall due. It may also arise from the way customers' funds are stored or invested, especially if those assets also experience liquidity problems or fail.

A MM firm may invest users' funds in illiquid business assets, such as a mobile phone tower, creating so-called 'liquidity' risk. This means the MM firm may not be able to liquidate its assets in time to pay out users' funds. Banks also face a similar problem because they perform what is

¹⁶ Jonathan Greenacre, "New Thinking for Institutional Distress of Mobile Money Firms" at 18, online (pdf): *Digital Pathways at Oxford Paper Series* <https://pathwayscommission.bsg.ox.ac.uk/sites/default/files/2020-12/greenacre_-_new_thinking_for_institutional_distress_of_mobile_money_firms_-_dec_2020.pdf>.

¹⁷ This means the firm has an inability to pay debts as they fall due.

called liquidity transformation,¹⁸ that is, they convert customers' deposits which are very liquid and payable on demand, to illiquid assets (long-term loans and investments) which cannot be easily converted to meet unusual demands from depositors.

Regulation often aims to address this problem by requiring MM firms to store funds in a trust account with a bank and/or government securities.¹⁹ In theory, doing so can ensure that a MM firm always has sufficient liquid assets to cash-in users' funds if and when required. The issue, however, is that MM firms may not strictly adhere to safeguard rules and/or may find ingenious ways to circumvent these rules. This was typical with many banks – seeking higher profits and less prudential constraints – which ultimately culminated in the establishment of shadow-banks and the collapse of the financial system.²⁰

Even where trust and portfolio rules are complied with, storing funds in a bank is not entirely safe as banks are themselves a source of liquidity risks which in turn can cause a liquidity problem for the MM firm.²¹ This happens because the monies deposited by the MM firm into a pooled bank account may be used by that bank to fund its operations just like any other non-mobile money deposit. This means the trust asset – to which the MM customers are beneficially entitled – itself comprises a claim against a financial intermediary. In turn, this means the MM firm and, through it, customers' funds are exposed to various forms of credit and liquidity risks.

(ii) Consequence of Liquidity Problem

A short-term liquidity problem can create a range of problems. First, and most immediately, customers will be unable to obtain liquidity from the MM firm upon demand, which may mean they default on obligations they owe to others. This is similar to a depositor unable to obtain her funds from a bank deposit to honour cash-based payments she may need to make.

Second, the liquidity problem can morph into one of solvency.²² For example, the MM firm may engage in a fire sale of its assets to meet liquidity demands, which causes it to become balance sheet insolvent. Alternatively, mobile money customers may engage in a 'run' which is similar to that which depositors do in relation to banks. In this case, customers are unable to distinguish that the MM firm is only cash flow – and therefore temporarily – insolvent and instead believe it is balance sheet insolvent, and so rush to redeem their funds.²³

¹⁸ Armour et al., *supra* note 5 at 279.

¹⁹ For example, in M-Pesa, the MM firm is required to invest users' funds in commercial bank accounts and/or Government of Kenya securities: M-Pesa Amendment Deed, Clause 6.1. This provision was then codified in Kenyan regulations: see, e.g., *National Payment Systems Regulations*, 2014, r. 25(3)(f). Further, diversification depends on the amount in the trust account. If the amount in the trust account is below 100 million Kenyan shillings, funds must be stored in a 'strong rated bank'. If the amount is greater than 100 million KSh, only 25% of total funds can be stored in a single bank. The funds must also be held in a minimum of two 'strong rated banks': regs. 25(4) and Fourth Schedule.

²⁰ See Jézabel Couppey-Soubeyran, "Financial Regulation in the Crisis Regulation, Market Discipline, Internal Control: The Big Three Turmoil" (2010), online: *International Economics* <<https://www.cairn.info/revue-economie-internationale-2010-3-page-13.htm>> where it explains that while prudential regulation was introduced to limit risk taking by banks, "...market logic gradually found its place again in the banking sector, with the suppression of credit constraints, the liberalization of rates and the privatization of financial institutions among others, and held financial institutions to the relevant potential sanctions, such as investors' demand for profitability, threats of buyouts, and the variability of resource costs."

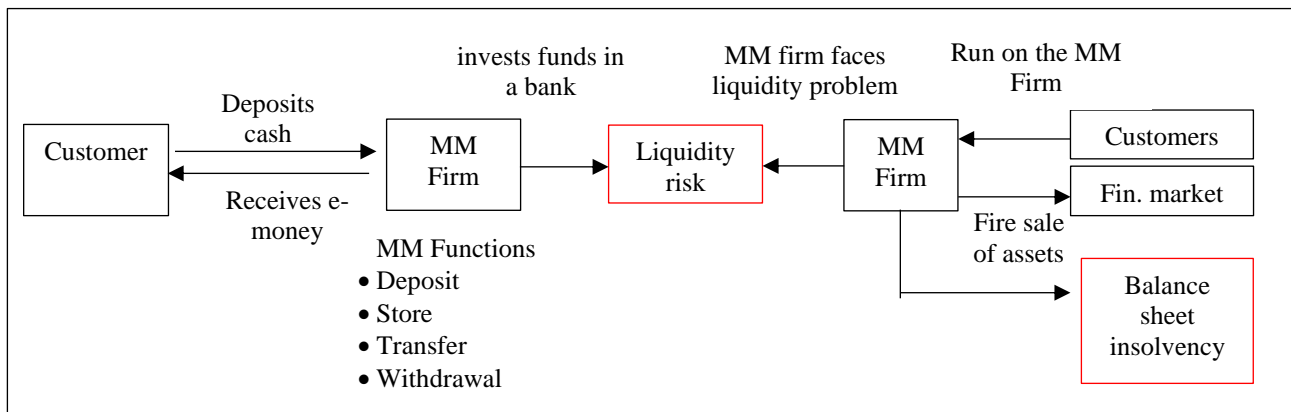
²¹ This is contrary to the assumption that many policymakers appear to have that storing funds in a bank account is a 'safe' approach. See Michael Klein & Colin Mayer, "Mobile Banking and Financial Inclusion: The Regulatory Lessons" (2011) World Bank Policy Research Working Paper No. 5664 at 16.

²² Armour et al., *supra* note 5 at 279.

²³ *Ibid.*

This approach can cause insolvency of the MM firm. Diagram One below illustrates how a liquidity risk can cause a cash-flow problem amongst MM firms, which may eventually lead to a more serious balance-sheet insolvency problem.

Diagram One: How liquidity risk occurs in mobile money



(b) Should Policymakers Do Anything?

Policymakers should only intervene in addressing liquidity problems in MM firms if there is evidence of a market failure, namely that mobile money actors are unable to design institutions which solve this problem themselves. We can think of at least three policy objectives which are based around economic justifications.

(i) Depositor or Consumer protection

The first justification is that customers, like depositors, will be unable to effectively co-ordinate in advance and, first, monitor the liquidity of MM firms and second, if a liquidity problem emerges, develop a response which ensures the ongoing viability of the MM firm. Such a response would involve *not* running to redeem their funds. However, this may not be the case in practice. This is due to a combination of information and co-ordination costs between mobile money customers, which prevents them from effectively monitoring the liquidity of the MM firm.²⁴ These costs are likely to be particularly severe for mobile money customers, many of whom may have little or no education (exacerbating information asymmetries with the MM firm and/or bank) and are often widely dispersed, living in rural areas (exacerbating co-ordination costs). These costs also arise at the level of the MM firm which is usually just one of many depositors of the bank(s) in which such funds are deposited, and so is unlikely to effectively monitor its bank(s) – meaning customers are

²⁴ Douglas Diamond & Phillip Dybvig, “Bank Runs, Deposit Insurance and Liquidity” (1983) 91:3 J. Political Economy 401. posit that banks are inherently fragile as depositors will withdraw their deposits when they expect other depositors to do the same. They do so due to the lengthy and costly corporate insolvency process and thus assume that obtaining their deposited moneys will be on a first-come-first served basis. This coordination problem causes a “bank run” by depositors where depositors withdraw or demand their deposits all at once. Dang, Gorton & Holmström (2010) state that even sophisticated funders or investors of banks are “information sensitive”, in that where there is a negative signal in relation to a bank, they will not take the effort to obtain credible information as they may deem it too costly to do so and just as retail depositors will also “run” and demand their deposits or funds: see Tri Vi Dang, Gary Gorton, & Bengt Holmström, “Ignorance, Debt and Financial Crisis” (2015), online: [Columbia University <http://www.columbia.edu/~td2332/Paper_Ignorance.pdf>](http://www.columbia.edu/~td2332/Paper_Ignorance.pdf). As a result, due to the asymmetry of information that the funders and investors would have, they are faced with an adverse selection problem which results in withdrawals and thus bank runs. See also Armour et al., *supra* note 5 at 321, who explain further that even in relation to more sophisticated investors, obtaining private information is too costly.

further exposed to information asymmetries on the use of their funds.²⁵ Behavioral biases amongst MM customers may amplify the information and co-ordination costs, providing an additional justification for regulation. For instance, the use of liquidity-crisis management tools for MM firms may reduce the propensity of MM customers (in a distressed scenario) to run.²⁶

(ii) Financial Inclusion

In this context, we might believe that low-income and unbanked communities will be unable to trust MM firms unless the state pre-commits to address potential liquidity problems on their behalf. There is however no apparent evidence that regulation makes a substantive difference to the options and actions of unbanked and low-income communities.²⁷ Nevertheless, the information asymmetries and behavioural problems amongst low-income unbanked individuals may amplify their concerns around depositor or consumer protection, which is likely to defeat financial inclusion efforts in these communities.

(iii) Negative Externalities

A stronger argument still is that collapse of a MM firm is a source of negative externalities and ultimately systemic risk. Negative externalities mean that a person or institution imposes costs on 'third parties' for which the person or institution is not fully charged.²⁸

Negative externalities are generally considered a market failure requiring intervention from governments. The idea is that third parties are unable to assemble and develop an agreement with the party or parties imposing the costs.²⁹ This is because there are too many third parties and/or there are insurmountable challenges of determining how to address the costs in question. Even if this were possible, it will be quite expensive for third parties to efficiently negotiate with the parties imposing the costs.

Negative externalities can contribute to systemic risk when the market activity in question is sufficiently large in comparison to the overall financial system and economy. For example, collapse of the country's payment system impacts so many people – firms, governments, consumers – that they are unlikely to meet together and develop agreements to protect against its occurrence. In this situation, disruption to financial activity can damage the financial system and have serious negative consequences for the real economy.³⁰

²⁵ In some countries that have a holding company structure, this problem may be three-tiered because the MM firm usually stores the funds with a holding company (who has legal title over the monies) who then stores the funds with a financial institution.

²⁶ Armour et al., *supra* note 5 at 64. Neuroeconomics links neuroscience with the social study of decision-making, with the goal of understanding the cognitive foundations of choice which may then explain the "mistakes" that consumers make in their decision-making. Behavioral economics shows that some errors made by consumers are persistent and predictable. Consumers have regret aversion, that is, action bias: and the implication of this insight is that consumers may act in an impulsive way.

²⁷ McKinsey reports that mobile telephone and MM connect "people who have little or no access to telecommunications due to the scarcity of fixed-line infrastructure" (2013), online: *McKinsey* <https://www.mckinsey.com/~media/mckinsey/industries/technology%20media%20and%20telecommunications/high%20tech/our%20insights/lions%20go%20digital%20the%20internets%20transformative%20potential%20in%20africa/mgi_lions_go_digital_full_report_nov2013.pdf> at 1.

²⁸ See Oren Sussman, *Market Failures, First Principles of Financial Economics*, (2017) at c. 6.

²⁹ Armour et al., *supra* note 5 at 65.

³⁰ For example, gridlock in the global inter-bank payment system or a loss of confidence banks worldwide would constitute 'a systemic failure in the global banking system.' See Söhnke M. Bartram, Gregory W. Brown and John E. Hund, "Estimating Systemic Risk in the International Financial System" (2005) FDIC Center for Financial Research Working Paper 2005, online: <<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.167.3780&rep=rep1&type=pdf>> at 4. Armour et al., *supra* note 5 at 78 states that, "...development in the financial system is causally important for economic growth."

Larger mobile money schemes may be a source of negative externalities and systemic risk, as Greenacre (2021) explores. Payment systems do appear to be a source of negative externalities.³¹ To the extent that they are, negative externalities should also be considered as a strong justification for regulatory intervention to address liquidity problems amongst MM firms.³² This justification is commonly used to apply liquidity-crisis management tools to banks.

Restriction on the access to users' funds can disrupt a host of essential services and goods, which sustain individuals and their families daily. An example of such a disruption was on 7 December 2018, when M-Pesa experienced a six-hour network outage. The consequences were significant because, at the time, payment platforms processed an estimated 679.3 million Kenyan shillings every hour. Once these transactions abruptly stopped, millions of households could not make payments to utility firms, vendors, hospitals, banks, government agencies, amongst others.³³

(c) Regulatory Intervention

To the extent we believe regulatory intervention in the form of liquidity-crisis management tools is justified, what form does it take? These tools should only support solvent but illiquid banks.³⁴ They aim to relax a bank's liquidity constraint, in doing so, avoiding the fire sale of illiquid loans or other assets, and enabling banks to remain open for business when usually any other type of firm would be forced into bankruptcy proceedings.³⁵ Tools include deposit insurance and lender of last resort (LOLR).

Measures such as liquidity-crisis management tools are thus used by policy makers to deal with liquidity risk to banks and the real economy.³⁶ Ex post regulatory tools are regulatory strategies used to minimize the fragility of banks which stems from the business of banking which is characterized by deposit-taking. They are used in relation to banks after an internal crisis event occurs such as cash flow problems. Applying liquidity-crisis management tools to MM firms

³¹ It is also critical for financial stability to have consistency of the MM service in good times and in bad times. The Bank of England holds this view and states that, "*The reliability and resilience of payments is so important to our economy that the UK Financial Policy Committee, tasked with identifying, monitoring and reducing systemic risks, lists avoiding serious interruptions in the provision of payment and settlement services as one of the very purposes of preserving financial stability.*" Christina Segal-Knowles, "Payments after the COVID crisis – emerging issues and challenges" (Delivered at London School of Economics and Centre for Economic Policy Research Webinar, 11 June 2020), online: <<https://www.bankofengland.co.uk/-/media/boe/files/speech/2020/payments-after-the-covid-crisis-emerging-issues-and-challenges-speech-christina-segal-knowles.pdf?la=en&hash=5398FAD3D7005A5D7CC9E87EE9FDD72C9E093B94>> at 6. The Bank of England is further of the view that prudential regulation, access to central bank liquidity and deposit insurance will give recipients (such as shops and businesses) "confidence that when someone taps their card or phone to pay, the amount promised will arrive in their account.

³² Armour et al., *supra* note 5 at 57-58.; see also in relation to externalities and macroprudential regulation, Stijn Claessens, "An Overview of Macroprudential Policy Tools" (2014) IMF Working Paper, online: *IMF* <<https://www.imf.org/external/pubs/ft/wp/2014/wp14214.pdf>>; see also in relation to externalities and being too central to fail, Stefano Battiston et al., "DebtRank: Too Central to Fail? Financial Networks, the FED and Systemic Risk" (2012), 2:541 *Sci. Rep.* online: *PubMed* <<https://pubmed.ncbi.nlm.nih.gov/22870377/>>; see also in relation to systemic risk stemming from a network of interconnected actors, Luca Enriques, Alessandro Romano, & Thom Wetzer, "Network-Sensitive Financial Regulation" (2019) 45 *J. Corp. L.* 351.

³³ See Nation, "Safaricom Probed over Costly M-Pesa" Outage online: *Nation* <<https://nation.africa/kenya/business/safaricom-probed-over-costly-m-pesa-outage-117140>>.

³⁴ Dan Awrey & Kristin Van Zwieten, "Mapping the Shadow Payment System" (2019) SWIFT Institute Working Paper No. 2019-001, online: *SWIFT Institute* <<https://swiftinstitute.org/research/https-swiftinstitute-org-wp-content-uploads-2019-10-mapping-the-shadow-payment-system-vfinal-pdf/>> at 11.

³⁵ Dan Awrey, "Bad Money" (2020) 106 *Cornell Law Review*, Cornell Legal Studies Research Paper No. 20-38 at 20.

³⁶ Armour et al., *supra*, note 5 at 318.

would be adopting a functional approach to regulation.³⁷ Namely, if MM firms create the same, or substantially the same liquidity risks as banks, there is prima facie a case for applying liquidity-crisis management tools to them.³⁸ This seems appropriate given that mobile money challenges the traditional definition of a “deposit”; providing a similar functionality under a different name.³⁹

(d) Policy Issues and Trade-offs

The potential liquidity problems may make a liquidity-crisis management scheme attractive, but policymakers must be careful given the issues and trade-offs which arise. Three are particularly important.

The first is moral hazard. MM firms may be incentivized ex-ante to take on more customers’ funds and more importantly, fail to take the necessary steps to safeguard customers’ funds, due to the existence of the liquidity-crisis management tools ex-post.

Secondly, in most developing countries and Africa in particular, the fiscus is limited. Thus, these countries may - due to limited resources - face significant difficulty in providing liquidity support to MM depositors, which could result in MM customers not being indifferent to running.

As has been stated above, liquidity-crisis management tools form part of a regulatory toolkit which allows for banks to continue operating in good times and in bad. This is particularly important in relation to MM due to its growth and importance in unserved and underserved communities. Thus, liquidity-crisis management tools have a positive effect on financial inclusion.

There are challenges in implementing liquidity-crisis management powers and so they should not be automatically transplanted and applied on MM firms⁴⁰ (or even on banks) in developing countries, particularly in Africa. Firstly, there are policy tradeoffs involved. Where there are higher regulatory costs, it makes it more costly to provide the MM service. Secondly, regulation changes the role of MM in the financial system and the real economy. By having liquidity-crisis management tools apply to MM firms, the service moves away from operating like a regular MM system (wherein customers/users/society are fully exposed to the risk of failure) to resembling banks (as the state guarantees the MM deposits and payments, and it is the public which is exposed to the risk of failure). Further, operating like banks introduces the possibility of moral hazard which then requires ex-ante measures to be taken.⁴¹

³⁷ Policymakers may believe that the liquidity problems in mobile money can be easily addressed through heightened banking regulation. The rationale for this argument may perhaps be that if banks are better regulated, funds deposited with such entities (including users’ funds held in a pooled account) are safe. However, as the paper explains, an MM firm may experience a liquidity problem outside of a bank by investing in illiquid assets or other financial instruments which indirectly expose customers’ funds to liquidity risks. Hence, policymakers must seek to address the liquidity challenges that arise from the liquidity mismatch that an MM firm faces.

³⁸ Indeed, the Bank of England’s approach to payment systems and innovation such as mobile money is that “*regulation should be technology neutral: based on the activity conducted and the risks posed, not the technology used or the entity’s legal form. In other words, same risks same regulation.*” Segal-Knowles, *supra* note 31.

³⁹ Juan Carlos Izaguirre, Claire McGuire & Dave Grace, “How Can Indirect Deposit Insurance Work in Digital Finance” (2016), online: *CGAP Blog Series* <<https://www.cgap.org/blog/how-can-indirect-deposit-insurance-work-digital-finance>> [Izaguirre, McGuire & Grace 2016].

⁴⁰ Alan Watson, *Legal Transplants: An Approach to Comparative Law*, 2nd ed. (Athens, G.A.: University of Georgia Press, 1993). Watson indeed defines legal transplants as, “...the moving of a rule or a system of law from one country to another, or from one people to another...” He states that this is a very common occurrence, which has occurred ‘since earliest recorded history.’

⁴¹ Armour et al., *supra* note 5 at 336.

Thirdly, resource constraints of developing countries could affect the credibility of the promised backing. The inability to use the tools can impede consumer protection and financial stability.

Fourth, the effects of the insolvency regime on the treatment of customers in the event of failure of a firm. In analyzing the liquidity-crisis management powers, the policy implication is that individual countries will have to consider the efficacy and viability of each tool given the prevailing MM governance landscape, and in some cases, make modifications to the regulatory landscape prior to the adoption and implementation of liquidity-crisis management tools.

Each country will have to consider the benefits and costs of liquidity-crisis management tools and consider the local regulatory landscape. The next section examines information we have so far.

(e) Existing Work

Despite the apparent importance of liquidity-crisis management tools for larger MM firms, there is very little scholarship on this point. For example, Armour and Awrey (2015) argue that a lack of analysis of the potential systemic consequences of the collapse of MM firms is a potentially important “lacuna” given the size of the service in many countries in which it operates.⁴² Izaguirre et al. (2019) argue that deposit insurance and pass-through deposit insurance should only be the “last line of defense” to protect MM firm customers and that the “main line of defense” is risk-based prudential regulation and supervision.⁴³ They also state that such regulation is necessary in order for the existence of deposit insurance to curtail excessive moral hazard. However, in outlining their arguments against deposit insurance, they state that deposit insurance “diverts attention and resources” away from financial institutions that have wider activities. This stance does not sufficiently reckon with the far-reaching effects of the failure of MM firms themselves and views the “narrow” activities of MM as a proxy for risk. Staschen et al. (2018) emphasize risk-based supervision of MM firms in keeping customers’ funds safe in order to fulfil the policy goal of financial inclusion.⁴⁴ This they state, is because MM firms are less complex and pose less risks.

⁴² John Armour & Daniel Awrey, “Prioritising the Implementation of International Financial Regulation” (2015) The Commonwealth, Economic Papers Series. Concerns have been raised that mobile money may increase the velocity of payments in the money transfer system (See Michael Klein & Colin Mayer, “Mobile Banking and Financial Inclusion: The Regulatory Lessons” (2011) Frankfurt School of Finance and Management Working Paper Series No. 166 at 10. The initial research on this topic suggests mobile money does not increase such velocity substantively and so is unlikely to have macro-economic effects and inflation (See Janine Aron & John Muellbauer, “Does Mobile Money Cause Inflation? Evidence from Inflation Models for Uganda: A Policy Brief” (2015), online: *University of Oxford Said Business School* <http://www.sbs.ox.ac.uk/sites/default/files/research-projects/mobile-money/Mobile-money-inflation-30April.pdf>; Janine Aron, John Muellbauer, & Rachel Sebudde, “Inflation Forecasting Models for Uganda: is Mobile Money Relevant?” (2015), online: *University of Oxford Said Business School* <<http://www.sbs.ox.ac.uk/sites/default/files/research-projects/mobile-money/inflation-forecasting-16April.pdf>>. These scholars also argue that such firms should be treated as systemically important financial institutions.

⁴³ Juan Carlos Izaguirre & Denise Dias, “Deposit Insurance: The Last Line of Défense for E-Money” (2019), online: *CGAP Blog* <<https://www.cgap.org/blog/deposit-insurance-last-line-defense-e-money>> at 15.; Juan Carlos Izaguirre & Denise Dias, “Risk-Based Supervision is Key to Financial Inclusion in 2020 & Beyond” (2020), online: *CGAP Blog* <<https://www.cgap.org/blog/risk-based-supervision-key-financial-inclusion-2020-beyond>>. See also Izaguirre, Claire McGuire & Dave Grace, “Deposit Insurance for Digital Financial Products; 3 Approaches” (2015), online: *CGAP Blog* <<https://www.cgap.org/blog/deposit-insurance-digital-financial-products-3-approaches>> [Izaguirre, McGuire & Grace 2015].

⁴⁴ Denise Dias, & Stefan Staschen, “A Guide to Supervising E-Money Issuers” (2018), online: *CGAP* <<https://www.cgap.org/research/publication/guide-supervising-e-money-issuers>>.

This work, however, does not deal directly with the liquidity risk (which they correctly identify,)⁴⁵ actually materializing, unlike this paper.

In addition, the implementation challenges with pass-through deposit insurance have also been observed, as well as the risk that even if the MM firm customers and their accounts could be correctly identified, it is not clear how the deposit insurer will release funds to MM customers in remote areas, those in the informal economy, and those that do not have access to any other financial service.⁴⁶ This is a valid question as the operational challenges have not been tested as yet.

The next two sections explore the issues, benefits and costs involved in applying liquidity-crisis management regimes to MM firms in institutional distress. The aim is to provide a broader understanding of the many issues that arise when using such regimes.

3. DEPOSIT INSURANCE

This section outlines the basic operation of deposit insurance (Section (a)) and then explores how to apply this tool to mobile money (Section (b)).

(a) Basic Operation and Policy Issues

Deposit insurance in the limited sense refers to the insurance that retail depositors receive when a bank fails, whereas deposit insurance in a wider sense also includes other ex-post mechanisms such as general guarantee schemes (as well as bailouts and others).⁴⁷ In this context, we are referring to deposit insurance in the narrow sense. Deposit insurance is designed to step into the shoes of a distressed bank by honouring the bank's commitments in terms of liquidity demands.⁴⁸ They allow for eligible depositors to be repaid funds up to a predetermined cap in the event of a bank's economic distress.⁴⁹

Deposit insurance seeks to credibly promise to perform any obligations to depositors that the bank does not, due to liquidity transformation mismatches. It provides assurance to short-term funders that their claims on the bank will be met by a third party where the bank defaults.⁵⁰ The objective of deposit insurance is to put depositors in the same position as they would have been in, had the bank not failed, thus eliminating depositors' incentives and making them indifferent to run.⁵¹ Deposit insurance involves the shifting of the illiquidity risk from the bank and its depositors to a third party, being the central bank (but usually through a deposit insurance corporation), as central banks theoretically do not have liquidity or solvency constraints.

⁴⁵ *Ibid.* at 6.

⁴⁶ World Bank, "Prudential Regulatory and Supervisory Practices for Fintech: Payments, Credit and Deposits" (2019) at 28, online (pdf): *World Bank* <<https://documents1.worldbank.org/curated/en/954851578602363164/pdf/Prudential-Regulatory-and-Supervisory-Practices-for-Fintech-Payments-Credit-and-Deposits.pdf>>.

⁴⁷ Franklin Allen, Elena Carletti, & Agnesse Leonello, "Deposit Insurance and Risk Taking" (2011), 27:3 *Oxford Review of Economic Policy* at 464.; Armour et al., *supra* note 5 at 332. These 'guarantee schemes' extend beyond retail deposits and may include unsecured debt liabilities which the government may guarantee to avoid widespread instability.

⁴⁸ Awrey & Van Zwieten, *supra* note 1 at 795.

⁴⁹ *Ibid.*

⁵⁰ Armour et al., *supra* note 5 at 333.

⁵¹ Armour et al., *supra* note 5 at 333;

If deposit insurance is successful, the liquidity problem is resolved because depositors will receive their outstanding balances from the insurer, and the bank is able to avoid a balance-sheet insolvency scenario. Ultimately, the conditions for a successful implementation of deposit insurance are that, firstly in relation to timing, the scheme must pay out quickly if the bank defaults, and secondly in terms of the amount and extent, it must pay out in full, thirdly, there needs to be credibility in the backing, in that there must be a credible promise to depositors to pay out.⁵²

It is important to note that while the insurance is usually paid out to the depositors account, not the firm, recent studies also show that since 2016, deposit insurance funds have increasingly been used for purposes other than depositor protection including recapitalisation of distressed banks.⁵³ This trend is statistically significant even in developing countries and can help promote confidence in the banking sector.⁵⁴ If no resource constraints exist, this trend can have the effect of further reducing the likelihood of bank insolvency, as deposit insurance will be applied to illiquidity that can arise from sources other than ordinary depositors, including other short-term funders and creditors seeking to redeem their investments from the distressed bank.

The main challenge with deposit insurance is moral hazard on the part of the bank, in that the existence of the insurance and the guarantee of the deposits by a third party, may mean that banks are incentivised to take on more risks as the insurance offered, relaxes the credit and liquidity constraints of banks.⁵⁵ The availability of deposit insurance may encourage banks to take more deposits and to increase in scale or take up more leverage in their capital structure.⁵⁶ This moral hazard problem occurs because with deposit insurance, the banks and investors capture all of the benefits of the insurance, however, they do not internalise all of the costs associated with bank fragility and consequently failure.

A way to ameliorate the cost of deposit insurance, being moral hazard and subsidy is to put the cost of the insurance coverage onto the industry, by requiring the compensation to be funded by the banks and for the levies on the banks to be adjusted according to the riskiness of each bank's activities.⁵⁷ The moral hazard problem can thus be dealt with adequately through the pricing of the liquidity provision by the central banks.⁵⁸ The effect of this for mobile money firms however is that this increased cost of regulation may be passed on to the customers which may then have a negative effect on financial inclusion. This is particularly so as mobile money accounts are frequently used by low-income customers.⁵⁹

Diagram Two: Operation of deposit insurance

⁵² Armour et al., *supra* note 5 at 334-335; Iceland serves as a cautionary example of the importance of a credible promise; Northern Rock also serves as an example of the importance of these three factors in determining designing an effective deposit insurance scheme, as depositors did in fact run. After reforms brought about by the EU, the cap on deposits was raised, co-insurance was removed and the payout promise is quicker, being seven days.

⁵³ Deniz Anginer et al., "Bank Regulation and Supervision Ten Years after the Global Financial Crisis" (2019) World Bank Policy Research Working Paper 9044 at 12.

⁵⁴ *Ibid.* At 13.

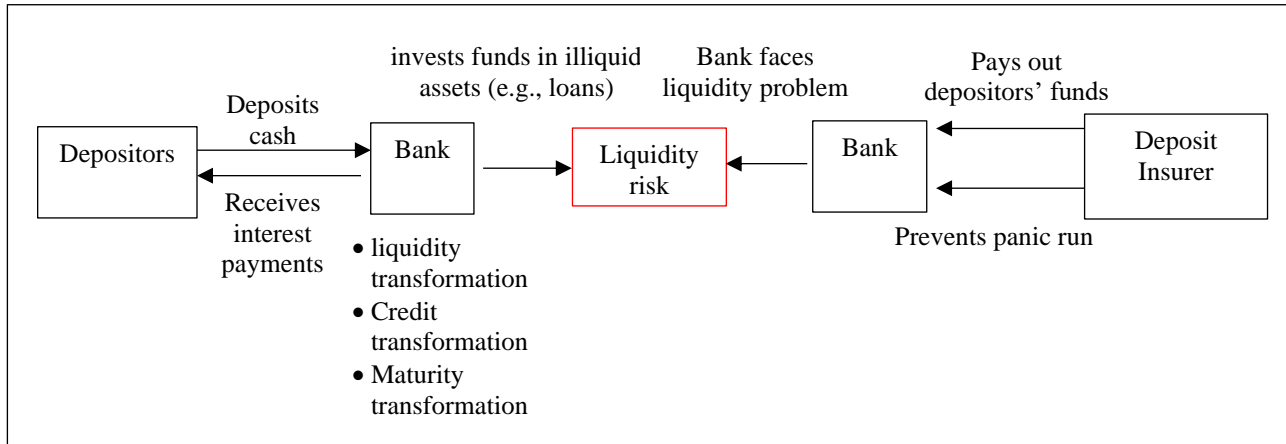
⁵⁵ Armour et al., *supra* note 5 at 336.

⁵⁶ *Ibid.* At 336.

⁵⁷ *Ibid.* At 336.

⁵⁸ *Ibid.* At 330.

⁵⁹ Izaguirre & Dias, *supra* note 43.



(b) Application to Mobile Money

We have established earlier in this paper that policymakers normally apply liquidity-crisis management tools like deposit insurance to banks only, not non-banks such as MM firms. Hence, for deposit insurance to be credible in MM, policymakers will first have to expand the list of deposit insurance members to include MM firms. This would place MM firms on the same level as banks with respect to deposit insurance and ensure that each MM customer is treated as an eligible depositor for the purposes of the insurance coverage.

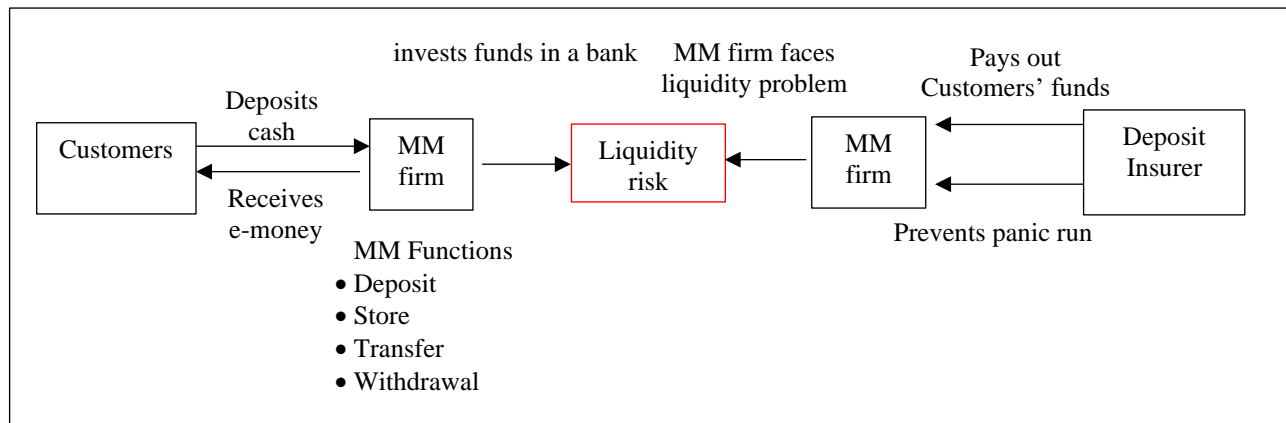
In this context, customers, not the MM firms are insured against the risk of loss. Thus, deposit insurance will step into the shoes of the MM firms and honour commitments to liquidity demands due to liquidity transformation mismatches and economic distress. In other words, the state pays funds that an insolvent MM firm owes to customers, usually up to a pre-arranged amount (the coverage limit).⁶⁰ In this case, customers are insured directly, while the MM firm pays a premium for the state insurance.

Mobile money firms will thus be protected from economic distress resulting in financial distress due to the protection from illiquidity risks. Assuming there are no statutory limitations on the deposit insurance coverage, a successful application of deposit insurance to mobile money will ensure that all funds deposited with an MM firm are protected, regardless of how those funds are later stored or invested by the MM firm. Thus, the digital value of a customer's deposit will be insured against the risk of loss even if the MM firm places the physical funds in an institution that is not a member of the deposit insurance system such as a bank.

This insurance mechanism will provide an ex-ante assurance to MM customers that their claims on the MM firm will be met by a third party in case the MM firm defaults, thereby reducing the propensity of customers to run on the MM firm since the risk of delay or loss of funds is eliminated by the provision of deposit insurance.

Diagram Three: Application of deposit insurance to MM

⁶⁰ Deposit insurance aims to put depositors in the same position as they would have been in, had the bank not failed, thus eliminating depositors' incentives, and making them indifferent to run. See Armour et al., *supra* note 5 at 333.; Diamond & Dybvig, *supra* note 24. The same logic can apply to mobile money.



(i) Main issues with application of deposit insurance to MM

In the succeeding paragraphs, this paper identifies five main issues that are likely to arise with the application of this tool to MM.

(ii) Deposit insurance may not exist

Deposit insurance does not exist in many developing countries that use mobile money and so it may be impracticable for deposit insurance to be extended to MM in such countries. Currently, about 146 countries have an explicit deposit insurance scheme,⁶¹ however, about 13 African countries are yet to introduce any formal deposit insurance scheme for depositors of financial firms. These include Bermuda, Botswana,⁶² Burundi, Egypt, Ethiopia, Guinea, Lesotho, Madagascar, Mauritius, Sierra Leone, Somalia, Swaziland and Zambia.

(iii) Low ceiling

Alternatively, deposit insurance may exist, but the ceiling is so low that it provides limited protection for customers' funds. Recent reports show that between 2015 and 2020, the value of inflows and outflows between mobile money platforms and banks has grown to about \$68 billion. This type of interoperability provides majority of individuals in the informal sector access to the formal sector; however, it also exposes their funds to the risks of illiquidity if the banking sector suffers from a financial shock. Kenya's deposit guarantee scheme insures funds up to a maximum of KSh500,000, or about \$4,600 approximately.⁶³ This means majority of customers' funds – usually pooled into one or more bank accounts and worth several billions in dollars⁶⁴ - are virtually completely uninsured against bank failure.⁶⁵

(iv) Resource Constraints

⁶¹ See the International Association of Deposit Insurers, online: <<https://www.iadi.org/en/deposit-insurance-systems/dis-worldwide/>>.

⁶² Botswana became an associate member of the International Association of Deposit Insurers in September 2021 and is at an advanced stage of setting up a deposit protection fund. Financial Stability Report (2021), Bank of Botswana Financial Stability Council at 34.

⁶³ See Kenya Deposit Insurance Corporation, online: <<http://kdic.go.ke/depositors>>.

⁶⁴ In 2013, the M-Pesa Holding Company (the firm which actually receives funds in M-Pesa) held £4.8 billion of customers' funds in a bank deposit with the CBA. This number has increased significantly since then.

⁶⁵ William Jack & Tavneet Suri, "The Economics of M-Pesa" (2010) Massachusetts Institute of Technology Working Paper, online: MIT <<http://www.mit.edu/~tavneet/M-PESA.pdf>> at 10.

It is questionable whether credible promises can be provided due to the resource constraints of developing countries. The goal of deposit insurance is for depositors to be indifferent to running, due to the fact that they will be able to have their liquidity demands met and thereby obtain their deposits from the bank or the government. In developing countries however, the credibility of such a mechanism is tenuous in some countries as the fiscal purse may not be strong. Therefore, the third party must be of “impeccable financial standing”⁶⁶ and must pay out in full.⁶⁷ In theory, a central bank is not limited in the amount of money that it has, however, in smaller economies, central banks do not have access to large sums of money. In addition, deposit insurance is attached to the solvency of the bank and the central bank, but also the solvency of the government as a whole (Iceland serves as an example).⁶⁸

(v) *Potential moral hazard*

MM firms may be incentivised ex-ante to take on more customers’ funds and more importantly, fail to take necessary steps to safeguard such funds due to the existence of deposit insurance ex-post. Due to the high levels of penetration and the pervasiveness of the use of mobile money payments, MM firms may be made to fund the scheme to ameliorate the negative incentive. In addition, as mobile money customers are classified as unsecured creditors in the insolvency process of many African jurisdictions, such payment by MM firms in the form of levies, could be ringfenced by the levies being paid to and held by the central bank. This, however, may increase the cost of doing business which may be passed onto mobile money customers, which would decrease the utility of mobile money payments to customers.

Further, where MM firms take on more risk ex-ante due to the existence of deposit insurance, Stefan Staschen et al. (2018) argues that policymakers may implement “proportional supervision” as part of a prudential toolkit to ameliorate the problems of moral hazard.⁶⁹

(vi) *Operational issues*

Adopting deposit insurance for MM may require expanding the size of the deposit insurance fund available to all members of the deposit insurance system. Policymakers may also need to consider the merits of increasing the premiums or applying different premiums for MM firms.⁷⁰ Resolving all these issues will not be straightforward.

We shall now outline the benefits and costs of deposit insurance to MM.

Table Two: Benefits and costs of deposit insurance to MM

⁶⁶ Armour et al., *supra* note 5 at 333.

⁶⁷ *Ibid.* At 334.

⁶⁸ In most recent times, so does Zambia in relation to its “limited fiscal space” which will lead to debt defaults, see Cortterill, Stubbington & Fletcher, “Zambia warns it is preparing for default” (2020), online: *Financial Times* <<https://www.ft.com/content/e56c2a34-16e4-4974-9df8-a72c092c5ee2>>.

⁶⁹ See CGAP, “Proportional Supervision for Digital Financial Services”, online: CGAP <<https://www.cgap.org/topics/collections/proportional-supervision-digital-financial-services>>.

⁷⁰ Izaguirre & Dias, *supra* note 43.

Benefits	Costs
Deposit insurance covers the deposits of the customers. MM firm customers should be indifferent to a panic.	Costly to the fiscus which is limited in developing countries.
	Moral hazard as MM firms may take more risks eg, not effectively monitoring or adjusting their portfolio holdings in assets/investments where liquidity issues may arise.
	Requiring MM firms to fund insurance schemes as an industry may increase the cost of operation.
	May create arbitrage opportunities.
	Increased cost of operation may result in increased transaction fees for mobile money use thus decreasing the utility to MM customers, which may hamper financial inclusion.

We shall now consider an indirect approach to deposit insurance that has been introduced in a few countries.

4. PASS-THROUGH DEPOSIT INSURANCE

This section outlines the basic operation of pass-through deposit insurance (Section (a)) and then explores how to apply this tool to mobile money (Section (b)).

(a) Basic Operation and Policy Issues

Some countries have begun to adopt this indirect (or pass-through) deposit insurance approach to protect the digitally stored value of customers. Its full operation is still unclear; however, it is expected to enable policymakers to extend deposit insurance coverage to deposited funds stored within financial entities outside the deposit insurance system.⁷¹ Under this approach, the non-bank deposit entity aggregates customers' funds and stores in a custodial account with an eligible deposit insurance member (usually a bank). The custodial accounts are held for the end customer's benefit, as the insurance is applied to the beneficiaries of the accounts.⁷² If the bank fails, deposit insurance is offered indirectly through the custodial account provider (the bank) to each of the customers of the non-bank as if they were individual depositors of the insured bank.⁷³

The coverage limit applicable to e-money balances may vary for individual countries.⁷⁴ Some countries impose a coverage limit on the aggregate sum of a customer's balance in all accounts held with an institution (directly or indirectly through a pooled bank account).⁷⁵ In other countries, the coverage limit applies separately to e-money balances irrespective of other accounts held by the customer in the same institution.⁷⁶

⁷¹ Kenya and Nigeria have introduced this tool to protect customers funds. See Izaguirre, McGuire & Grace 2015, *supra* note 43.

⁷² Izaguirre, Dias & Kerse, *supra* note 4 at 11

⁷³ Izaguirre, McGuire & Grace 2016, *supra* note 39.

⁷⁴ The World Bank points out that, "the limit applied is the sum of the amounts individual e-money customers would have had insured if they had been direct customers of the bank. This would provide some protection for customers from a failure of the bank." See World Bank, *supra* note 46 at 27.

⁷⁵ For example, Nigeria and Rwanda; see Izaguirre, Dias & Kerse, *supra* note 4 at 14.

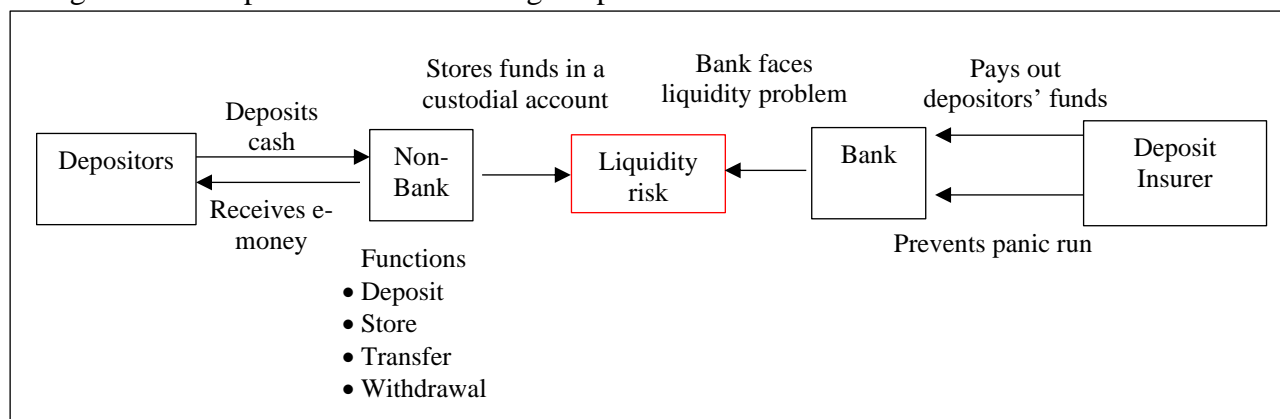
⁷⁶ Jamaica & Kenya, *supra* note at 14.

A major challenge is that legal frameworks for custodian accounts may not exist in many countries. Without a viable framework, policymakers may not be able to extend pass-through deposit insurance to digitally stored value held with non-members of the deposit insurance system. Even where a framework exists, the requirements may be so cumbersome; making the implementation of pass-through insurance impracticable.⁷⁷

Secondly, statutory limits on the total deposit insured may not eliminate the incentives to run. Hence, where the aggregate of a customer’s funds with the non-bank firm deposited in a custodian account, and the funds in her personal bank account (with the same bank) exceeds the total deposit insurance coverage per customer, she may be incentivized to rush to collect her funds for fear that she may lose a portion of her wealth.

Thirdly, it appears this indirect approach is only implemented where the eligible deposit insurance member defaults or is in distress.⁷⁸ Where the original deposit service provider fails, it is unclear how the pass-through deposit insurance will work. Where the non-deposit insurance member fails, the custodial bank and the deposit insurer may be left without the information needed to satisfy customers’ claims. Diagram Five illustrates the basic operation of pass-through deposit insurance

Diagram Four: Operation of Pass-through deposit insurance



We shall now consider the application of pass-through deposit insurance to mobile money.

(b) Application to mobile money

The application of this tool to mobile money is largely similar to the general application explained above. Policymakers are increasingly adopting this approach and imposing pass-through deposit insurance for mobile money. Indeed, countries like Kenya and Nigeria have introduced pass-through deposit insurance to mobile money, however, its implementation is yet to be fully operational in those countries. In this situation, the deposit insurance provider acknowledges that the MM firm’s pooled custodial bank account can be characterized as a number of smaller accounts for the purposes of deposit insurance protection.⁷⁹ In effect this means each mobile money account

⁷⁷ Izaguirre, McGuire & Grace 2016, *supra* note 39.

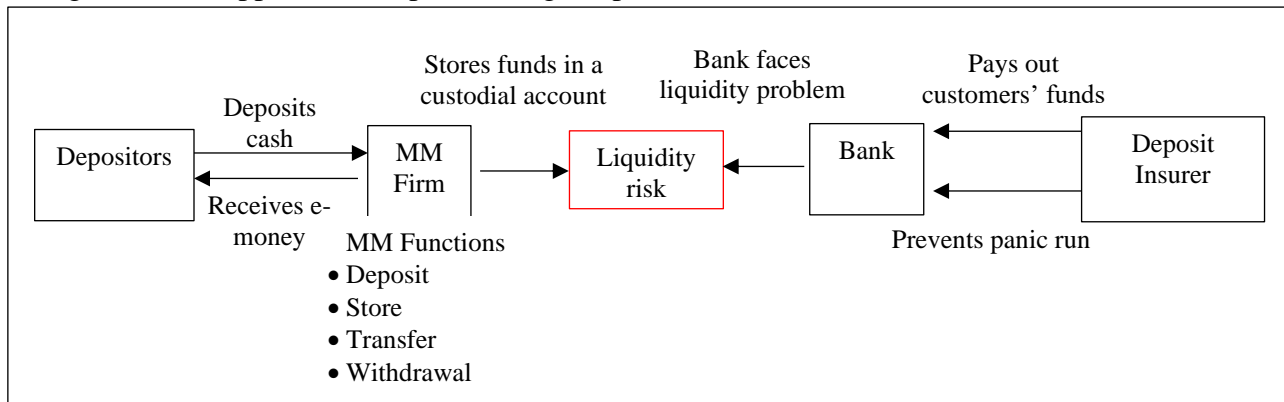
⁷⁸ *Ibid.*

⁷⁹ Juan Carlos Izaguirre et al., “Deposit Insurance and Digital Financial Inclusion” (2016), online: *CGAP*, <https://www.cgap.org/sites/default/files/Brief_Deposit_Insurance_and_Digital_Financial_Inclusion.pdf> at 3.

receives the full protection of the country's deposit insurance scheme.

The pass-through approach does not require the MM firm to become a member of a deposit insurance system, but it requires the deposit-taking institution (a bank or other financial institution) holding the float account to be a member of an existing deposit insurance system.⁸⁰ Diagram Five below illustrates its operation to mobile money

Diagram Five: Application of pass-through deposit insurance to MM



We shall now consider the issues involved with applying pass through insurance to mobile money.

(i) *Issues with Applying Pass through Insurance to MM*

In addition to the general issues highlighted in Section 2.3.1 above, this paper identifies additional issues which arise when applying pass through deposit insurance to mobile money.

(ii) *Herdling of investments*

Requiring MM firms to store funds in a bank and/or encouraging them to do so by extending pass through deposit insurance to such funds, may reduce diversification of fund assets and increase correlated shocks. Diversification requirements mandate MM firms in certain countries to store customer funds- or a portion of it- in corporate and/or government bonds.⁸¹ In particular, this trust asset is available to MM firms in the Philippines and countries in the West African Economic and Monetary Union (WAEMU), which includes Benin, Burkina Faso, Ivory Coast, Guinea-Bissau, Mali, Niger, Senegal, and Togo)⁸² or company bonds in WAEMU⁸³. This brings diversification as bonds, particularly government bonds, are safer than bank deposits. Herding of investments into banks creates correlated investment risk.⁸⁴

⁸⁰ Izaguirre, Dias & Kerse *supra* note 4 at 12.

⁸¹ Jonathan Greenacre, *Safeguarding Funds Stored in Mobile Money Systems* (2020), Briefing Paper for the Fletcher School of Law and Diplomacy Tufts University and the Bill and Melinda Gates Foundation at 23.

⁸² BCEAO *Instruction regarding E-Money Issuance*, art. 33-34 and circular 649.

⁸³ In the WAEMU, an MM firm can store customers' funds in one or more of the following: (1) bank deposits; (2) securities issued by central governments; (3) securities issued by regional financial institutions; and/or (4) securities issued by companies listed on the West African Regional Securities Exchange: see *Central Bank of West African States Instruction regarding E-Money Issuance*, art. 33-34.

⁸⁴ See the discussion on herd behaviour and contagion by Marco Cipriani & Antonio Guarino, "Herd behaviour and Contagion in Financial Markets" (2010) Institute for International Economic Policy Working Paper Series.

Due to the fact that the institution that holds the custodial accounts is a deposit-taking institution, MM firms will be highly interconnected with the formal banking system and the distinct separation of MM firms from the formal banking system will be lost. Thus, MM firms will be exposed to the failure of the formal banking system. The float accounts are held in banks (or other financial institutions) however, banks can fail, and such failure could lead to the failure of the MM firms as the digital depositors in a panic, may have unusually high cash withdrawal demands which results in liquidity mismatches. This can be solved by transferring the funds held for digital depositors to a float account of a solvent bank or paying out to the trustee.⁸⁵

(iii) Conflict with other policy goals

Pass-through insurance can have negative effects on other policy goals. The interconnectedness with the banking system can result in negative externalities. This is because it is assumed that the bank where the custodial accounts are kept will always be solvent. Thus, the policy goal of protecting MM consumers can result in a conflict with other policy goals such as financial stability.

(iv) Operational Issues

There are also practical challenges as regards the implementation of pass-through deposit insurance as it is prone to human and technological error.⁸⁶ Two types of issues are particularly important.

One of these is detailed record keeping.⁸⁷ Detailed record-keeping is required in order to identify beneficiaries and outstanding balances of mobile money customers. Such a requirement can be very challenging.⁸⁸

A second is paying out funds. The World Bank (2019) correctly identify implementation challenges with pass-through deposit insurance and identify the risk that even if the MM firm customers and their accounts could be correctly identified, it is not clear how the deposit insurer release funds to MM customers in remote areas, those in the informal economy, and those that do not have access to any other financial service.⁸⁹ This is a valid question as the operational challenges have not been tested as yet.

(v) Arbitrage

Providing pass-through deposit insurance to MM firms provides for an opportunity to arbitrage. This is because MM firms are providing a payment system function which is the same or similar to what is provided by banks.⁹⁰ However, these firms are not normally subject to the regulatory obligations that banks are subject to, due to not falling within the legal definition of a bank.⁹¹

⁸⁵ Izaguirre, Dias & Kerse, *supra* note 4 at 13.

⁸⁶ Izaguirre et al., *supra* note 79.

⁸⁷ World Bank, *supra* note 46 at 28.

⁸⁸ Izaguirre, Dias & Kerse, *supra* note 4 at 12.

⁸⁹ World Bank, *supra* note 46 at 28.

⁹⁰ If direct deposit insurance were to be applied to mobile money, policymakers may also face the issue of arbitrage. However, it can be calibrated to the peculiar business model of mobile money.

⁹¹ Jonathan Greenacre, "Regulating Mobile Money: A Functional Approach" (2018) Pathway for Prosperity Commission Background Paper Series No. 4, online (pdf): <https://pathwayscommission.bsg.ox.ac.uk/sites/default/files/2019-09/regulating_mobile_money.pdf> at 16.; Dan Awrey & Kathryn Judge, "Why Financial Regulation Keeps Falling Short" (2020) ECGI Working Paper Series in Law Working Paper No. 494/2020 at 8-9.; Armour et al., *supra* note 5 at 646.

The table below outlines the benefits and costs of applying pass through insurance to mobile money.

Table Three: Benefits and Costs of Pass-Through Insurance

Benefits	Costs
Allows for obligations to MM firm customers to be met.	Many countries do not have a legal framework for custodial accounts, and those who do are not fully operational.
Problems of moral hazard are reduced compared to direct insurance.	May reduce diversification of fund assets and increase correlated shocks.
Disincentivises MM firm customers from panicking when a MM firm is in distress.	Caps on deposit coverage may provide banked customers with incentives to run.
	Uncertainty around implementation of pass-through insurance if MM firm fails.
	Exposes MM firm to bank failure.
	It is costly and there's an administrative burden of paying out funds and keeping records of custodial accounts, which could be passed on to the MM customers.
	May impede other policy goals such as financial stability.
	Provides opportunity for arbitrage.

We shall now consider LOLR facilities.

5. LENDER OF LAST RESORT

This section outlines the basic operation of LOLR facilities (Section (a)) and then explores how to apply this tool to mobile money (Section (b))

(a) Basic Operation and Policy Issues

LOLR provides insurance to the bank directly, not the depositors, when a liquidity problem arises. LOLR extends short-term collateralized loans to banks when banks have liquidity issues.⁹² The proceeds of the loans are used by banks to meet cash demands and address liquidity transformation mismatches which reduces liquidity pressures and stops economic distress snowballing into financial distress and ultimately insolvency.⁹³ LOLR thus allows a bank to shift its illiquid assets to a third party in exchange for liquid assets (such as gilts or central bank reserves).⁹⁴

The LOLR scheme allows a bank to obtain liquidity from a wider range of assets, and allows for banks to use highly rated loans as collateral to obtain cash and therefore liquidity from third

⁹² Awrey & Van Zwieten, *supra* note 1 at 795.

⁹³ Armour et al., *supra* note 5 at 324-325.

⁹⁴ *Ibid.*

parties and it thus gives banks an alternative way in which to counter the risk of liquidity transformation mismatches caused by withdrawals of short-term funding.⁹⁵ In order to be feasible, the third-party providing liquidity in times of stress must be an institution that sits outside of the private markets, in terms of which central banks are the obvious choice.⁹⁶

A challenge with LOLR is that unconditional ex-post support while eliminating run externalities, creates a funding subsidy for banks, which in turn, can create ‘too big to fail’ entities, and defeating policy goals. In this view, the access to central bank funds allows banks to take risks beyond the normal standards on the basis that emergency liquidity provided by the central bank will bail them out.⁹⁷ This is also a moral hazard problem. It is so because the bank will benefit from a lower cost of financing, which will increase its profitability.⁹⁸ It has been suggested that to reduce the funding subsidy, the ex-post support should be conditional, and that the central bank’s exercise of its lending powers should be rule-based and that the central bank should lend only against prescribed forms of high quality collateral.⁹⁹

Furthermore, advancing this type of support to banks is not guaranteed as it is a discretionary decision on the part of a central bank whether or not to extend this type of support. This decision is taken on the basis of the preservation of financial stability as opposed to the need of the particular bank.¹⁰⁰ Thus, LOLR is not full proof as it is not guaranteed.

In addition, access to LOLR schemes results in stigma, that is, banks will be viewed negatively by the market as they may be assessed by the market as posing a solvency risk.¹⁰¹ An example of this is when knowledge of Northern Rock’s use of LOLR triggered a retail run on the bank in 2007.¹⁰² This has been addressed in the UK, with Article 17.5 of the Market Abuse Regulations which provide that in the public interest, in order to “preserve the stability of the financial system” financial institutions may be exempted from disclosing price-sensitive information. The use of LOLR by banks may also result in regulatory and political scrutiny of the bank which adds a political risk factor for consideration.¹⁰³ Diagram Six illustrates the basic operation of LOLR.

⁹⁵ Armour et al., *supra* note 5 at 324.

⁹⁶ *Ibid.* at 325.

⁹⁷ *Ibid.* at 330.

⁹⁸ Morgan Ricks, “A Regulatory Design for Monetary Stability” (2013) 65:5 Vanderbilt Law Review 1287 at 1332.

⁹⁹ *Ibid.* At 1334.

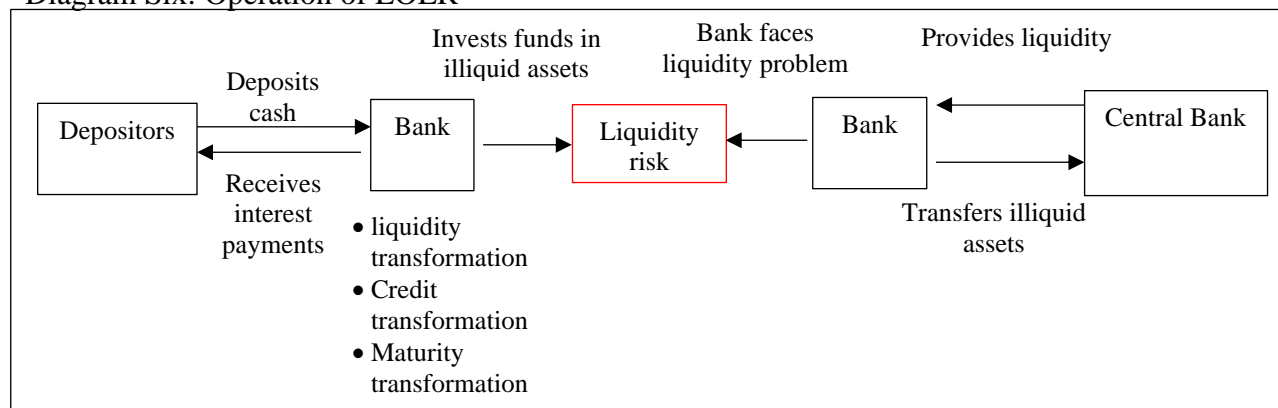
¹⁰⁰ Armour et al., *supra* note 5 at 325.; Paul Davies, “Liquidity Safety Nets for Banks” (2013) 13:2 J. Corp. L. Stud. at 297, states that, for the Bank of England, there is no right for the banks to receive LOLR facilities, in addition, the collateral that is acceptable to banks is limited.

¹⁰¹ Armour et al., *supra* note 5 at 329.

¹⁰² Davies, *supra* note 100 at 305.; Armour et al., *supra* note 5 at 316, which state that it was funding illiquidity, that is economic distress rather than financial distress that was the dominant risk for banks. The economic distress turned into financial distress as the liquidity challenges could not be met.

¹⁰³ *Ibid.* at 305.

Diagram Six: Operation of LOLR



We shall now consider the application of LOLR facilities to mobile money.

(b) Application to Mobile Money

In this regard, the government (usually through its central bank) gives cash to a MM firm¹⁰⁴ with liquidity problems (in exchange for its highly rated liquid assets facing market illiquidity),¹⁰⁵ enabling it to continue operating.¹⁰⁶ This tool may however be purely discretionary.¹⁰⁷ And it is the MM firm directly and not the customers who receive the LOLR support.¹⁰⁸ However, customers' funds are indirectly protected since the MM firm is prevented from failing.

The illiquid MM firm will be able to transfer some of its (now) highly rated illiquid assets to a third party, in this case the central bank, in exchange for liquid assets. An example of such highly rated illiquid asset could be government bonds held by the MM firm as part of its MM investment portfolio. However, the usefulness of a LOLR mechanism will depend on the amount of high-quality collateral a MM firm possesses compared to its liquidity demands. Thus, MM firms which have invested a larger portion of their MM portfolio in lower rated assets including company bonds with significantly low credit ratings are likely to find it more difficult to access the LOLR support.

¹⁰⁴ Applying LOLR to mobile money is unusual, as most jurisdictions usually apply LOLR to banks. However, policymakers may consider LOLR as a viable option for rescuing large illiquid MM firms. The decision to apply LOLR should be made on a case-by-case basis and weighed against the costs. For example, it may be useful to implement this tool where the stability of the financial system is threatened.

¹⁰⁵ This could include state-backed marketable securities held by MM firms such as government bonds.

¹⁰⁶ Usually, banks use the proceeds of loans to meet cash demands and address liquidity problems they may have. In exchange for these state-backed loans, the central bank usually receives the market illiquid assets (i.e., assets which cannot be easily converted to cash) of the bank as collateral for the loans Awrey & Van Zwieten, *supra* note 1 at 795.

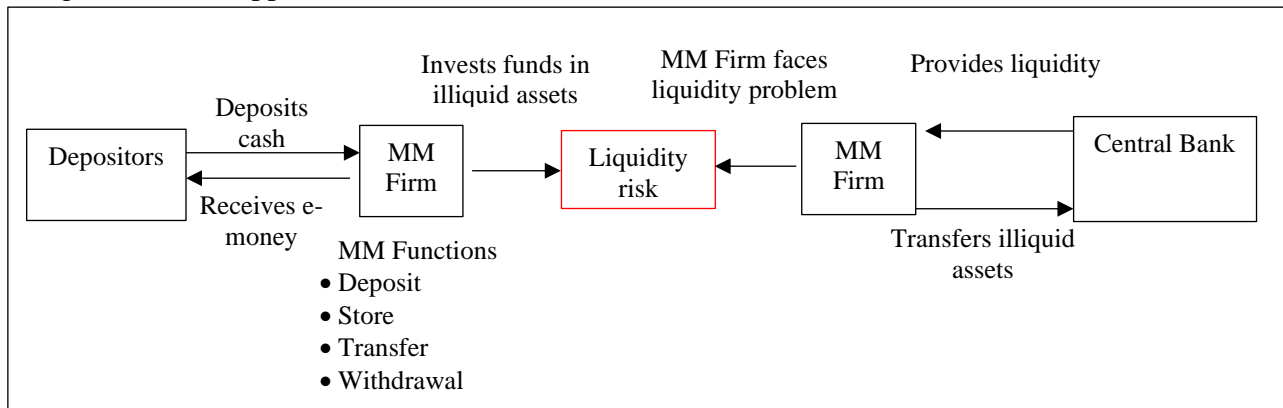
¹⁰⁷ As a fundamental principle, central bank liquidity support should only go to a solvent entity to avoid sustaining 'zombie' companies. And public disclosure of the recipients may be required, to produce just the right amount of stigma that discourages firms from seeking LOLR support. See Armour et al., *supra* note 5 at 332.

¹⁰⁸ There is an argument that on the basis of financial stability, all systemically impotent institutions should have access to the central bank's liquidity arrangement, and such an argument is a counterpoint to the subjection of some non-banks to capital requirements, see Armour et al., *supra* note 5 at 331. Some of the general schemes designed by the Fed during the crisis were designed to provide liquidity support to non-banks (e.g., the Term Securities Lending Facility scheme by the Federal Reserve in 2008, was open to a number of brokers/dealers who were not traditional banks). Further, the Fed still has authority under the US *Dodd-Frank Act*, 2010 to develop general schemes which apply to non-banks: see s. 716(b). Also, the Bank of England's "Red Book" explicitly contemplates a role for the Bank as 'market maker of last resort'.

Applying LOLR facilities to MM firms in economic distress operates in much the same way as deposit insurance. MM firms will also benefit from a lower cost of financing which will increase the profitability of the firms and perhaps exacerbate the moral hazard problems. The discretionary nature of LOLR could serve as a buffer, however, the discretionary nature of the provision of LOLR will have to be explicit and credible. In addition, the discretionary nature of providing LOLR facilities by central banks (which are regulatory bodies) could result in MM operating like licenced banks, which could potentially have negative effects on innovation that MM is known for.¹⁰⁹

It is important to note that unlike deposit insurance schemes discussed in Section Two earlier, LOLR facilities aim to insure the MM firm directly and not the customers. Thus, like with banks,¹¹⁰ the assurance in this case is also provided to the solvent (but illiquid) MM firm that it will retain liquidity in a crisis. The result is that MM customers will be able to retrieve their stored funds on demand or transfer them as the MM service will be uninterrupted. Diagram Seven below illustrates its application to mobile money. Table Four depicts the application of LOLR to mobile money.

Diagram Seven: Application of LOLR to MM



The table below outlines the benefits and costs of LOLR to mobile money.

Table Four: Benefits and costs of LOLR to MM

Benefits	Costs
MM firms will be provided relief for economic distress which will prevent insolvency.	Moral hazard due to LOLR facility being a subsidy, which may increase risk taking by MM firms.
Will prevent instability in MM.	The discretionary nature of the provision of LOLR facilities by central banks transforms the nature of MM to a regulated entity.
	MM firms may not possess sufficient high-quality collateral.

¹⁰⁹ Segal-Knowles, *supra* note 31 at 5: It is stated that the innovation in payments makes payments less “costly and cumbersome.”

¹¹⁰ Armour et al., *supra* note 5 at 332.

6. CONCLUSION

Liquidity-crisis management tools can protect customers' funds by addressing liquidity problems in MM firms. We may assume that one or more of deposit insurance, pass through deposit insurance and/or lender of last resort are automatically useful additions to the toolkit of a policymaker seeking to regulate mobile money. However, each comes with important benefits and costs and policymakers need to understand them in order to design and implement the tool most appropriate for their jurisdictions.

The three-step approach that a policymaker should consider is first, to consider whether policy goals in her jurisdiction *justify* the use of ex post liquidity tools. Financial inclusion, consumer protection and financial stability may serve as such justifications. Second, identify existing and/or potential liquidity-crisis management tools that advance these policy goals. And third, consider the benefits and cost of using these tools.

In addition, as the Alliance for Financial Inclusion (2020) suggests, there is a need to have education initiatives for consumers in order to create awareness of the existence of liquidity-crisis management tools in order to ensure that MM customers are aware of the protections provided.¹¹¹ This awareness will result in MM customers not acting 'rationally' when a MM firm is in distress by immediately and simultaneously demanding their funds. This will form part of the broader regulatory toolkit available to policymakers in order to reinforce trust and confidence in MM systems.

¹¹¹ Alliance for Financial Inclusion, Issues Paper (2020) at 20.